December 2022, Vol. 10, No. 2
ISSN 2163-758X

Tackling the Insufficient Food Supply in the Sufficient Chinese Hot-Pot Chain Restaurant Industry - A Summer Project

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Abstract

Purchasing is widely acknowledged as a critical factor for business survival and success. This study uncovers the traditional purchasing model that affects the cost of vegetables and eventually food quality, based on our summer field research on Chinese hot pot restaurants. Seventeen retail branches were studied, and we propose an innovative procurement model to reduce the total cost of purchasing vegetables. In the new procurement model, vegetables shall be transported from the vegetable base to the central processing plant for cost-down measures by centralized processing and cleaning. Compared to the traditional method, the innovative purchasing approach integrates upstream supplying resources and standardizes vegetable processing, contributing to cost reduction in vegetables and processing. In the research, the group collected data about food sales, prices from suppliers, and related processing to calculate aggregate procurement costs containing vegetables, delivery, and processing costs. The calculation indicates that the new method produces an additional 21,102 Chinese RMB in vegetable and delivery costs. However, it removes the need for a vegetable cleaner in each outlet, which could save more than 70,000 Chinese RMB. Therefore, we verified such an assumption with qualitative interviews with the managers of hot-pot chain restaurants and found that the actual saving can be around 53,356 Chinese RMB. In addition, the standardization and quality control of dishes and fuller utilization of staff have been overlooked in prior daily operation management. Finally, the proposed new procurement model can also be applied to global hot pot restaurants.

Key words: purchasing, procurement model, saving

Introduction

The food industry is fragmented, highly regulated, and increasingly complex due to globalization (Pullman and Wu, 2021). In particular, because of the rise of E-commerce, the correlation between market activities and geographic environment moderates, and food control, including cost and quality management, becomes arduous compared with past times. Aktas and Bourlakis (2020) asserted that food supply chains are crucial to satisfying community needs and underpin environmental sustainability. Nowadays, approaches for more sustainable and circular food supply chains are also eagerly sought. However, the food supply chain has been hit hard by the COVID-19 pandemic, which reinforces the requirement to improve the food supply chain to support business development. The entire agri-food sector needs more attention in the context of the pandemic, as online work cannot be implemented (Sid et al., 2021).

Literature review

December 2022, Vol. 10, No. 2
ISSN 2163-758X

According to the literature, Short Food Supply Chain is an emerging sustainable supply chain experiment that eliminates the intermediaries in complex supply chains and facilitates direct connections between farmers and end consumers (Weerabahu, Malaarachchi, and Samaranayake, 2021), thus as a promising sustainable alternative to industrial agricultural food supply systems (Wang et al., 2022). Lengthy supply chains generate high food prices in circulation, resulting in high rates of food waste (Lan and Wang, 2013). Moreover, the researchers suggest that direct agricultural supply is a feasible and innovative way to reduce the additional costs and loss of food supplies (Shi et al., 2011). Upon further inspection, it is founded that short supply chains are also applicable to the Chinese environment. Additionally, owing to the current slightly chaotic situation in the food industry, the catering industry also urgently needs to innovate and improve the food supply chain. Finding innovative methods to produce, distribute and consume food is a moral, financial, and environmental necessity (Cagliano, Caniato, and Worley, 2016).

Case Description

The focused company is the “Chen-Ji-Shun-He (CJSH) beef hot pot”, which has 17 chain stores, mainly in Jiangsu (corporate website http://www.gzcjsh.com). Its advantages are good service, high-quality dishes, and a self-developed digital system that predicts demand for dishes, which helps them be in the lead. However, it still has some pain points that impede development and expansion. According to field research, the group identified the problem in procurement. The problem is that the traditional procurement method influences the quality of vegetables and costs. Traditional hotpot restaurants use regional distributors to supply vegetables. It has several negative impacts. Lan and Wang (2013) support that because the supply chain has many levels, the price of vegetables in the circulation link increases, and the attrition rate increases. In addition, decentralized suppliers may result in the uneven quality of vegetables among outlets. These pain points squeeze the profit margins and influence the standardization of dishes.

The Aims and Objectives

Focused on pain points, there are two directions of research to solve them: reducing procurement costs and improving quality control and employee utilization.

Research Design

The research subjects are small and medium-sized Chaoshan fresh beef hotpot chain stores with 17 outlets. The group mainly collected data from three stakeholders: hotpot restaurants, processing plants, and farms, including the number of vegetables needed, selling prices, and transportation costs.

Table 1: Interviews of different stakeholders

Field	Respondent	Business	Position	Business Size (Number of branches)

December 2022, Vol. 10, No. 2
ISSN 2163-758X

Hot Pot Restaurants	Beibei Li	CJSH Beef Hot Pot	Project manager	17
Processing plants	Shubiao Chen	Suzhou youmile Food Co., Ltd	Manager	11
Farms	Lv Qing	Ougennik (Kunshan) Agricultural Technology Co., Ltd.	Manager	1
Farms	Yangyang Zhao	Yangyang Farm	Manager	1
Farms	Guishen Zeng	Xiao Zeng Agricultural Department store	Manager	1
Farms	Fengwei Chen	Shanghai Qing Agricultural Department store	Manager	1

Source: Compiled by the Authors.

The purpose of the interview is to collect data to validate whether our assumptions are correct. The interview method is one-on-one semi-structured interviews. Interview transcripts are in Appendix A. The group applies the qualitative research method, which includes observation and interviews. There are three reasons for qualitative research. First, it is difficult to obtain hot pot restaurant operation data for quantitative analysis. Second, the interactive method has a flexible structure, where the group can follow up on the answers given by the respondents in real time (Rahman, 2016). Finally, the group can have in-depth conversations with interviewees to gain more industry insights. In addition to the first-hand data obtained from observation and interviews, the group also gets second-hand data by searching industry reports.

Data Collection

Through interviews, the group obtained the vegetable sales proportion of the CJSH hotpot restaurant in June 2021 (see Figure 1). Because the proportion of baby cabbages, potatoes, and lettuces account for the majority of the total sales, the research focuses on them.

To compare different methods in Figure 2 and Figure 3, the group calculates costs respectively. Cost calculation consists of vegetable cost, transportation cost, and processing cost. Detailed data is shown as follows.

December 2022, Vol. 10, No. 2
ISSN 2163-758X

Figure 1. Sales proportion of different kinds of vegetables in June

Table 2: One day in June's demand of 17 outlets of 3 kinds of vegetable

Vegetable type	Sales (portion)	Weight per portion (gram)	June's demand quantity (Half a kilo) (Demand quantity per day * 30)
Lettuce	3619	180	1448
Potato	4729	240	2522
Baby cabbage	9729	200	4324

Ps: Wastage exists and is accounted as 10%; June's demand quantity = (portions sold per day * 30 / 0.9) *weight of portion / 500

Table 3: The average vegetable price from the supplier of June

Vegetable type	Price (CNY) per half kilo
Lettuce	2.68
Potato	1.85
Baby cabbage	4.93

December 2022, Vol. 10, No. 2
ISSN 2163-758X

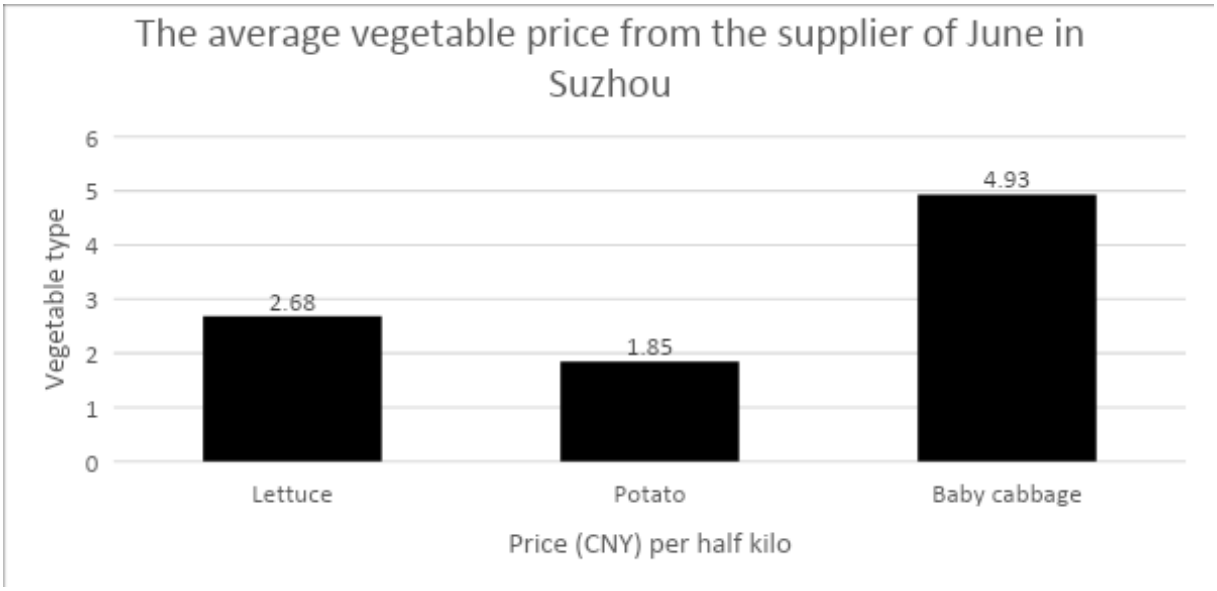


Table 4: The vegetable price from a farm in Suzhou

A farm in Suzhou	Unit price (CNY/half a kilo)
Lettuce	1.5
Potato	1.4
Baby cabbage	1

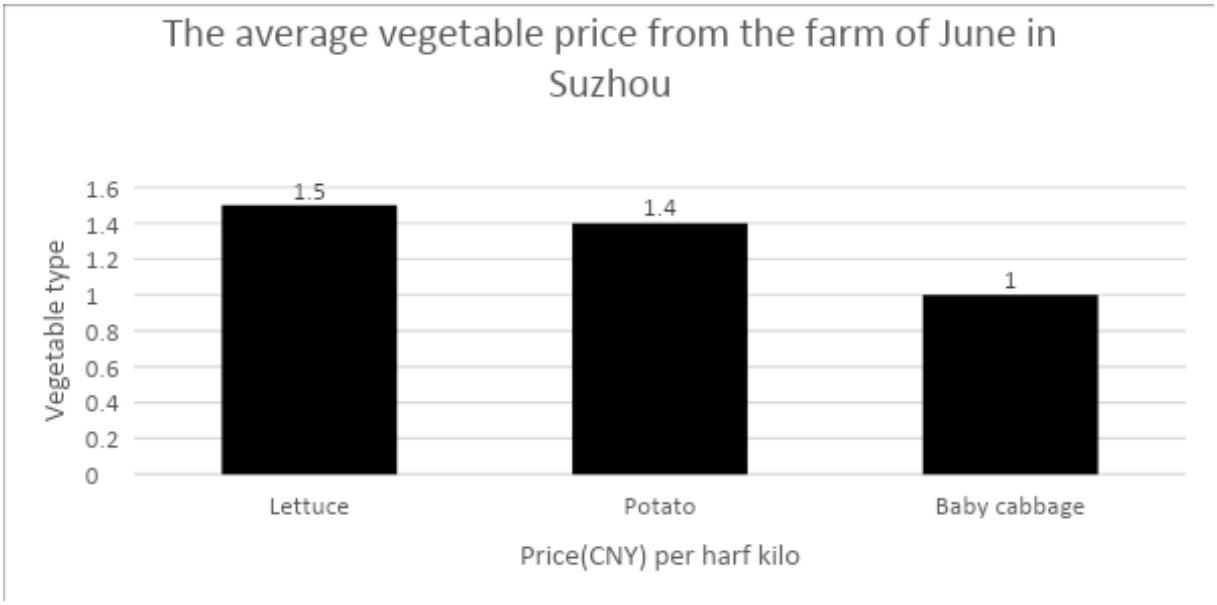


Table 5: Processing costs of two schemes

December 2022, Vol. 10, No. 2
ISSN 2163-758X

Processing type	Cost	Number
By labor	4500 per worker (monthly)	1 worker every store
By machine	24500 yuan per year	1

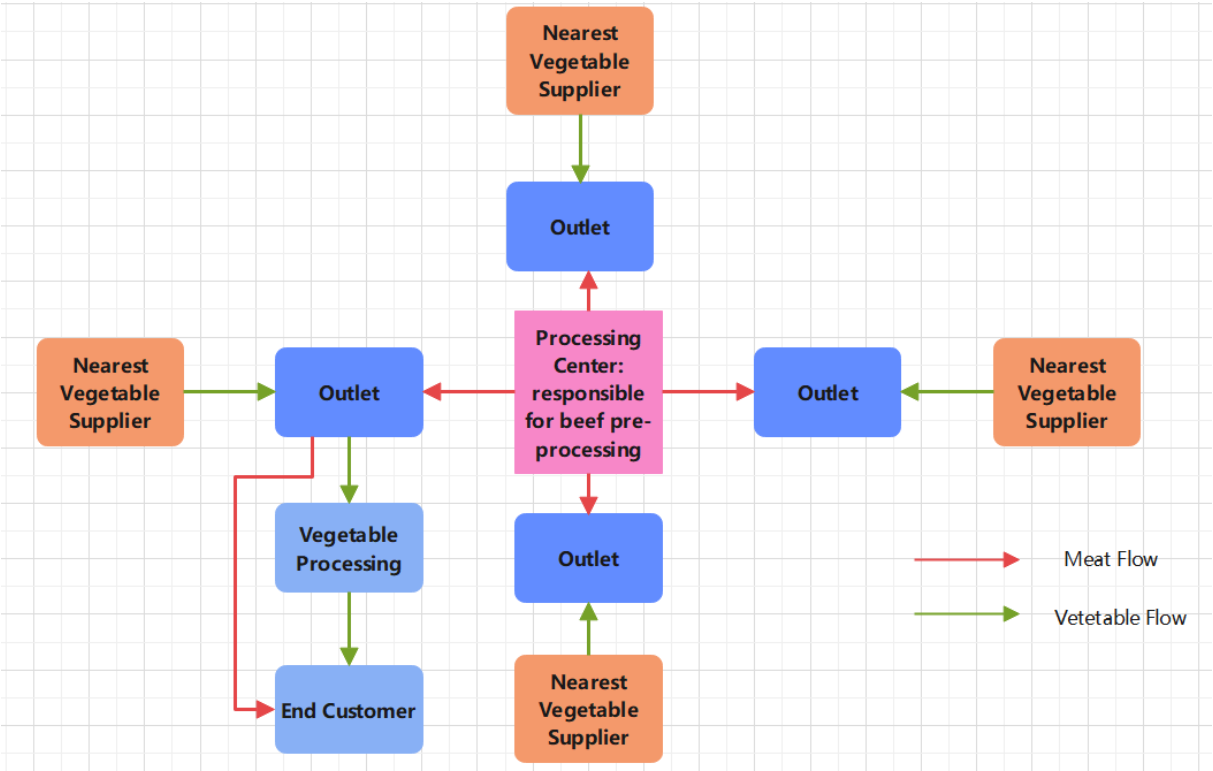
Table 6: Transportation costs of new schemes

Type	Cost
From vegetable base to processing center	400 per day
From processing center to stores	3.5 yuan per half kilo

Data Analysis

Traditional scheme

The traditional way of purchasing vegetables, shown in Figure 2, is that each outlet has its specific supplier. The suppliers would deliver the vegetables each day without charging an extra transportation fee as it is inherently contained in the vegetable price. Moreover, traditionally, the vegetables are processed manually by an employee at each outlet. Based on these, the fee of the traditional purchasing method per month is calculated in Table 7.



December 2022, Vol. 10, No. 2
ISSN 2163-758X

Figure 2: Traditional scheme

Table 7: Total cost of the traditional method in June

Vegetable	Unit Price	Demand Quantity for June (0.5kg)	Total Price (CNY)
Lettuce	2.68	1,448	3,881
Potato	1.85	2,522	4,666
Baby cabbage	4.93	4,324	21,317
Aggregate			29,864
Processing Cost	Unit Price (CNY/outlet)	Number of Outlets	Total Price (CNY)
Labor	4,500	17	4500*17=76,500
Total Cost (CNY)			106,364

The proposed scheme

The new purchasing scheme designed by the team (Figure 3) is that the company would purchase vegetables directly from vegetable bases like farms and cut the middle supplier from making profits. The original centralized beef processing center will be equipped with a vegetable washing machine. The washed, cut, and selected vegetables would be sent to each outlet together with the beef, which reduces the time and labor cost of processing vegetables in the outlet. The cost of the new scheme is shown in Table 8.

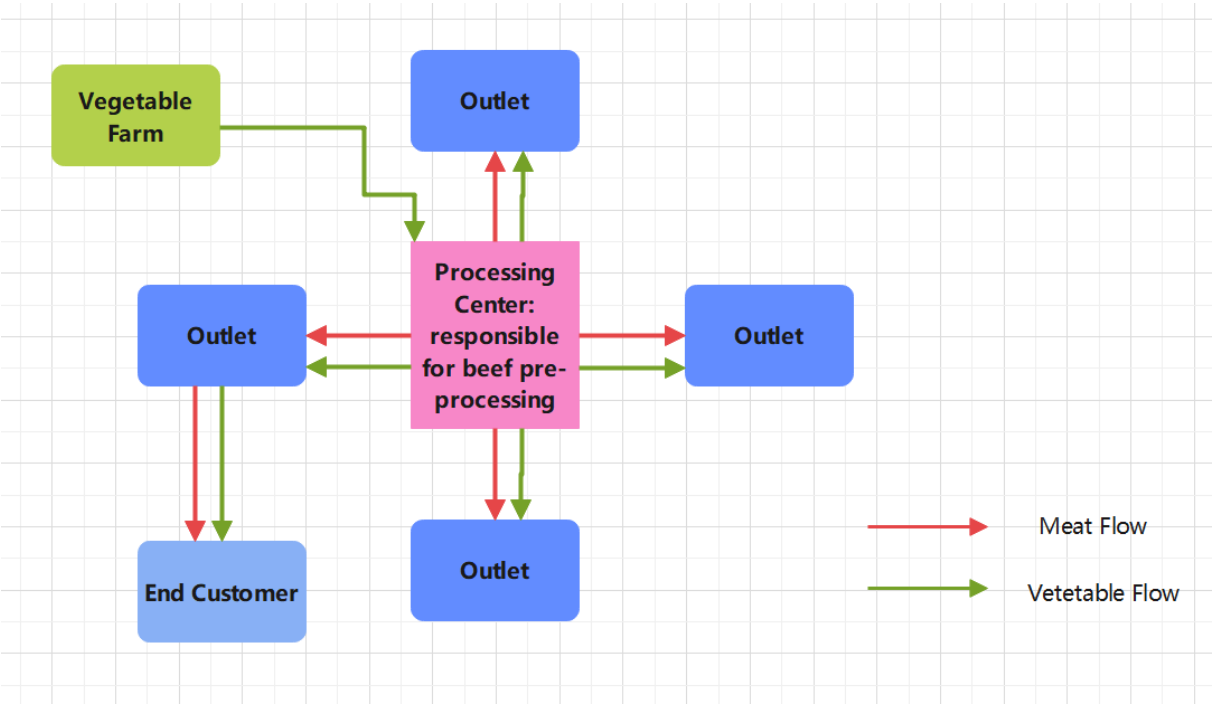


Figure 3: The new scheme

Table 8: Total cost of the proposed method in June

December 2022, Vol. 10, No. 2
ISSN 2163-758X

Vegetable	Unit Price (CNY/0.5kg)	Demand Quantity for June (0.5kg)	Total Price (CNY)
Lettuce	1.5	1,448	2,083
Potato	1.4	2,522	3,530
Baby cabbage	1	4,324	4,324
Aggregate			21,937
Transportation	Unit Price	Quantity for June	Total Price (CNY)
Delivery Fee (from vegetable base to processing center)	400 (CNY/Day)	30 (Day)	400*30=12000
Delivery Fee (from processing center to 17 outlets)	3.5 (CNY/0.5kg)	1448+2522+4324=8294 (0.5kg)	3.5*8294=29029
Processing Cost	Annual Cost (CNY)	Monthly Cost (CNY)	Total Price (CNY)
Machine	24,500	24500/12	2,042
Total Cost (CNY)			65,008

Comparison

In comparison, the proposed method can save 53,356 CNY in total cost (Figure 4). Specifically, in the new scheme, thanks to the vegetable machine, the processing cost can be reduced by around 74,459 CNY, and the purchasing cost can be saved by 7,927 CNY because of the cut middle supplier. However, the new scheme can generate transportation costs because the middle supplier and the vegetable farm's pricing methods differ. Overall, the main contributor to the cost reduction is employee costs.

December 2022, Vol. 10, No. 2
ISSN 2163-758X

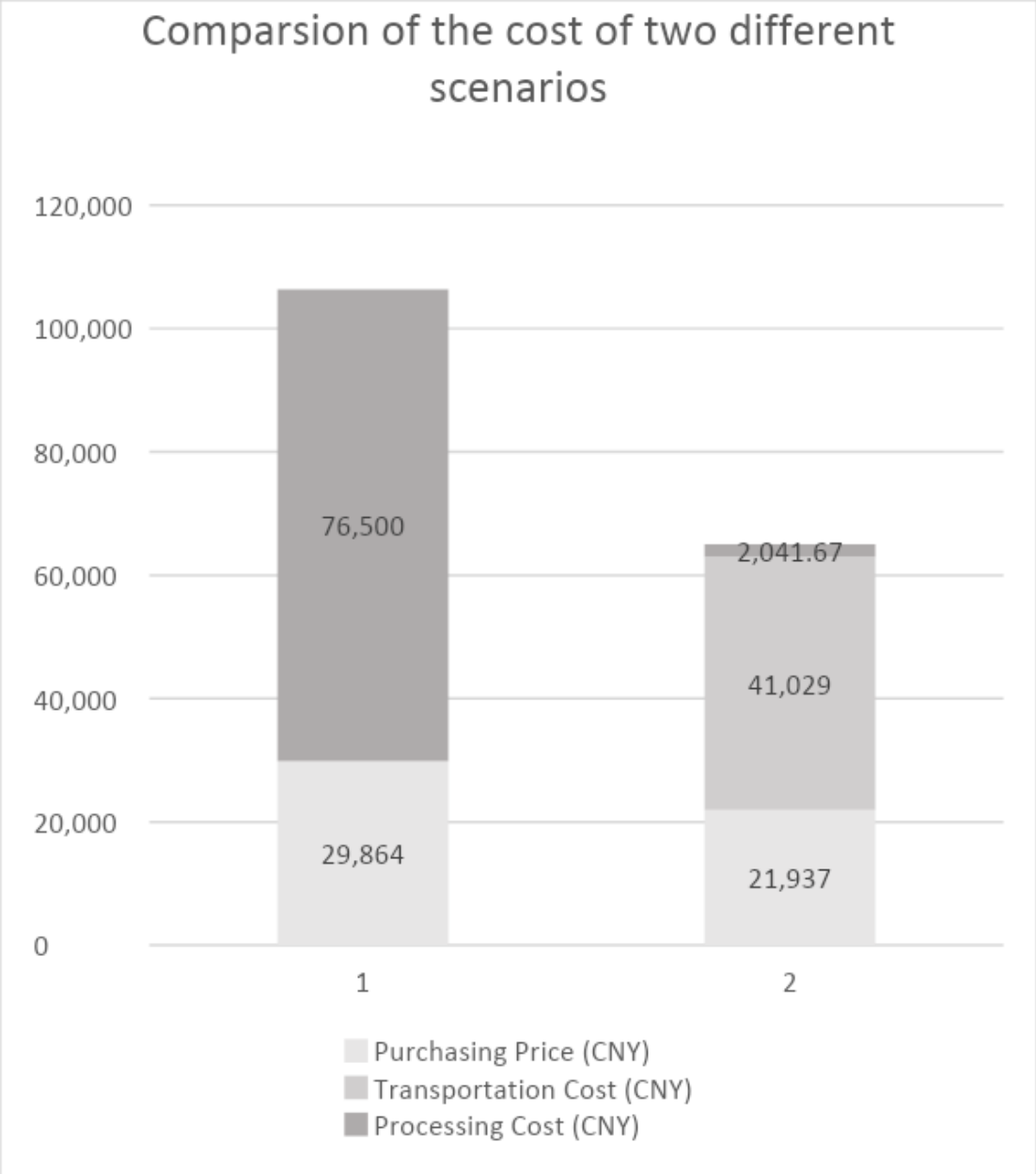


Figure 4: Comparison of the cost of two different scenarios

Implication

This study mainly identifies three implications for researchers and small and medium-sized chain restaurant managers in achieving a sustainable food supply chain. Firstly, the research verifies possible cost reduction in raw materials and labor by shortening the food supply chain in the catering industry. Compared with CJSH's traditional logistic plan, the overall cost of the proposed method would decrease by 53,000 CNY. The main contributor to this reduction is the decrease in labor costs through replacing the manual labor in each outlet with the vegetable processing machine in the processing center. In the global catering industry, raw material cost accounts for 60% of the total cost, and personnel cost is predicted to rise with the growing salaries of positions like

December 2022, Vol. 10, No. 2
ISSN 2163-758X

the chef and the waiter (Grand View Research, 2021). The utilization of the central processing center and direct purchase from farms provide a direction for reducing raw material and labor costs for small and medium-sized chain restaurants worldwide. The proposed scheme could be implemented in small and medium-sized restaurant chains in other countries in Asia having similar eating habits and cultures.

Secondly, this method can increase restaurant operation standardization through several cooperative initiatives. In chain hot pot restaurants, one of the qualifications emphasized most by managers is standard vegetables with high quality in each outlet. In the traditional method, each store is supplied by its nearest supplier, whose vegetable quality is unlikely to be controlled the same. However, in the research method, the quality could be standardized by purchasing the same bulk of vegetables and then distributing the processed vegetable to different outlets. There are also opportunities for restaurants to build long-term cooperative relationships with farms to improve the stability of the supply chain (Monczka et al., 2016).

Thirdly, the research method also brings environmental benefits. The main principle of the proposed method is to reduce suppliers by centrally purchasing in bulk. The reduced purchasing process also implies reduced transportation distance and CO2 emissions. CO2 emission is also a global issue highlighted by many scholars. Although CO2 emissions from global transportation declined by 10% in 2020 compared to 2019, it is rebounding and will continue to rise after 2021 (Iea, 2022). With the expected growth of carbon emissions damaging the environment, the new procurement scheme advocates for shortening transport distance by reducing layers of food supply and dispersed transportation, which is beneficial to decreasing energy consumption and emissions. Therefore, the research provides possible approaches for enterprises to alleviate negative environmental impacts.

Research Limitations

Prior to our group's research, limited research had been done on vegetable availability in hotpot restaurants, and there may be a lack of appropriate data models to support this study.

Data limitations also exist. The primary data comprising this model's vegetable prices, transportation, processing, and labor costs were collected mainly within the Suzhou region. These prices vary across regions in China. Additionally, the impact of time was not considered in data collection. Transport prices are affected by different seasons and weather conditions (Cassady, Jetter and Culp, 2007). Labor costs also rise in winter (Fink, Jack and Masiye, 2020). The models in the data may fluctuate accordingly, and fluctuations are ignored in this study.

Finally, the location of the processing plant is fixed in this model, which means that the corresponding transport costs are also fixed in the calculations. If the conclusions are to be applied to most hotpot restaurants in China in the future, more data will be required to support them.

December 2022, Vol. 10, No. 2
ISSN 2163-758X

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December 2022, Vol. 10, No. 2
ISSN 2163-758X

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Appendix

Appendix A Hotpot restaurants interview

Q : Are your suppliers scattered?

A : Yes, by region. At present, each region has a fixed vegetable supplier, but it does not rule out changing into a unified procurement and distribution model after the establishment of our supply chain system in the future.

Q : Is the vegetable center a centralized processing place for vegetables?

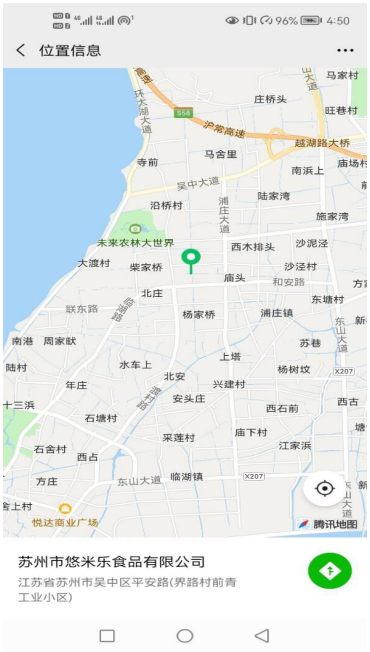
A : Yes, the purchased vegetables will be processed, including washing, picking, cutting and plastic packaging, and then sent to the store, the store can directly produce. This allows for highly uniform standardization.

Q : Is your company going to build its own vegetable center?

A : Later construction may be carried out in the factory you visited last time, but this is not the company's plan in the short term.

Q : Where is the specific location of the factory we visited before? We want to investigate the cost of self-dispatch transportation.

A :

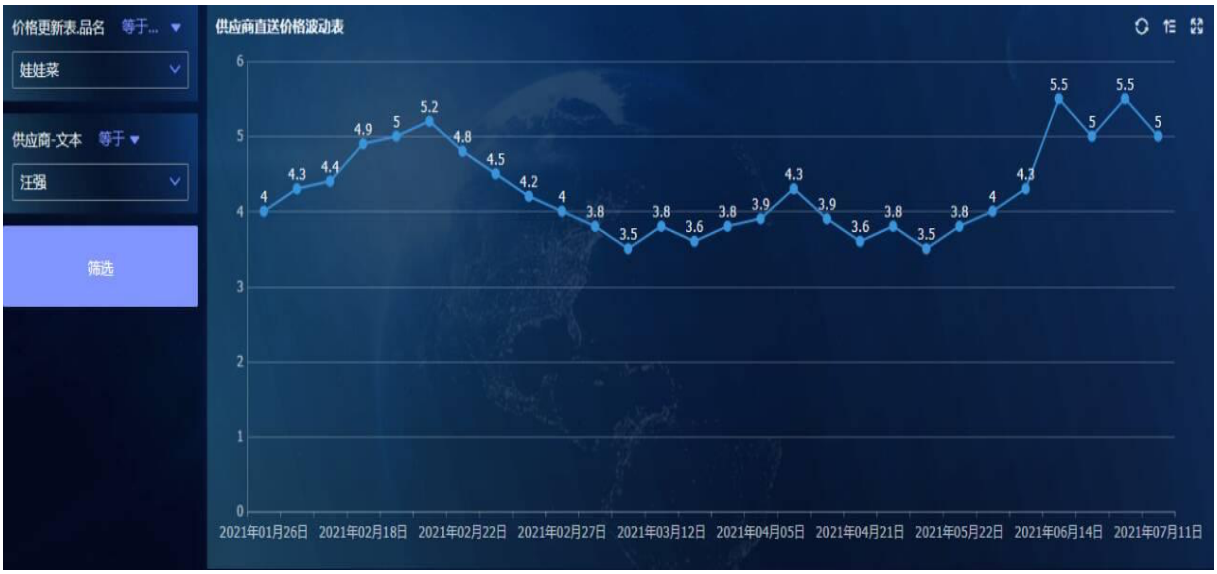


Suzhou Youmele Food Company Limited
Location: Pingan Road, Haozhong District, Suzhou City, Jiangsu Province (From Tencent map)

December 2022, Vol. 10, No. 2
ISSN 2163-758X

Q : What about the price of vegetables?

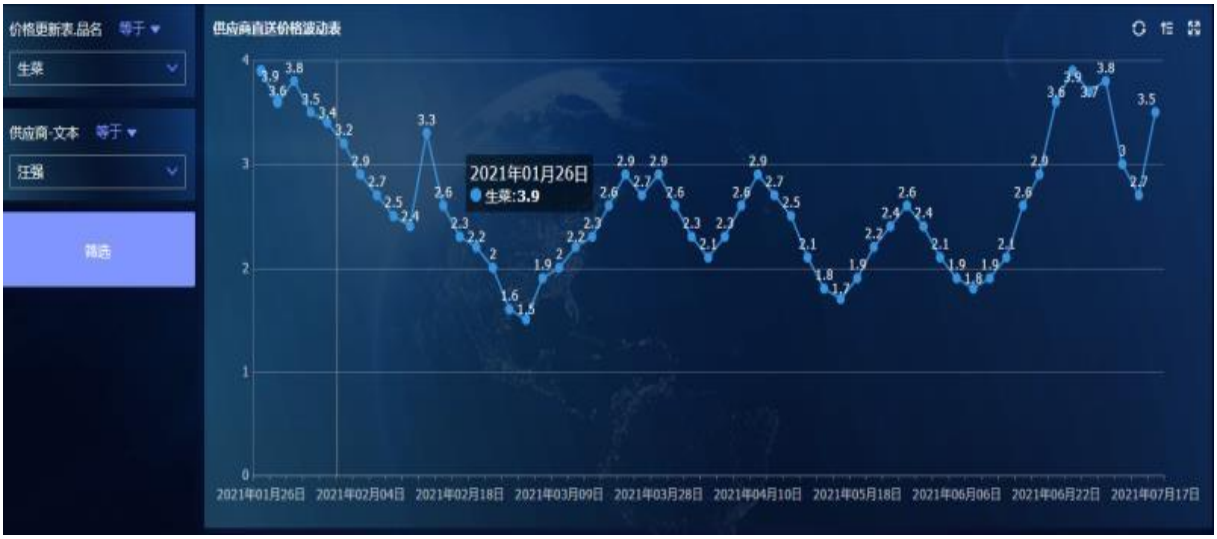
A : Price fluctuation table for supplier direct delivery of baby vegetables.



Price fluctuation table for supplier direct delivery of potatoes.

Price fluctuation table for supplier direct delivery of lettuce.

December 2022, Vol. 10, No. 2
ISSN 2163-758X



A : The price of vegetables varies with the seasons and there are grades of vegetables. We will require suppliers to provide us with the best quality products, so the unit price may be higher than your survey data.

Q : What is the price of the supplier?

A : Quotes from different suppliers on vegetables

蔬菜供应商价格对比表 2/3

供应商 Suppliers			Xiang Peng 副翔	Qiang Wang 汪强	Keke Cao 曹可可	Siyu Qi 齐思雨	Zhikai Zhang 张志开	Xiuxia Li 李修侠	Xianguo Tang 汤先国	Summary 汇总
品项编号	品名 Vegetables	单位 unit	明细表.单价 price per unit	明细表.单价 price per unit	明细表.单价 price per unit	明细表.单价 price per unit	明细表.单价 price per unit	明细表.单价 price per unit	明细表.单价 price per unit	明细表.单价 price per unit
010001	生菜 lettuce	斤 1/2 kilogram	3.30	3.50	3.00	3.00	3.00	3.00	-	3.13
010002	蓬蒿菜 Chrysanthemum greens	斤	8.00	9.50	6.00	8.50	6.50	7.50	-	7.67
010003	菠菜 spinach	斤	5.70	5.90	6.00	6.00	4.50	5.50	-	5.60
010004	香菜 coriander	斤	13.00	14.50	11.00	12.50	7.50	10.00	-	11.42
010005	芹菜 celery	斤	3.00	3.00	2.80	3.00	3.00	3.00	-	2.97
010006	小葱 shallot	斤	3.00	3.50	3.00	2.80	3.80	2.80	-	3.15
010007	广东菜心 choy sum	斤	3.50	3.20	5.00	5.00	4.50	2.80	-	4.00
010008	金针菇 Flammulina velutipes	斤	3.00	2.60	2.50	3.50	2.20	3.00	-	2.80
010009	杏鲍菇 pleurotus eryngii	斤	3.50	3.60	3.60	4.00	3.60	3.50	-	3.63
010010	海鲜菇 Hypsizygus marmoreus	斤	3.50	3.60	4.50	4.50	3.86	4.50	-	4.08
010011	香菇 shii-take	斤	9.00	10.00	10.00	9.50	8.00	9.50	-	9.33
010012	大葱 Allium fistulosum	斤	2.20	2.90	2.50	2.30	3.00	2.20	-	2.52
010013	老姜 ginger	斤	4.80	4.90	4.80	5.50	5.00	5.00	-	5.00

A : This one is a horizontal comparison of prices between our suppliers. After referring to the prices, we'll negotiate with the suppliers.

Q : Well, thank you for taking time out of your busy schedule to interview us.

A : You're welcome.

Farms interview

Q: Can you introduce the supply processes from farm to restaurant?

A: The process is normally as follows.

December 2022, Vol. 10, No. 2
ISSN 2163-758X

Vegetable bases ---- Jiangqiao vegetable Cargo Center ------ Wholesale markets in Shanghai ---- clients
Generally they directly purchase. Especially, the restaurant could also negotiate the transportation fee.
Q: If we want to reduce supply process of the vegetable supply chain, which level of supplier do you suggest we choose?
A: You can investigate vegetable bases, and the quality is medium to above. The price is lower. But some green organic farms have higher prices.
Q: Is daily delivery possible?
A: Of course, the requirement is daily delivery.
Q: The quality of the food is usually the same as the dealer's ?
A: Pretty much the same.
Q: Should the price be based on its daily market price or fixed daily price based on the average price, if the restaurant has a long term corporation with it?
A: Long-term cooperation can be discussed, this is a very detailed thing, because the price fluctuates every day, so for example, the restaurant will talk about a relative price for long-term cooperation. In a general contract, one is to determine the price, and the other is to avoid the price risk in case of special circumstances.

Processing factory interview
Q: I would like to ask if there is a vegetable cleaning machine in your factory.
A: No, manual cleaning.
Q: Do you know the price of the vegetable cleaning machine on the market now?
A: We don't use a lot of vegetables right now, so we haven't gotten to know the price yet.
Q: We are currently doing research, the goal is to reduce the cost of vegetables in hot pot restaurants, and we have come up with a plan to transport the vegetables to you in a unified manner for cleaning, and then distribute them to each hot pot restaurant. Do you think this plan is feasible?
A: Yes. Now there are some special vegetable companies, they can help clean the vegetables and deliver them uniformly. Restaurants can directly purchase clean vegetables, ship them to various restaurants, and the restaurant could just simply clean the vegetables. However, clean vegetables will cost a lot. Now this industry is very competitive, and the price has been compressed quite a lot. Similarly, the cost of processing clean vegetables in a food factory will also increase, but you can investigate the specific price space to see if it is worthwhile to carry out unified cleaning in the processing plant.

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December 2022, Vol. 10, No. 2
ISSN 2163-758X

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