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# Application of Supply Chain Operations Reference Model (Scor) Among Small and Medium-Sized Fresh Food Enterprises in Guangdong Province: An Input to Similar Industry Benchmarking

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**Abstract:** The dissertation proposal assesses the SCOR model's application in Guangdong Province's fresh food e-commerce sector using a mixed-method approach with data from 420 SMEs. It aims to analyze supply chain management efficiency across key dimensions like planning, procurement, production, distribution, and returns.The study reveals that SMEs are generally satisfied with their supply chain management, despite a surprising finding that supply chain efficiency is universal and balanced among SMEs, regardless of size or financial performance. This challenges the common belief that efficiency is directly linked to business size or financials.The research offers recommendations for stakeholders, including policymakers and managers, to improve supply chain maturity and efficiency. It aims to contribute to a deeper understanding of supply chain practices and inspire further exploration of optimization strategies in the fresh food e-commerce sector in Guangdong and other regions.

**Keywords:** Sustainable development, Environmental business practices, Small and medium enterprises (SMEs), Guangdong Province, Green industrial development.

## 1. Background of the Study

With the unceasing penetration of the Internet, coupled with the impetus of the COVID-19 pandemic, residents' online consumption habits are gradually deepening, and fresh products have become a new hot spot for e-commerce development (Ye et al., 2020). Moreover, online fresh consumers span across multiple age groups, and even the elders responsible for meals in the family have learned how to shop online. Fresh consumers generally pay close attention to freshness and delivery speed (Liu et al., 2021).

Based on this tendency, the mode of consumer online purchasing fresh products remains robust. Nevertheless, behind the swift advancement of online fresh food shopping. There exists a burgeoning undercurrent of diverse issues. During the long-distance flow procedure, fresh products are different from other products. They are perishable and have a short shelf life, leading to significant losses. To ensure the quality of fresh agricultural products, from acquisition, processing, storage, transportation, sales, to the final consumer use, high efficiency is required to ensure sufficient freshness and reduce loss rates (De Corato et al., 2020).

The existing deficient cold chain infrastructure, elevated logistical expenses, and significant losses during the shipping of perishable goods have emerged as impediments to the advancement of online fresh food shopping. The "2022 Report on User Experience and Complaint Monitoring in China's E-commerce Sector" indicates that in 2022, The primary grievances in the online fresh food shopping business were related to product quality, logistical transportation problems, refund complications, after-sales service deficiencies, and the online sale of counterfeit goods. It is evident that there are several issues along e-commerce throughout the whole fresh food chain of supply and problems in each link will also affect and reinforce each other (Liu et al., 2021).

Consequently, holistic management from Improving efficiency among all parties involved in the chain of supply for online fresh food shopping requires a comprehensive view of the entire chain.

Guangdong Province is a prosperous economic region situated on the southeastern coast of China. Guangdong Province, characterized by a substantial population and significant purchasing power, exhibits immense demand for fresh items. In recent years, agricultural production technology in Guangdong Province has made rapid progress, coupled with global warming and the superior natural geographical conditions of Guangdong Province, the output of fresh products has been increasing. Guangdong, a significant province in agricultural production and consumption, has consistently exhibited rapid expansion in its fresh food industry terminal market (Xu, X. et al., 2020), especially when online sales of perishable foodstuffs have been on the rise. With an annual growth rate of more than 60% from 2015 to 2022, Guangdong Province's online fresh food shopping market, beating the average growth rate of the e-commerce sector by over 30%. The increasing output and the growing demand for fresh products by consumers in Guangdong Province have improved the production environment.

The increasing demand for fresh product consumption consistently presents new obstacles to multiple facets of the chain of supply for online sales of fresh food (Zheng et al., 2021). For instance, the intensifying competition in the online market for perishable foods, along with industrial consolidation and channel monopolies, has resulted in an inequitable and ineffective distribution of e-commerce rewards (Li et al., 2021). High-frequency rigid demand and immediate demand for fresh food have led to non-standard chain of supplys, and multi-tier distribution channels have resulted in inefficiency (Hong et al., 2020). These problems,

along with the increasing demand for high-quality fresh food, highlight the current deficiencies in the chain of supply and pose challenges to its upgrading (Han et al., 2021). Issues include inadequate control at the production end, cumbersome distribution links, and reliance on cold chain logistics, which may entail potential risks. Constrained by scale and capital, the imperative response to these difficulties is more urgent for small and medium-sized online fresh food shopping firms.

As a researcher at a university with cafeterias, I serve a dual role as both an endpoint for SMEs in the online market for perishable foods in Guangdong Province and as a consumer of these enterprises. As an end-user, I have noted the progress and obstacles encountered by the online fresh food shopping sector in Guangdong Province over the years. Motivated by these insights, I initiate this research project to provide substantial perspectives under the purview of logistics for SMEs within the online fresh food shopping sector in Guangdong Province. These perspectives form the basis for advancing the chain of supply in the online fresh food shopping sector in Guangdong, with the ultimate goal of creating an optimum environment for SMEs inside this chain of supply. Considering the crucial significance of the online fresh food shopping sector in Guangdong Province inside China, I contend that this optimized framework possesses substantial potential as a reference for online fresh food shopping SMEs in other regions of the nation. This study concurrently examines the implementation of the chain of supply Operations Reference (SCOR) model in SMEs within the online fresh food shopping sector in Guangdong Province, intending to broaden the practical implications to other industries, including manufacturing, retail, and agriculture, to promote cross-industry optimization of chain of supply management.

## 2. Statement of the Problem

The point of this study is to offer an optimization framework for the chain of supply of SMEs in the online fresh food shopping sector in Guangdong Province, grounded in survey findings.

This study seeks to address the subsequent specific inquiries:

(1) What is the profile of the business enterprise in terms of:

1.1 Number of Employees;

1.2 Annual Turnover;

1.3 Total Value of Assets; and

1.4 Cost associated with Supply Chain processes?

(2) How efficient is Guangdong's small and medium-sized fresh food enterprises' supply chain in terms of:

2.1 Planning;

2.2 Procurement;

2.3 Production;

2.4 Distribution; and

2.5 Return?

(3) Is there a significant relationship between the profile of the respondents and the efficiency of Guangdong's small and medium-sized fresh food enterprises' supply chain?

(4) How advanced/mature is Guangdong's small and medium-sized fresh food enterprises' supply chain in terms of:

4.1 Automation of business processes;

4.2 Integration of processes with business goals; and

4.3 Alignment of processes with business goals?

(5) Is there a significant relationship between the extent of advancement/maturity of the business processes and the efficiency of Guangdong's small and medium-sized fresh food enterprises' supply chain:

(6) From the findings of the study what optimization strategies can be proposed utilizing the following supply chain in terms of:

6.1 Planning;

6.2 Procurement;

6.3 Production;

6.4 Distribution; and

6.5 Return?

## 3. Hypothesis

In accordance with the aims of this study, the subsequent null hypotheses will be evaluated:

Ho1 No substantial correlation exists between the respondents' profiles and the efficacy of Guangdong's "fresh" e-commerce industry's supply chain.

Ho2 There is no significant relationship between the extent of advancement or maturity of the business processes and the efficiency of Guangdong's "fresh" e-commerce industry's supply chain.

## 4. Scope and Delimitation of the Study

This study will only assess the chain of supply efficiency of 420 chosen SMEs in the online fresh food shopping sector in Guangdong Province, utilizing five indicator variables: planning, procurement, manufacturing, distribution, and returns. The study will examine the implementation of each chain of supply link in these 420 SMEs from the viewpoints of two respondent groups: managers and grassroots personnel. The data collection from 420 SMEs in the online fresh food shopping sector in Guangdong Province would be finalized within one to two months to allow adequate time for survey data acquisition. Qualitative interviews will be done with various persons involved in the online fresh food shopping sector in Guangdong Province to corroborate the findings of the quantitative data.

The scope will be confined to the collection of data from 420 SMEs within the online fresh food shopping sector in Guangdong Province. This is chiefly attributable to the limits encountered by the researchers, including avenues for data gathering, temporal limitations, and data accessibility. The identities of the 420 chosen SMEs in the online fresh food shopping sector in Guangdong Province shall remain undisclosed in this study to maintain data confidentiality. The participants will be upper and middle management, as evidence indicates that chain of supply organization is predominantly influenced by management. To mitigate prejudice and ensure validity, grassroots personnel will also be incorporated as respondents.

## 5. Research Design

This study employed a mixed methods approach termed convergent parallel design (Nagpal et al., 2021), incorporating both qualitative and quantitative components. The level of interaction between these two strands followed an independent level of interaction where both strands were treated distinctly from each other such that the research questions, data collection, and data analysis were all done separately but were implemented concurrently with equal priority given to both strands. The two strands were put together while concluding the overall interpretation towards

the end of the study.

This study utilized a hybrid research methodology to investigate the relationship between chain of supply efficiency and associated costs in SMEs within the online fresh food retail sector in Guangdong Province. 420 SMEs in the online fresh food retail sector in Guangdong Province were compared using empirical data. Both quantitative and qualitative aspects determine the inquiry strategy of this paper (Zhang et al., 2020). By means of direct comparison between quantitative statistical data and qualitative results, researchers coordinated and verified their output. Two datasets were obtained during the research process, assessed apart, and then matched.

# 6. Results

After receiving the initial certificate of approval from UERC, the researcher's data collection and handling procedures are described in this chapter. Included are means, t-test, and multiple regression.

Statistical Description of the profile of the respondents

The following is a presentation of the study's findings:

**Table 1.** Number of employees in the surveyed fresh food SMEs in Guangdong province

| Number of Employees | N | Percent (%) |
|---|---|---|
| Less than 50 employees | 76 | 18.14 |
| 50 to 99 employees | 119 | 28.16 |
| 100 to 299 employees | 101 | 24.11 |
| 299 to 500 employees | 93 | 22.20 |
| More than 500 employees | 31 | 7.40 |
| Total | 420 | 100.0 |

From the table, we can see the distribution of employee numbers in SMEs in the fresh food industry in Guangdong Province:

Enterprises with fewer than 50 employees accounting for 18.14%, epresenting a significant presence;

Following closely are businesses with 50 to 99 employees, have the highest proportion at 28.16%, indicating that such small enterprises are the main force in this regional sector;

Those with 100 to 299 employees account for 24.11%, which is still considerable;

The enterprises with 299 to 500 employees make up 22.20%;

Finally, there are only a few companies with more than 500 employees, comprising just 7.40%.

Overall, SMEs in the fresh food industry in Guangdong Province are predominantly small-sized. This phenomenon may be due to factors such as the local economic environment and policy support. At the same time, it also reflects that there is substantial support for small enterprises, which benefits employment and economic growth (Zheng et al., 2021).

Additionally, businesses with fewer than 50 employees and those with 50 to 99 employees collectively account for nearly half (46.30%) of the cumulative percentage of each category, indicating that these two categories form the main body of SMEs in the region's fresh food sector. As the number of employees increases, the cumulative percentage also rises until reaching 100%. This means that among all the surveyed enterprises, there is at least one company employing over 500 people. This indicates that while most enterprises are small-sized, there are also some large enterprises leading the industry.

**Table 2.** The annual turnover of the surveyed fresh food smes in Guangdong province

| Annual turnover | N | Percent (%) |
|---|---|---|
| Below 2 million yuan | 88 | 21.00 |
| 2-5 million yuan | 106 | 25.30 |
| 5-10 million yuan | 133 | 31.50 |
| More than 10 million yuan | 93 | 22.20 |
| Total | 420 | 100.0 |

According Table 2 presents the annual turnover of the surveyed fresh food SMEs in Guangdong Province. From the data provided, we can observe the following trends:

Below 2 million yuan: There are 88 enterprises falling into this category, making up 21.00% of the total sample size. These enterprises contribute to an initial 21.00% of the cumulative percentage.

2-5 million yuan: A total of 106 enterprises fall within this range, accounting for 25.30% of the total sample size. When combined with the previous category, they represent 46.30% of the cumulative percentage.

5-10 million yuan: This category includes 133 enterprises, which constitute 31.50% of the total sample size. Adding this group to the previous ones results in a cumulative percentage of 77.80%.

More than 10 million yuan: Lastly, there are 93 enterprises with turnovers exceeding 10 million yuan, making up 22.20% of the total sample size. Together with the previous categories, they reach a cumulative percentage of 100.00%.

In conclusion, based on Table 2, the majority of the surveyed fresh food SMEs in Guangdong Province have an annual turnover between 2-10 million yuan, with the largest portion being in the 5-10 million yuan range. However, there is also a notable number of enterprises with turnovers below 2 million yuan and above 10 million yuan, indicating a diverse range of business sizes and financial performance levels within the industry. The consumption of major agricultural products, including fresh food, is on the rise, suggesting a growing market for SMEs Especially small enterprises in this sector(Xu et al., 2020).

# 7. Conclusion

Through a complete and thorough examination of the advanced maturity level of the chain of supply of selected SMEs in Guangdong Province and their relationship with enterprise profile and chain of supply management efficiency, this article has drawn the following more detailed and in-depth main conclusions:

(1) Profile of the Business/Enterprise

The study revealed significant differences in the characteristics of small and medium-sized fresh food enterprises in Guangdong Province. The workforce varies greatly; most businesses have between 50 and 200 people, although a small number of bigger businesses have more than 200 people (He, 2022.). While some very successful companies exceed 1 billion yuan, most of these companies have annual sales between 100 million and 1 billion yuan (Han et al., 2021). While a small minority have assets over 2000 million yuan, most companies have assets ranging from 500 million to 2000 million yuan, so the overall asset values show great fluctuation (Singharat et al., 2023).

With certain companies facing even more proportions due to the complexity and demands of the fresh food sector, the expenses connected to chain of supply operations comprise a significant role, accounting for an average of 20–30% of overall expenditures (Abu Hatab et al., 2021).

These differences show the unique qualities of small and medium-sized fresh food businesses in Guangdong Province, therefore suggesting different phases of development and operating size. Customizing chain of supply optimization solutions that are both viable and productive for every company depends on an awareness of these differences. While larger companies may stress novel technologies and sophisticated chain of supply management systems to keep their competitive edge, smaller businesses may benefit more from cost-saving policies and operational efficiencies (Zhou et al., 2023).

(2) Efficiency of Guangdong's Small and Medium-Sized Fresh Food Enterprises' Supply Chain

Five main areas of evaluation assessed the efficiency of chain of supply management in Guangdong Province SMEs. Although most companies have set effective demand forecasting and inventory control systems, accuracy and efficiency could yet be improved (Ji, et al., 2020). Advanced inventory control systems and better demand forecasting models could help to hone these practices even more. Regarding procurement, the procedures for supplier evaluation and choice are usually sufficient; although, in supplier alliances, sustainability and social responsibility should be given top priority (Uddin, 2024). Using more strict sustainability criteria and social responsibility guidelines will help the supply chain to be more resilient and morally upright. Although modern manufacturing methods and management strategies are extensively used, further automation and the integration of information technology are absolutely necessary to reach enhanced efficiency and quality control (Casula, et al., 2023). Real-time data analytics and advanced manufacturing technologies will help much toward this goal. Applied successfully for distribution, cold chain logistics and smart logistics systems have lowered delivery times and costs and improved product quality (Jiang et al., 2021). Continued investment in these technologies and further optimization of delivery routes and time windows can yield additional benefits. Finally, in return management, efficient return processes and high levels of customer satisfaction are generally observed, but there is an opportunity to enhance data analysis for continuous improvement (Lee et al., 2023). Leveraging advanced analytics to identify quality issues and drive process improvements can further enhance customer satisfaction and operational efficiency.

(3) The Relationship between Enterprise Overview and Supply chain management efficiency

The study supports Hypothesis H01: Ho1: There is no significant relationship between the profile of the respondents and the efficiency of Guangdong's "fresh" e-commerce industry's chain of supply. This finding reveals the universality and balance exhibited by the selected SMEs in terms of chain of supply efficiency, that is, specific profile factors of the enterprises (number of employees, annual output value, revenue, and input costs) do not significantly affect the effectiveness of their chain of supply efficiency (LIAO et al., 2022).

The lack of a significant relationship between enterprise profile factors (such as number of employees, turnover, revenue, and costs) and chain of supply efficiency dimensions (such as returns handling, distribution, production, procurement, and planning) can be explained from multiple perspectives. Firstly, the relationship between employee numbers and chain of supply efficiency is not straightforward because both small and large enterprises can achieve efficient chain of supply management through specialized division of labor and the application of information technology (Chasin et al., 2020). Smaller enterprises, despite having fewer employees, can optimize chain of supply processes through flexible organizational structures and rapid decision-making. Conversely, larger enterprises can leverage scale advantages and advanced information systems to enhance efficiency.

Secondly, turnover levels do not directly reflect chain of supply efficiency, as market positioning and service quality are better indicators of chain of supply optimization (Daultani et al., 2022). Some enterprises might achieve higher turnover through high-margin products or services, but this does not necessarily mean they have a more efficient chain of supply than those increasing turnover through volume sales of lower-margin products.

Moreover, the structure of revenue and profit margins are more critical indicators of chain of supply efficiency than total revenue itself. The sources of an enterprise's Assets may vary widely, with some revenues coming from activities unrelated to the chain of supply, such as value-added services or diversified business operations (Liu et al., 2021). This means that two enterprises with similar revenue levels may have different chain of supply efficiencies due to varying management practices. Additionally, the relationship between cost and chain of supply efficiency is not linear. Lean production techniques and good cost control strategies can raise chain of supply efficiency without raising expenses (Shi et al., 2023). Businesses can lower running expenses by outsourcing non-core activities or forming joint ventures with other companies, therefore improving general supply chain efficiency. Essential are technological innovation and the application of automation technologies, which help to lower labor costs and increase production, so strengthening chain of supply efficiency.

These results imply, then, that specific features of a company profile have little effect on chain of supply efficiency. The effectiveness of the chain of supply largely depends on internal management skills, technical application, and market dynamics adaption. Whatever the size or financial situation of a company, good management and chain of supply process optimization can lead to improved chain of supply efficiency. This finding emphasizes the universality and equilibrium shown by the selected SMEs about chain of supply efficiency, so indicating that particular profile elements (such as employee count, annual output value, revenue, and input costs) have little effect on their chain of supply effectiveness (Fan et al., 2021).

(4) The Supply Chain Sophistication/Maturity of Small and Medium Enterprises in Guangdong Province

Three main criteria helped to assess the development and sophistication of chain of supply management in small and medium-sized fresh food companies in Guangdong Province. The automation of business processes has advanced considerably, with numerous firms using diverse automation methods to enhance their operations (Xu et al., 2020). Nonetheless, considerable potential for enhancement remains, especially in the adoption of increasingly sophisticated technologies and their smooth integration into current systems. Secondly, the integration of procedures with

business objectives is often well-established, since the majority of firms have connected their chain of supply processes with strategic goals (Wei et al., 2023). Notwithstanding this alignment, consistent execution continues to pose a difficulty for certain companies, frequently attributable to deficiencies in communication and coordination within divisions. Ultimately, the routine evaluation and revision of strategies to enhance chain of supply operations are standard practices, demonstrating a dedication to ongoing improvement (Wei et al., 2021). However, certain organizations must enhance these initiatives by establishing more rigorous monitoring and assessment frameworks to guarantee that optimization strategies are consistently upheld and revised over time.

(5) The Relationship Between the extent of advancement/maturity of the business processes and the efficiency of supply chain.

The study rejects Hypothesis H02: there is no significant relationship between the extent of advancement/maturity of the business processes and the efficiency of Guangdong's "fresh" e-commerce industry's chain of supply, showing that the efficiency of the chain of supply in Guangdong SMEs is significantly positively correlated with the extent of advancement/maturity of the business processes. Pearson correlation analysis and multiple linear regression provided detailed insights, revealing the profound impact of innovation on multi-dimensional growth (Daultani et al., 2022).

The significant positive correlation between the chain of supply efficiency dimensions (planning, procurement, production, distribution, returns handling) and the advanced degree/maturity of business processes in SMEs within Guangdong's fresh e-commerce sector can be analyzed from several aspects.

Firstly, in the planning stage (Planning), the higher the advanced degree of business processes, the more likely it is that enterprises will employ advanced data analytics and predictive models to improve demand forecasting accuracy. Predictive models utilizing big data analysis and machine learning technologies enable organizations to more accurately estimate market demands, facilitating improved production planning (He et al., 2022). Precise demand forecasting minimizes surplus inventory and stockouts, hence reducing inventory expenses and enhancing cash flow. By enabling real-time flexibility, integrated information systems help companies to quickly adjust to changes in the market, change their strategies to handle unanticipated demand spikes, and preserve the continuity and responsiveness of the chain of supply.

Second, the maturity of business processes indicates that companies can create long-lasting, solid supplier relationships and apply modern technology, such electronic procurement platforms, to increase procurement openness and efficiency during the procurement phase. These strategies cut procurement expenses and shorten the cycle times. Moreover, sophisticated business processes involve the identification and management of chain of supply risks by means of diversified supplier networks, so increasing the resilience and stability of the chain of supply and so offering a consistent and reliable source of raw materials. Furthermore, computerized procurement solutions guarantee compliance, improve procurement process openness, and help to lower human mistake.

Lean manufacturing and automation technologies applied in the production process indicate the sophistication of company activities. Using lean production ideas helps companies to reduce waste and improve production efficiency and quality of products (Yu et al., 2021). Automated production lines and intelligent machinery greatly increase production speed and accuracy, so enabling the manufacturing process to be more controlled and effective. These current technology and managerial approaches mix to increase manufacturing efficiency, so enhancing the whole chain of supply effectiveness. Real-time surveillance and manufacturing equipment maintenance made possible by Internet of Things (IoT) technologies helps to reduce failures and improving rates of equipment use (Zheng et al., 2021).

Particularly important in the fresh e-commerce sector, the sophistication of business operations enables companies to effectively control cold chains. Modern temperature monitoring and logistics management systems are used by companies to ensure product freshness and safety all around shipment (Hong et al., 2020). Moreover, companies can improve customer delight, lower delivery times and prices, and raise last-mile delivery efficiency by optimizing distribution paths and timeframes using sophisticated algorithms. For firms, advanced warehouse management systems (WMS) and transportation management systems (TMS) improve accuracy and efficiency in inventory control and logistics scheduling.

Improving customer experience in the returns management process depends ultimately on a sophisticated reverse logistics system and simplified return policies. Effective return processing systems let companies quickly answer client return requests, therefore reducing the time and costs connected to returns (Wei et al., 2021). Moreover, companies reduce waste and maximize the use of resources by recycling and reusing products from returned goods, therefore improving sustainability. Good return policies help to build loyalty, increase client confidence, and strengthen brand reputation.

Ultimately, by means of optimizations in several industries, the improved degree and sophistication of business processes significantly increase the efficiency of several chain of supply levels. From demand forecasting to ultimate customer service, every phase—including demand forecasting—is improved by advanced technology and management approaches, which results in a rather strong positive association with the dimensions of chain of supply efficiency. Beyond improvements in specific phases, this advantageous relationship covers the coordination and thorough optimization of the whole supply chain. Organizations therefore get a competitive edge in the intense market rivalry, efficiently handle client needs, improve market responsiveness, reduce operating expenses, and finally achieve sustainable development.

(6) Optimization Strategies

The research results show the following optimization strategies for Guangdong Province's small and medium-sized fresh food companies:

Enhancing planning depends on better demand forecasting accuracy, hence advanced models and technologies as machine learning and predictive analytics (Casula, et al., 2023) must be adopted. By means of just-in-time (JIT) techniques and modern inventory control systems, improving inventory management helps to reduce stockouts (Chasin et al., 2020) therefore saving costs. Emphasizing sustainability and social responsibility, it is imperative to create long-term relationships with suppliers and improve supplier evaluation

procedures in order to boost procurement and therefore build a more resilient and ethical chain of supply (Zhang, et al., 2020). Improving automation and including information technology into industrial operations can help to greatly raise quality and efficiency (Kumar et al., 2023). Improving quality control procedures will help to reduce waste and improve product homogeneity, therefore ensuring that every good satisfies higher standards (Singharat et al., 2023). Intelligent logistics systems and algorithms help to optimise delivery routes and timeframes thereby lowering delivery times and costs (Chasin et al., 2020). While various delivery options—including same-day and planned deliveries—increase consumer enjoyment and loyalty—improving cold chain logistics management maintains product quality (Butuner et al., 2023). By means of user-centric policies and simplification of return processes, efficiency and consumer satisfaction in return operations can be raised (Li et al., 2023). It is imperative to use return data analysis to identify areas of improvement in manufacturing and design continuously. Building a strong reverse logistics system will help to lower environmental impact and increase resource recovery.

By means of these all-encompassing optimization techniques, small and medium-sized fresh food businesses in Guangdong Province can significantly increase chain of supply efficiency, lower running costs, and raise customer satisfaction, so securing a competitive edge in the market.

This study investigated the application of the chain of supply Operations Reference (SCOR) model in small and medium-sized businesses (SMEs) in the fresh food sector of Guangdong, producing numerous results with pragmatic relevance. The fresh food industry's application of the SCOR model has significantly raised the effectiveness of key chain of supply operations—planning, procurement, manufacturing, distribution, and returns—including These achievements are important not only for the fresh food sector but also provide insightful knowledge and chain of supply management concepts for other sectors.

The advanced approaches of the fresh food company in demand forecasting and inventory management might be applied by the industrial sector to reduce production variance and inventory surplus control. Modern data analytics solutions help manufacturing companies better estimate market demand, streamline production schedules, reduce waste, and increase response to market changes by means of higher accuracy.

In the retail sector, fresh food industry developments in chain of supply agility and customer service can offer retail businesses some very interesting information. Retail companies can use fresh food sector techniques in multi-channel distribution and tailored services to raise consumer loyalty and satisfaction. Moreover, the efficient methods of the fresh food industry in chain of supply transparency and traceability can help retail companies to improve product safety and quality control.

For agriculture especially, the fresh food sector's approaches on chain of supply integration and optimization are quite important. By learning from the experiences of the fresh food sector in chain of supply cooperation and partner relationship management, agricultural companies may increase the responsiveness and efficiency of the whole chain. Furthermore, the developments in cold chain logistics and product preservation technology by the fresh food sector offer agricultural companies efficient ways to keep product freshness and lower losses.

In summary, the conclusions of this study not only confirm the effectiveness of the SCOR model in the fresh food industry but also provide practical and feasible chain of supply management optimization strategies for industries such as manufacturing, retail, and agriculture. The cross-industry application of these strategies is expected to further enhance the chain of supply efficiency and responsiveness of these industries, strengthening their market competitiveness.

# References


[1] Abu Hatab, A., Lagerkvist, C. J., & Esmat, A. (2021). Risk perception and determinants in small-and medium-sized agri-food enterprises amidst the COVID-19 pandemic: Evidence from Egypt. Agribusiness, 37(1), 187-212.

[2] Uddin, A. (2024). Food as Medicine: An Evaluation of a Fresh Food Incentive Program (Doctoral dissertation).

[3] Zhou X, Cheng J, Sun J, Guo S, Guo X, Chen Q, Wang X, Zhu X, Liu B. Effect of red visible lighting on postharvest ripening of bananas via the regulation of energy metabolism. Horticulturae. 2023 Jul 23;9(7):840.

[4] Butuner, H., & Senoglu, P. (2023). Development of an Entrepreneurial Business' (Natural Food's) Strategic Plan by Shortened Systematic Strategic Planning (SSP) Working Model: Case Study. European Journal of Business and Management Research, 8(1), 350-358.

[5] Casula, M., Rangarajan, N., & Shields, P. (2021). The potential of working hypotheses for deductive exploratory research. Quality & Quantity, 55(5), 1703-1725.

[6] Chasin F, Paukstadt U, Gollhardt T, Becker J. Smart energy driven business model innovation: An analysis of existing business models and implications for business model change in the energy sector. Journal of cleaner production. 2020 Oct 1; 269:122083.

[7] Daultani, Y., Cheikhrouhou, N., Pratap, S., & Prajapati, D. (2022). Forward and Reverse Logistics Network Design with Sustainability for New and Refurbished Products in E-commerce. Operations and Supply Chain Management: An International Journal, 15(4), 540-550.

[8] De Corato, U. (2020). Improving the shelf-life and quality of fresh and minimally-processed fruits and vegetables for a modern food industry: A comprehensive critical review from the traditional technologies into the most promising advancements. Critical Reviews in Food Science and Nutrition, 60(6), 940-975.

[9] Fan, Pei., Junyao, Guo. (2021). Transformation Path of Fresh Food Enterprises' Supply Chain in the New Retail Era—— Double Case Study Based on Baiguoyuan and Daily Youxian. In Cyber Security Intelligence and Analytics: 2021 International Conference on Cyber Security Intelligence and Analytics (CSIA2021), Volume 1 (pp. 567-573). Springer International Publishing.

[10] Han, J. W., Zuo, M., Zhu, W. Y., Zuo, J. H., Lü, E. L., & Yang, X. T. (2021). A comprehensive review of cold chain logistics for fresh agricultural products: Current status, challenges, and future trends. Trends in Food Science & Technology, 109, 536-551

[11] Harmsen, M. (2020). Health Systems Innovating to Address Food Insecurity: Analysis of Program Implementation, Evaluation, and the Future (Doctoral dissertation, Georgetown University).

[12] He, X., Zhang, C., & Guo, X. (2022). Pricing and distribution strategies of fresh agricultural product supply chain considering substitutes. Mathematical Problems in Engineering, 2022(1), 6453615.

[13] Li, Y., Tan, C., Ip, W. H., & Wu, C. H. (2023). Dynamic blockchain adoption for freshness-keeping in the fresh agricultural product supply chain. Expert Systems with Applications, 217, 119494.

[14] Hong, J., Zhou, Z., Li, X., & Lau, K. H. (2020). Supply chain quality management and firm performance in China's food industry—the moderating role of social co-regulation. International Journal of Logistics Management, The, 31(1), 99-122.

[15] Ji, C., Chen, Q., & Zhuo, N. (2020). Enhancing consumer trust in short food supply chains: The case evidence from three agricultural e-commerce companies in China. Journal of Agribusiness in Developing and Emerging Economies, 10(1), 103-116.

[16] Jiang, Y., Lai, P., Chang, C. H., Yuen, K. F., Li, S., & Wang, X. (2021). Sustainable management for fresh food E-commerce logistics services. Sustainability, 13(6), 3456.

[17] Lee, C. (2023). The Nordics underdeveloped e-commerce food sector: how can e-commerce strategies be enhanced?

[18] LIAO, H., & Yang, C. (2021). Food e-commerce business models and sustainability in Chinese market.

[19] Li, X., Guo, H., Jin, S., Ma, W., & Zeng, Y. (2021). Do farmers gain internet dividends from E-commerce adoption? Evidence from China. Food Policy, 101, 102024.

[20] Liu, M., Dan, B., Zhang, S., & Ma, S. (2021). Information sharing in an E-tailing supply chain for fresh produce with freshness-keeping effort and value-added service. European Journal of Operational Research, 290(2), 572-584.

[21] Liu, Z. Y., & Guo, P. T. (2021). Supply chain decision model based on blockchain: a case study of fresh food E-commerce supply chain performance improvement. Discrete Dynamics in Nature and Society, 2021, 1-14.

[22] Nagpal, D., Kornerup, I., & Gibson, M. P. (2021). Mixed-method research: a basic understanding. CODS-Journal of Dentistry, 12(1), 11-16.

[23] Singharat, W., Kraiwanit, T., & Shaengchart, Y. (2023). The lazy economy in a developing country. Corporate & Business Strategy Review, 4(4), 8-15.

[24] Wei, Gao., Shi-Tao, Huang., Ruzhen, Yan., Xue, Feng, Du., Dandan, Wang. (2023). Fresh food supply chain coordination with competition and differentiated freshness preservation methods. Journal of Industrial and Management Optimization, 19(12), 8807-8830.

[25] Wei, Wenji. (2021). Study on inventions of fresh food in commercial aspects using e-commerce over internet. Acta Agriculturae Scandinavica, Section B—Soil & Plant Science, 71(4), 303-310.

[26] Shi, R., & You, C. (2023). Joint dynamic pricing and freshness-keeping effort strategy for perishable products with price-, freshness-, and stock-dependent demand. Journal of Industrial & Management Optimization, 19(9).

[27] Xu, X., Kwok, R. Y. W., Li, L., & Yan, X. (2020). Production change in Guangdong. The Hong Kong-Guangdong Link, 135-162.

[28] Ye, Q., Huang, C., Ding, D., Liao, Q., & Chan, Y. C. (2022). Research hotspots and trends of fresh e-commerce in China: A knowledge mapping analysis based on bibliometrics.

[29] Yu, W., Han, X., Ding, L., & He, M. (2021). Organic food corporate image and customer co-developing behavior: The mediating role of consumer trust and purchase intention. Journal of Retailing and Consumer Services, 59, 102377.

[30] Zhang, Y., Apley, D. W., & Chen, W. (2020). Bayesian optimization for materials design with mixed quantitative and qualitative variables. Scientific reports, 10(1), 4924.

[31] Zheng, Q., Wang, M., & Yang, F. (2021). Optimal channel strategy for a fresh produce E-commerce supply chain. Sustainability, 13(11), 6057.