INTECHBIZ2025
International Conference on Industrial Technology and Business

Optimizing the Vegetable Supply Chain to Increase Farmers' Sales Value

Endang Astuti[1], Muhammad Fuad Asrofillah[2]
[1,2]*Business Administration Department, State Polytechnic of Bengkalis, Indonesia*
Endangastuti445@gmail.com[1], fuadasrofillah@polbeng.ac.id[2]

Abstract

The agricultural sector, particularly horticulture, is fundamental to Indonesia's economy, yet the welfare of farmers often remains low. This paradox is largely caused by a long, inefficient, and multi-layered conventional vegetable supply chain, which suppresses farm-gate prices and diminishes the producers' bargaining power. This research aims to analyze the structure of the current vegetable supply chain and identify optimization strategies to increase farmers' selling value. Using a descriptive method with a literature review and a qualitative case study approach, this study investigates the roles of key stakeholders, from farmers to retailers, in the vegetable supply centers of Rokan Hilir Regency. The findings reveal that the lengthy distribution channel, involving collectors, wholesalers, and retailers, significantly reduces the profit margin for farmers. As a solution, the implementation of digital technology to create a shorter, more direct supply chain from farmers to consumers is proven to be the most effective optimization strategy. By cutting out intermediaries, farmers gain full autonomy to set fair prices, leading to a significant increase in their selling value and overall welfare. This study confirms that supply chain optimization is a crucial step toward farmer empowerment and strengthening the national agricultural foundation.

1. INTRODUCTION

The agricultural sector is a fundamental foundation for Indonesia's economy, serving as a major provider of employment, a pillar of national food security, and an important contributor to Gross Domestic Product (GDP). Within this sector, the horticulture sub-sector, particularly vegetable commodities, plays a vital role due to high market demand that continues to increase in line with population growth and public awareness of healthy lifestyles. However, behind its strategic role lies a worrying paradox: farmers, as the frontline of production, often find themselves trapped in a cycle of poverty and economic uncertainty. Their welfare is not commensurate with the heavy workload and risks they face, a condition that threatens the sustainability of the agricultural sector itself.

One of the main root causes of the low welfare of vegetable farmers lies in the current supply chain structure. The conventional supply chain system in Indonesia tends to be very long, convoluted, and involves many layers of intermediaries. The distribution flow generally begins with farmers selling their harvest to village middlemen, then continues to collectors at the sub-district level, wholesalers at the central market, and finally to retailers before being purchased by consumers. Each layer in this chain takes a profit margin, which cumulatively erodes the price received by farmers at the upstream level and increases prices at the downstream level.

This inefficient supply chain structure has various negative impacts that directly affect farmers. First, farmers' bargaining position is very weak due to their dependence on middlemen and their lack of access to transparent market price information. Second, high levels of post-harvest losses are a serious problem; the perishable nature of vegetables is exacerbated by inadequate handling and transportation processes at every point of distribution, with the losses often borne by farmers. Third, information asymmetry prevents farmers from planning their crops according to market demand, often resulting in oversupply that causes prices to plummet during the harvest season.

Faced with this series of challenges, the concept of supply chain optimization has emerged as a comprehensive solution. Optimization is not simply an effort to cut out intermediaries, but rather a strategy to build a more efficient, transparent, and integrated system. This effort can be realized through several key interventions, such as the use of digital technology for direct buying and selling platforms, improvements to logistics and distribution systems to reduce costs and time, the development of direct partnership schemes between farmer groups and modern markets, hotels, restaurants, or processing industries, and the implementation of standard operating procedures (SOPs) for better post-harvest handling.

By implementing an optimal supply chain model, it is hoped that the flow of products from farmers to consumers will become smoother, faster, and at a lower cost. This will directly provide a larger and fairer share of profits for farmers, so that the selling value of their crops can increase significantly. This increase in income will not only improve the welfare of farmers and their families, but will also serve as a strong incentive for them to continue producing, improving quality, and implementing good agricultural practices. Therefore, research on models and strategies for optimizing the vegetable supply chain is very important and urgent, as a concrete step in empowering farmers.

2. REVIEW OF LITERATURE

High market demand is often not in line with the welfare of farmers as primary producers. The root of this problem is widely identified as stemming from a long, complex, and inefficient supply chain structure. The vegetable supply chain consists of several stages, starting from cultivation and harvesting by farmers, collection by collectors, distribution and logistics (vegetables enter central markets, supermarkets, or traditional markets), to the final stage where consumers purchase vegetables. Each stage plays an important role in ensuring that the vegetables produced are managed properly and reach consumers in optimal quality. The involvement of various parties in this supply chain requires good coordination and communication so that each process can run smoothly. Supply chain management is an integrated system that regulates the movement of goods, information, and funds from upstream to downstream.

According to (Maharani et al., 2024)the supply chain is an important foundation that supports the fulfillment of consumer needs by retail and wholesale businesses. Effective supply chain management can have a positive impact on customer productivity and growth. According to (Fadhilah & Murdani, 2025), supply chain management (SCM) is the management of business processes from upstream to downstream with the aim of improving efficiency and customer satisfaction. In the property industry, supply chain management plays

a strategic role in ensuring the success of projects because it is highly dependent on the supply of construction materials and services. According to (Elaina, 2023), an efficient and effective supply chain is essential for maintaining product freshness and quality, meeting consumer preferences, and providing added value to farmers and all parties involved. In his research, he highlights that domestic supply chains in Indonesia are often unable to meet market demand due to the complexity and various challenges of the industry. Therefore, he identifies new trends such as short food supply chains (SFSC) and coordination-collaboration contracts as potential models to overcome these challenges.

According to (Shamsudin et al., 2025), the effective implementation of Supply Chain Management (SCM) principles is one of the key factors for Micro, Small, and Medium Enterprises (umkm) to increase their competitiveness. In their research, SCM is seen as a way to help umkm improve efficiency and responsiveness to market needs. Efficiency in the supply chain, optimization of production capacity, and improvement in product quality are considered to contribute significantly to the competitiveness of umkm. According to (Putri et al., 2020), agro-industrial supply chain management is a system that involves various stakeholders who are integrated from upstream to downstream in a sustainable manner. In their research, they emphasize that the main aspects that need to be considered to achieve effectiveness and efficiency are performance, added value, and risk in the supply chain. They also concluded that discussions on improving the effectiveness and efficiency of fruit agro-industry supply chain management are still limited and not comprehensive, so it is necessary to develop a model that combines several methods and the implementation of information technology.

According to Lumunon et al., Supply Chain is defined as a system through which organizations distribute their products and services to customers. This chain is also a network of various organizations that are interconnected and share the same goal of procuring or distributing goods in the best possible way. This process encompasses various stages, ranging from planning, sourcing, manufacturing, delivery, to product returns According to (Sani et al., 2023), supply chain management is a series of integrated activities involving various parties to create and deliver products to end users. All elements involved, including suppliers, manufacturers, and distributors, collaborate to produce high-quality products at affordable prices and with high efficiency. According to (Hidayat et al., 2024), supply chain management (SCM) is a strategic approach to coordinating all elements in the supply chain with the aim of improving efficiency, quality, and customer satisfaction. This approach involves various activities such as planning, organizing, implementing, controlling, and supervising all parties involved, from producers or suppliers, distributors, to retailers who sell products directly to end consumers.

According to (Fajar, 2019), the organic broccoli supply chain involves three main actors, namely partner farmers as producers, a distribution company (Simply Fresh Organic) that carries out sorting and labeling, and retailers that sell products to end consumers. In his research, he explains that the supply chain management of agricultural products differs from that of manufactured products due to their perishable nature, requiring special handling from cultivation, processing, distribution, to marketing so that the products reach consumers in good condition. According to (Istipani et al., 2025), the smooth flow of goods, both raw materials and finished products, is one of the keys to the success of a business. They

emphasize that raw materials are the key to the success of the agro-industrial supply chain, and suppliers play an important role as the parties that distribute raw materials to companies until they reach the end consumers.

According to (Adedoyin Tolulope Oyewole et al., 2024) supply chain management (SCM) is an important component of modern business operations. They state that the integration of predictive analytics in SCM has emerged as a transformative force in improving efficiency, decision-making processes, and overall performance. According to (Fadhilah & Murdani, 2025), supply chain management (SCM) is the management of business processes from upstream to downstream with the aim of improving efficiency and customer satisfaction. In the property industry, they emphasize that supply chain management plays a strategic role in ensuring project success because it is highly dependent on the supply of construction materials and services.

3. METHOD

This research was conducted using a descriptive method with a literature study oriented towards aspects of supply chain optimization in increasing the selling value for farmers, particularly in vegetable production. With a qualitative approach and case study design, it aimed to provide a systematic, factual, and accurate description of the vegetable supply chain conditions and analyze them to formulate optimization strategies. The research location will be deliberately (purposively) centered in vegetable farming centers in Bangko Subdistrict, Rokan Hilir Regency, which serve as the main suppliers to the market in Bagansiapiapi City. The research subjects are key stakeholders involved in the supply chain, including farmers, collectors, distributors, and retailers, who are selected as informants through purposive sampling techniques. To obtain rich and in-depth data, data collection will be carried out using two main techniques, namely direct observation to observe the entire series of operational activities from the harvesting process to transactions in the market, and semi-structured in-depth interviews to explore information related to the roles, business processes, constraints, and pricing mechanisms of each informant.

4. RESULT & DISCUSSION

Based on the literature analysis and case studies conducted, several key findings regarding the optimization of the vegetable supply chain in increasing the selling value for farmers can be summarized as follows:

Tahapan Rantai Pasok Sayur

The vegetable supply chain consists of several stages, starting from farmers, collectors, wholesalers, retailers, to consumers, causing a significant price difference between the price at the farmer level and the price paid by consumers. Farmers, as the main producers, usually receive lower prices because they sell their harvest in large quantities to collectors without the ability to determine market prices. After that, collectors and wholesalers add their respective transportation, storage, and profit costs, which causes prices to continue to increase at each stage. Retailers also raise prices again to cover operating costs and earn profit margins. As a result, by the time vegetables reach consumers, their prices can be much higher than the initial prices at the farmer level. This condition shows that the longer the supply

chain, the greater the price difference between producers and consumers, so distribution efficiency is very important to improve farmers' welfare and stabilize prices in the market.

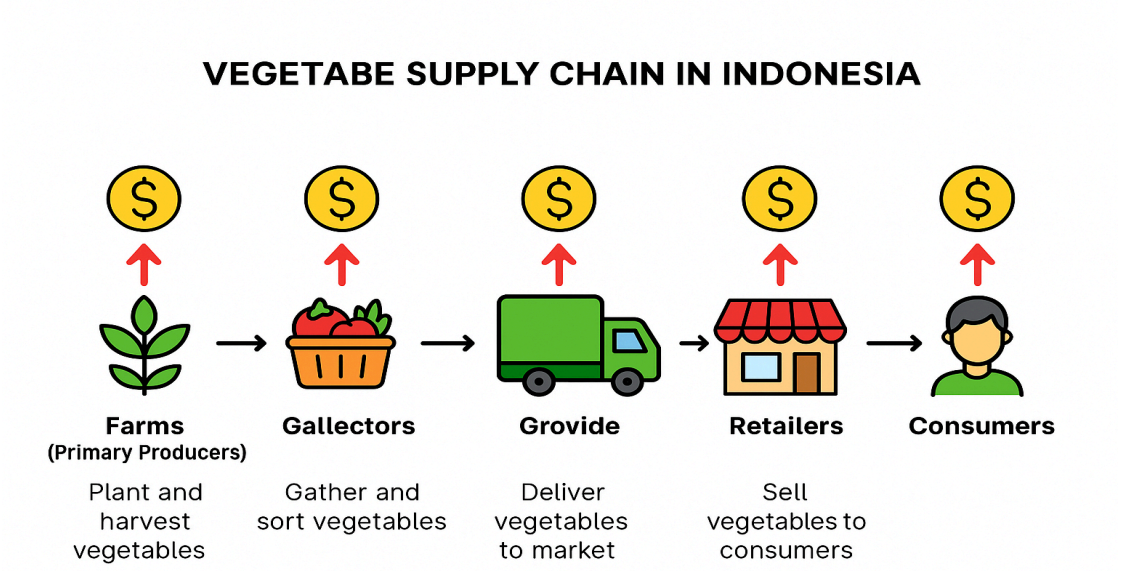

Figure 1. Vegetable supply chain

Application of Digital Technology

The application of digital technology provides concrete solutions to classic and structural problems that have long plagued farmers, namely the low selling price of their crops. Farmers are at the very beginning of a long and complicated supply chain, but ironically, they are often the ones who reap the least benefits. The existence of many layers of intermediaries, from middlemen and collectors to large distributors, has created a market structure in which prices at the farmer level are kept as low as possible, while prices at the end consumer level are skyrocketing. Dependence on this conventional system not only drastically erodes income potential, but also eliminates farmers' bargaining power and sovereignty over the fruits of their own labor.

Recognizing this injustice, the application of technology through digital platforms is specifically designed to break the inefficient and unfair chain. This technology creates a digital market ecosystem that builds a direct, transparent, and mutually beneficial bridge connecting farmers with end consumers in urban areas and other regions. By cutting out intermediaries that do not provide significant added value, this technology effectively returns economic control to farmers. Through this technology-based system, farmers have full autonomy to determine their own fair and reasonable selling prices, in line with the quality of their products and the hard work they have put in. As a result, all profit margins that were previously distributed and eroded by many parties can now be fully enjoyed by farmers, thereby significantly increasing the selling value of their crops and ultimately improving their welfare.

5. CONCLUSION

Based on the results of research and analysis that has been conducted, it can be concluded that the long conventional vegetable supply chain involving many intermediaries is a major factor in the low selling price received by farmers. This inefficient market structure creates farmer dependence on middlemen, causing price information asymmetry, and significantly eroding profit margins before products reach end consumers. This condition directly impacts farmers' welfare, which is difficult to improve even though they are the main producers. Supply chain optimization, particularly through the application of digital technology that connects farmers directly with consumers, has proven to be the most effective solution to overcome this problem.

By cutting out the middlemen, farmers can gain several strategic advantages: first, farmers have full autonomy and control to determine fairer and more appropriate selling prices based on the quality of their harvest. Second, there is a significant increase in selling value at the farmer level because all the profit margins previously enjoyed by middlemen can now be received directly. Third, the creation of market transparency and better access to information allows farmers to plan production in line with consumer demand. Thus, this study confirms that the modernization and optimization of the vegetable supply chain is not merely a matter of logistical efficiency, but a crucial step in empowering the economy and improving the welfare of farmers. The implementation of a shorter, technology-based supply chain model fundamentally strengthens farmers' bargaining position and ensures that their hard work is fairly rewarded.

6. REFERENCES

Adedoyin Tolulope Oyewole, Chinwe Chinazo Okoye, Onyeka Chrisanctus Ofodile, & Emuesiri Ejairu. (2024). Reviewing predictive analytics in supply chain management: Applications and benefits. *World Journal of Advanced Research and Reviews*, *21*(3), 568–574. https://doi.org/10.30574/wjarr.2024.21.3.0673

Elaina, S. (2023). Pengembangan Model Rantai Pasok Buah Segar di Indonesia. *Jurnal Bisnis Darmajaya*, *9*(2), 136–150.

Fadhilah, I., & Murdani, D. (2025). Optimalisasi Rantai Pasok Proyek Properti. *Jurnal Ilmu Komputer Dan Bisnis*, *16*(1), 165–175. https://doi.org/10.47927/jikb.v16i1.1028

Fajar, M. S. (2019). *Analisis Rantai Nilai pada Rantai Pasok Sayuran Brokoli Organik*. 1–114.

Hidayat, N., Asmanita Wati, N. Z., & Oktaviani, N. (2024). Analisis Manajemen Rantai Pasok (Supply Chain Management) Guna Optimalisasi Distribusi Usaha Mikro Kecil Menengah Pengepulan Kepiting di Wilayah Tarakan. *El-Mal: Jurnal Kajian Ekonomi & Bisnis Islam*, *5*(4), 2628–2636. https://doi.org/10.47467/elmal.v5i4.1144

Istipani, A., Hamdala, I., Industri, D. T., & Brawijaya, U. (2025). *Evaluation of Supplier Performance and Efficiency*. *03*(03), 223–232.

Maharani, S. B., Naswa, D., Amallina, N., & Zahira, M. (2024). Strategi Optimalisasi Rantai Pasok Padi dalam Penyimpanan RMU Mekar Jaya di Kecamatan Bangodua , Kabupaten Indramayu. *Jurnal Cendekia Ilmiah*, *4*(1), 617–628.

Putri, F. P., Marimin, & Yuliasih, I. (2020). Mulai Definisi efektivitas dan efisiensi manajemen rantai pasok agroindustri Identifikasi dan analisis metode efektivitas dan efisiensi manajemen rantai pasok agroindustri Identifikasi dan analisis metode efektivitas dan efisiensi manajemen rantai pasok a. *Jurnal Teknologi Industri Pertanian*, *30*(3), 338–354.

Sani, R., Ramadhani, I., & Harmutika, D. (2023). Analisis Manajemen Rantai Pasok pada UMKM. *Jurnal Teknik Industri Terintegrasi*, *6*(4), 1510–1516.

Shamsudin, A. N., Jahriyah, N., & Alhidayatullah, A. (2025). Optimalisasi Rantai Pasok Dengan Meningkatkan Daya Saing Umkm Di Kota Sukabumi. *Jurnal Inspirasi Ilmu Manajemen*, *3*(2), 70–79. https://doi.org/10.32897/jiim.2025.3.2.4075