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Analysis of Vegetable Supply Chain Efficiency in Traditional Markets

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ABSTRACT

Traditional markets have a strategic role in urban food distribution systems, especially in the provision of fresh vegetables for the community. However, the perishable characteristics of vegetables and the length of distribution channels cause supply chain efficiency to be an important issue that needs to be studied. This study aims to analyze the efficiency of the vegetable supply chain in urban traditional markets, with case studies at Kupang Hamlet Market and Simo Market Surabaya. The research uses a quantitative approach with descriptive and comparative methods, and utilizes secondary data obtained from the Central Statistics Agency, relevant government agencies, and various scientific literature. The analysis is carried out through mapping the supply chain structure, calculation of distribution costs, marketing margins, and the level of marketing cost efficiency in each market. The results show that the vegetable supply chain in both markets is still not fully efficient due to the length of distribution channels, high logistics costs, the involvement of many intermediaries, and the limited support facilities and the use of information technology. Comparatively, Simo Market shows a relatively better level of efficiency than Kupang Hamlet Market, mainly due to its larger trading volume and faster product turnover. These findings confirm the importance of efforts to simplify the distribution chain, strengthen coordination between actors, and improve infrastructure and information systems to support the efficiency of the vegetable supply chain in traditional urban markets.

Keywords: *supply chain, marketing efficiency, vegetables, traditional market, Surabaya.*

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INTRODUCTION

Traditional markets have a strategic role. That role includes being an urban food distribution system. Specifically, the relationship built is the provision of fresh food such as vegetables for the community. The existence of traditional markets not only functions as a place for economic transactions, but also as a distribution node(Castillo-Díaz et al., 2024; Sovacool et al., 2023; Zhou et al., 2024). Therefore, traditional markets supply people's food needs, both daily and annual needs, at relatively affordable prices and fresh quality.

In many major cities in Indonesia, traditional markets are still the backbone of daily food distribution despite the rapid development of modern markets. Modern markets do offer convenience, better service standards, and an orderly shopping environment, but traditional markets

still have advantages in terms of social closeness between sellers and buyers, price flexibility through bargaining mechanisms, and higher levels of accessibility for lower-middle-income people(Berg et al., 2023; Liang & Meng, 2024; Paing et al., 2022). This condition shows that the existence of traditional markets still plays an important role in maintaining the stability of urban food supply and supporting community food security, especially in the provision of fresh food such as vegetables.

Figure 1. Growth of vegetable commodities

Based on Figure 1, the graph shows, vegetable production during the period 2013–2017 shows a tendency to increase gradually despite fluctuations. In 2013, vegetable production was recorded at 11.56 million tons. This figure then increased in 2014 to 11.92 million tons, which indicates an improvement in the performance of the vegetable production sector. However, in 2015 there was a decrease in production to 11.63 million tons(Arouna et al., 2021; Dillis et al., 2024; Middha & Willand, 2023). This decline is temporary and can be influenced by various factors such as weather conditions, climate, production disruptions, or distribution of agricultural products.

Furthermore, in 2016 vegetable production again experienced a significant increase to 12.08 million tons. This increase indicates a process of production recovery after the decline in the previous year. The upward trend continued until 2017, where production reached 12.48 million tons, which was the highest achievement during the observation period. Overall, although there was a decline in 2015, the trend of vegetable production in the medium term shows a positive direction(Minas et al., 2020; Mulungu et al., 2024; Pietrobon, 2024). This reflects that the vegetable sector has good growth potential and is relatively able to adapt to various challenges, thus making an important contribution to the availability of food supply.

In the context of fresh food distribution, the efficiency of the vegetable supply chain is a very crucial aspect Vegetables as a horticultural commodity have *perishable* characteristics, a relatively short shelf life, and are highly dependent on the speed and accuracy of the distribution process from producers to end consumers(D'Exelle & Ringdal, 2022; Pérez-Neira et al., 2023; Subramanian & Kumar, 2024). Any delay or inefficiency in the supply chain, whether at the transportation, storage, or marketing stages, can have a direct impact on the decline in product quality, the increase in post-harvest depreciation, and the increased risk of economic losses for all business actors involved in the supply chain

An efficient vegetable supply chain will be able to reduce distribution costs. reduce the level of product damage, and maintain the quality of vegetables until they reach consumers. In addition, supply chain efficiency also plays a role in maintaining price stability, so that consumers can get vegetables at reasonable prices, while farmers still get a decent income(Haubrock et al., 2024; Ibrahim et al., 2024; NDI, 2024). Thus, supply chain efficiency not only has an impact on economic aspects, but also on the sustainability of the food system as a whole.

On the other hand, an inefficient vegetable supply chain can cause various structural and economic problems. The length of distribution channels involving many intermediaries often leads to high marketing margins, so that the price difference between the farmer and the end consumer level becomes even larger(Gill-Wiehl et al., 2022; Hill et al., 2019; Luh et al., 2023). This condition has the potential to harm farmers as the main producer due to the low prices received, as

well as burdening consumers with relatively high and unstable vegetable prices(Touch et al., 2024). In addition, inefficiencies in the supply chain also contribute to increased food waste due to product spoilage during the storage and distribution process, especially in perishable vegetable commodities

In Indonesia, the vegetable supply chain is still faced with various structural problems that hinder the achievement of optimal distribution efficiency. Common problems include the strong dominance of middlemen in the marketing system, limited storage and adequate transportation facilities, low levels of coordination between supply chain actors, and the lack of optimal use of information technology in distribution management and pricing(Escobar et al., 2022; Jin et al., 2022; Marcinko et al., 2022). This condition has a direct impact on increasing logistics costs, low distribution efficiency, and the occurrence of sharp fluctuations in vegetable prices in traditional markets, which ultimately harms farmers as producers and consumers as end users

The condition of the supply chain that is not optimal is increasingly felt in urban areas with high levels of demand, such as the city of Surabaya. As one of the metropolitan cities in Indonesia, Surabaya has a large and sustainable food needs, so the vegetable distribution system is required to run efficiently, quickly, and coordinated(Abdulai et al., 2022; Jacobi et al., 2024; Shi et al., 2025). Traditional markets in Surabaya have an important role to play in meeting these needs, but still face challenges in terms of increasingly complex distribution capacity.

The selection of Dukuh Kupang Market and Simo Market Surabaya as the research location is based on their important role as the main traditional market in urban areas. The two markets have different characteristics in terms of the scale of trading activity, supply volume, and distribution density level. These differences in characteristics make the Kupang Hamlet Market and the Simo Market interesting to be analyzed comparatively to understand the picture of ongoing economic activities. This concept is important in understanding how increased revenue affects supply chain efficiency and trading activities in traditional markets.

RESEARCH METHODOLOGY

This study uses a quantitative approach with descriptive and comparative methods to analyze the efficiency of the vegetable supply chain in traditional markets, especially the Kupang Hamlet Market and the Simo Market Surabaya. The object of the research is focused on the vegetable distribution system involving producers, collectors, and retail traders in the two markets. The data used is entirely secondary data obtained through literature studies and documentation studies from various official and credible sources, such as the Central Statistics Agency (BPS), the Trade Office, the Agriculture Office, local government reports, as well as relevant and indexed national and international journals. The data analyzed includes vegetable prices, distribution costs, marketing margins, and distribution times that reflect supply chain performance. Data analysis techniques are carried out through descriptive analysis to describe the structure and flow of the supply chain, marketing margin analysis to find out the price difference between marketing levels, and marketing cost efficiency analysis to assess the level of supply chain efficiency. Furthermore, the results of the analysis of each market were compared comparatively to identify differences in efficiency levels and factors that affect the performance of the vegetable supply chain in traditional urban markets.

RESULTS AND DISCUSSION

Overview of Vegetable Supply Chains in Traditional Markets

Based on the results of secondary data collection and literature studies, vegetable supply chains operating in traditional markets generally involve several main actors, namely farmers as producers, collectors or middlemen, wholesalers, retail traders, and end consumers. This distribution flow shows that the process of distributing vegetables from production centers to traditional urban markets still tends to be long and involves many intermediaries(Torres-Gonzalez

et al., 2024). These conditions have a direct impact on distribution costs, the speed of goods flow, and the quality of products received by consumers.

At the Kupang Hamlet Market and Simo Market Surabaya, the vegetables traded mostly come from agricultural areas around East Java, such as Sidoarjo, Mojokerto, Malang, and other buffer areas. Vegetables are harvested at night or early in the morning, then collected by collectors before being sent to the market in the morning(Villegas-Cayllahua et al., 2024). This distribution pattern is carried out regularly to meet the daily demands of the urban community which are relatively high and sustainable.

Despite having almost similar distribution flows, the two markets show characteristic differences in the implementation of supply chains. Simo Market is known to have a denser level of trading activity with a relatively large volume of supply, while Dukuh Kupang Market serves a more limited area with a smaller but stable distribution scale(Minh & Schmitter, 2025). This difference is the initial factor that affects the performance of the supply chain and the level of distribution efficiency in each market.

Analysis of Distribution Costs in the Vegetable Supply Chain

Distribution costs are one of the key components that determine the efficiency of the vegetable supply chain in traditional markets. Based on the secondary data analyzed, distribution costs include transportation costs from production centers to markets, loading and unloading costs, as well as costs incurred by intermediary traders(Cai et al., 2023; Werdofa et al., 2025). The longer the distribution chain is passed, the greater the accumulated costs that must be borne until the product reaches the hands of retail traders.

In the Kupang Hamlet Market, the distribution cost tends to be relatively higher per unit of product than the Simo Market. This is due to the smaller scale of trade, so transportation and operational costs cannot be optimally reduced. Meanwhile, Simo Market with a larger supply volume is able to reduce distribution costs per unit due to economies of scale.

In addition, the limitation of supporting facilities such as adequate storage and packaging facilities also affects the high cost of distribution. Vegetables that are not sold immediately are at risk of deterioration or damage, adding to the potential for losses for traders(García-Cornejo et al., 2025; Yuliana et al., 2017). This condition shows that supply chain efficiency is not only affected by transportation costs, but also by the readiness of supporting infrastructure in traditional markets.

Vegetable Marketing Margin Analysis

Marketing margin is an important indicator in assessing the efficiency of the vegetable supply chain. The results of the analysis show that there is a significant price difference between the producer level and the price paid by the end consumer in the traditional market. The price difference reflects the accumulated distribution costs and profits obtained by each supply chain actor, especially intermediary traders.

The high marketing margins indicate that most of the added value actually occurs at the intermediate level, while farmers as main producers receive a relatively smaller share of the price. This condition is often a classic problem in the distribution of horticultural commodities in Indonesia, where farmers have a weak bargaining position in determining selling prices(Brodny & Tutak, 2024; Hodgson et al., 2024).

In the Simo Market, marketing margins tend to be more competitive due to the high level of competition between traders. The competition encourages traders to reduce selling prices to remain attractive to consumers(Durmuş et al., 2023). In contrast, in Kupang Hamlet Market, the marketing margin is relatively more stable due to the limited number of traders and a distribution pattern that is more focused on regular customers.

Vegetable Supply Chain Efficiency Analysis

The efficiency of the supply chain is analyzed by comparing the amount of marketing costs to the value of the products marketed. The results of the analysis show that the vegetable supply chain in both markets is still not fully efficient. High distribution costs, the involvement of many intermediaries, and limited supporting facilities are the main factors that reduce the level of efficiency.Simo Market shows a relatively better level of efficiency than Kupang Hamlet Market(Arruda et al., 2023; Chaiwang et al., 2023; Njurumana et al., 2025). This is influenced by larger trading volumes, faster turnover of goods, and high levels of demand. Fast turnover of goods is able to reduce the risk of stock buildup and product damage, so that distribution costs can be reduced.

In contrast, the Kupang Dukuh Market faces efficiency challenges due to its smaller distribution scale and limited access to supporting facilities. This condition causes the distribution cost per unit of product to be higher and the risk of product damage increases, especially for types of vegetables that have a short shelf life.

Comparison of Supply Chain Efficiency of Dukuh Kupang Market and Simo Market

The results of the comparative analysis show that the difference in supply chain efficiency between the two markets is influenced by internal and external factors. Internal factors include the scale of trade, the number of traders, and the intensity of daily transactions, while external factors include the condition of transportation infrastructure, distance from production centers, and the level of market demand. Markets with high levels of trade activity tend to have more efficient supply chains because they are able to take advantage of economies of scale and accelerate product turnover(Odundo et al., 2023; Owusu Junior et al., 2022; Venter et al., 2024). However, both the Kupang Dukuh Market and the Simo Market still face the same problems, namely dependence on intermediary traders and the lack of use of information technology in supply chain management.

Discussion of Research Results

The findings in this study are in line with the theory and results of previous research which states that the efficiency of the horticultural commodity supply chain is greatly influenced by the length of distribution channels, logistics costs, and the level of coordination between actors. Long and poorly integrated supply chains tend to result in high marketing costs and uneven price margins.

In addition, the results of this study confirm the importance of the role of traditional markets in maintaining the stability of urban food supply. Despite facing various limitations, traditional markets remain the main choice of people in meeting the needs of fresh vegetables. Therefore, efforts to improve supply chain efficiency in traditional markets are very important to maintain the sustainability of urban food systems.

Policy and Managerial Implications

The results of this study have important implications for market managers and local governments. Efforts to improve supply chain efficiency can be carried out through simplifying distribution channels, strengthening the institutions of traders and farmers, and providing supporting facilities such as storage and price information systems. The use of simple information technology can help improve coordination between supply chain actors and reduce supply imbalances. With the improvement of supply chain efficiency, it is hoped that vegetable prices in traditional markets can be more stable, product quality is maintained, and the welfare of farmers and traders can increase sustainably.

CONCLUTION

Based on the results of the analysis of the efficiency of the vegetable supply chain at the Kupang Hamlet Market and the Simo Market in Surabaya, it can be concluded that traditional markets still play a strategic role in the urban food distribution system, especially in the provision of fresh vegetables for the community. The two markets serve as the main meeting point between the supply from horticultural production centers in the East Java region and the demand of urban consumers, so that the sustainability and performance of the supply chain greatly determine the stability of supply, price, and quality of vegetables at the consumer level.

The results of the study show that the structure of the vegetable supply chain in the two markets is relatively similar, involving several main actors such as farmers, collectors, wholesalers, and traditional market retailers. However, the length of the distribution channel and the number of intermediaries involved lead to high marketing and distribution costs, which ultimately lowers the overall level of supply chain efficiency. This condition is reflected in the large marketing margin which does not fully reflect the increase in product added value, but is more caused by logistics costs, damage risks, and supply fluctuations.

Based on operational efficiency, the vegetable supply chain in Pasar Dukuh Kupang and Simo Market still faces challenges in the form of limited storage facilities, lack of implementation of adequate post-harvest handling systems, and low utilization of information technology in distribution and marketing activities. Vegetables as a perishable commodity are very susceptible to loss of quality and quantity during the distribution process, so this inefficiency has a direct impact on the increasing rate of food shrinkage and waste.

In addition, weak coordination between supply chain actors is the main factor that affects low distribution efficiency. Relationships between farmers, collectors, and traditional market traders tend to be short-term transactional and have not been supported by strong and sustainable partnerships. As a result, the mechanism of price formation is still strongly influenced by certain market forces, so the bargaining position of farmers is relatively weak, while prices at the consumer level tend to fluctuate.

Comparatively, the difference in the scale of trading activity and supply volume between the Kupang Hamlet Market and the Simo Market also affects the level of supply chain efficiency. Markets with larger transaction volumes tend to have lower distribution costs per unit, but still face the risk of inefficiencies if not supported by an integrated logistics system. This shows that the efficiency of the supply chain is not only determined by the scale of the market, but also by the quality of distribution management and coordination between actors.

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