Volume 5 Issue 1 (2025) Pages 589-598
**Amkop Management Accounting Review (AMAR)**
ISSN: 2828-2248 (Online)

# Supply Chain Management (SCM) Analysis in the Distribution Flow of 3 Kg LPG Gas at UD. Fitri Depot in Karo Regency

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## Abstract

The purpose of this study is to investigate the stages of the supply chain process involved in distributing 3 kg LPG gas at the UD distribution center in Karo Regency, as well as to identify the causes of delays in delivery and reductions in the quantity of goods requested by retailers at the distribution center. Fitri in Karo Regency, as well as to identify the causes of delivery delays and reductions in the quantity of goods requested by retailers at the distribution center. The method used in this study is a qualitative survey analysis, conducted through Lean Search, based on direct observation at the LPG gas distribution center. Data collection techniques included observation, interviews, and documentation conducted directly at the gas distribution center. The results of the study indicate that the 3 kg LPG gas distribution center is located at UD. Fitri in Karo Regency has three supply chain flows: product flow, information flow, and financial flow. Delays in the delivery of goods from the distribution center to retailers are caused by transportation limitations of the distribution center, which cannot transport large quantities of LPG gas to multiple retailers at once, as well as transportation issues such as flat tires and the distance between the distribution center and retailers, and unexpected road conditions that occasionally cause traffic congestion, leading to delays in goods delivery. Additionally, discrepancies between the quantities ordered by retailers and those delivered by the distribution center are caused by the limited supply available at the distribution center, which must allocate the available LPG gas among multiple retailers. Based on the analysis conducted by the author, the LPG distribution center UD. Fitri should establish and implement a scheduling system for retailers by dividing days and times for placing LPG gas orders. Additionally, the distribution center should consider the distance traveled for deliveries to retailers to minimize the risk of delivery delays. It should also calculate distribution costs for deliveries to retailers by avoiding and reducing excessively long distances, thereby saving on distribution costs in the event of fuel price increases while maintaining an efficient distribution process.

**Keywords:** *supply chain management, effectiveness, distribution flow.*



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# INTRODUCTION

The distribution process of Liquid Petroleum Gas (LPG) in the Karo Regency area is carried out through distribution channels via gas stations. The government,

DOI: 10.37531/amar.v5i1.2552

through Pertamina, the entity responsible for providing and distributing 3 kg of LPG, has established and designed a distribution system capable of reaching all segments of society, from urban areas to rural villages. According to Kottler (as cited in Eka Santi Agustina, 2023), a distribution channel is defined as a group of companies and individuals who take over the rights, or assist in the transfer of rights, over certain goods or services during the movement of those goods or services from the producer to the consumer. (Eka Santi Agustina, 2023). The distribution of LPG gas begins at the producer, proceeds through intermediaries, and ends at the storage facility, ultimately reaching the consumer or community. Pertamina, as the company that developed the SPBE (LPG Fuel Filling Station) distribution system, is responsible for filling LPG. Next, LPG is distributed through agents, which are large distribution companies, and ultimately reaches sub-agents or distribution points that serve as the frontline in LPG distribution. Sub-agents or distribution points act as intermediaries in the distribution of 3 kg LPG to end consumers.

According to data from Kompas (2025), the government's recent decision prohibiting the public from purchasing Liquid Petroleum Gas (LPG) through retailers has made it difficult for people to obtain gas for their daily needs. Under these circumstances, people have to queue at distribution points because it is challenging to obtain LPG through retailers. The government did not impose the ban on purchasing LPG through retailers without a reason. Price uncertainty and discrepancies in selling prices prompted the government to implement this policy. Within the distribution network, Pertamina has established the maximum retail price (MRP) based on Minister of Energy and Mineral Resources Regulation No. 2458 of 2017, which outlines the Reference Price for 3 kg LPG. The government and Pertamina have set the MRP for LPG distribution points in the Tanah Karo region at Rp. 17,000 to Rp. 18,000 per cylinder. However, the prices set are not being honored, and consumers are not receiving the gas at the MRP. If the public purchases LPG through retailers, the price is typically higher than the Het, ranging from Rp. 19,000 to Rp. 21,000 per cylinder. The issues arise due to the increasingly lengthy distribution chain for LPG to reach consumers, as well as other factors such as additional transportation costs, delays in the delivery of goods or LPG, and reductions in the quantity of goods requested by retailers from the distribution points.

The key competitive advantages in a business are consistency in product delivery, whether it is carried out by suppliers to the company or by the company to customers. This highlights the crucial role of Supply Chain Management (SCM) for companies and other businesses. According to Simchi and Levi (in Guritno & Harsasi, 2018) define “Supply Chain Management (SCM) as a set of approaches used to integrate suppliers, manufacturers, warehouses, and stores efficiently so that goods are produced and distributed in the right quantities, to the right locations, and at the right time, to minimize costs throughout the system while meeting service level requirements.” (Guritno & Harsasi, 2018). Distribution plays a crucial role in the supply chain, ensuring that supplies meet demand. The role of distribution is to maintain a balance between demand, supply, and needs, thereby preventing shortages or excesses of goods. Fulfilling orders accurately can increase a business's competitive advantage.

Previous studies by Devyana (2023), in " Analysis of Supply Chain Management in the Home-Based Tofu Industry in Dusun I Sidorukun, Labuhan Batu

DOI: 10.37531/amar.v5i1.2552

District," stated that problems were found to be caused by a lack of coordination between producers and retailers, retailers' inability to plan accurately in measuring market demand and adjusting production levels accordingly, resulting in an imbalance between the amount of tofu produced and consumer demand.

In a study titled "Analysis of Supply Chain Management Implementation in Dodol Products at Bengkel Market in Serdang Bedagai," Lubis (2022) emphasized the planning process to enhance innovation and the use of technology in facing market competition. This is because these factors are crucial for the success of supply chain management implementation in the dodol business. Research conducted by Hasan & Karuntu (2023) in "Analysis of the Determination of the Distribution Route for 3 KG LPG Gas at PT. Surya Gas Mandiri Manado" states that the transportation routes of PT. Surya Gas Mandiri is still experiencing inadequate capacity, resulting in delivery delays. The primary focus of LPG gas distribution is from UD. Fitri is solely selling 3-kilogram LPG cylinders—additionally, UD. Fitri's gas distribution point also supplies LPG to retailers for resale. By selling through retailers, the distribution of LPG is brought closer to consumers. However, consumers must accept that an increase in LPG prices will occur because retailers will inevitably take a profit margin from their sales.

## Management

According to Stoner, J.A., R.E. Freeman, and D.R. Gilbert Jr. (1995, as cited in Dian Wijayanto, 2012), management is the process of planning, organizing, directing, and supervising the efforts of an organization's members and the utilization of other organizational resources to achieve the organization's established goals. Activities are carried out by the planning stages that have been prepared to achieve the organization's objectives. In the LPG gas station business, a thorough planning process is necessary to ensure that business activities run smoothly and minimize errors in ordering quantities of goods.

## Supply Chain Management

Supply Chain Management can be defined as a set of activities (in the form of entities or facilities) involved in the process of transforming and distributing goods from the earliest raw materials extracted from nature to the finished product to the end consumer (Rahmani, 2022). Supply chain management encompasses not only producers and suppliers but also distributors, warehouses, retailers, and customers or consumers. To meet consumer needs, supply chain management shows how the quality of goods is maintained from the initial shipment to the customer. It not only demonstrates product quality but also ensures that inventory quality meets consumer demand, thereby ensuring availability. Additionally, it involves understanding customer needs, ensuring that high-quality products are consistently available, maintaining effective logistics and distribution, promoting clear communication and information, and fostering strong relationships among supply chain members (Febryani, 2020). Supply chain management integrates all processes within the distribution system into a structured whole, from upstream to downstream.

DOI: 10.37531/amar.v5i1.2552

Distribution

Distribution is a marketing channel used by product manufacturers to deliver their products to industry or consumers (Rahmani, 2022). Distribution facilitates and simplifies the delivery of goods from producers to consumers. Distribution carried out by an individual or a company is called a distributor, who acts as an intermediary that channels products from manufacturers to retailers. Products produced by factories are sent directly to a distributor, who then resells the goods to other retailers (Amiruddin et al., 2023). Distribution is one of the components of the supply chain that enables the optimal dissemination of information and goods. Specifically, the distribution process referred to here is the supply chain network. This component can be used to find the ideal distribution channel. Important factors in the distribution of goods, such as travel time, distance to the fastest and shortest route, as well as supply and demand, must be considered.

# METHODOLOGY

This study focuses on 3kg LPG gas station businesses by identifying distribution channels. The study was conducted at the UD—Fitri in Karo Regency. The research informant is a 3kg LPG gas station owner who is directly involved in the research issue and can answer questions regarding the distribution process at the owner's gas station. This research employs a qualitative approach, utilizing survey analysis through Lean Search. The data collection techniques used are observation, interviews, and documentation.

# RESULTS AND DISCUSSION

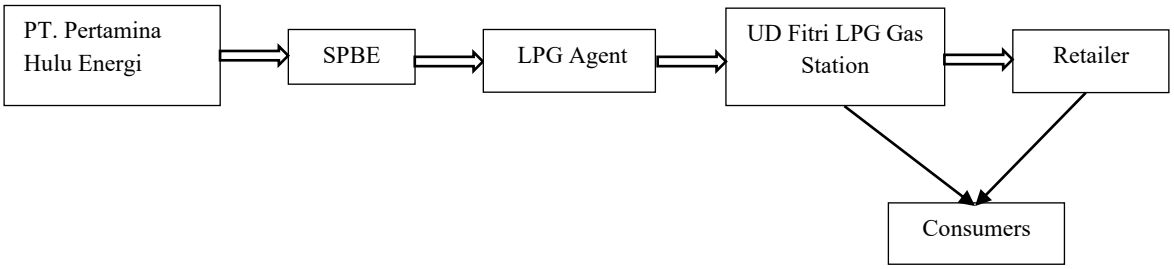


**Figure 1. Alur Supply Chain**

LPG (Liquefied Petroleum Gas) is an energy diversification program implemented by the government through Pertamina, which involves switching from the use of kerosene to LPG. Optimal distribution can achieve the efficiency of the government's diversification program. The stages of the supply chain structure in the LPG distribution flow begin with the journey of the product from upstream to downstream. PT. Pertamina Hulu Energi (PHE) is a subsidiary of PT. Pertamina (Persero) engaged in oil and gas exploration and production. PT. Pertamina Hulu Energi (PHE) operates and produces oil and gas in Indonesia, which is then distributed to SPBE (LPG Fueling Stations).

The image above shows the stages of the LPG distribution process through SPBE (LPG Fuel Filling Stations), which operate as an extension of Pertamina (Persero) and function as distributors of LPG to the public. LPG is one of the products distributed by SPBE PSO (Public Service Obligation). SPBE PSO is a Bulk LPG Filling

DOI: 10.37531/amar.v5i1.2552

Station that has obtained all necessary approvals and permits by applicable regulations and requirements set by Pertamina to operate and utilize SPBE, including receiving LPG from designated supply points, storing, and filling LPG into PSO LPG cylinders by Pertamina's specifications. 3 kg of LPG is a subsidized product from the government intended for low-income households and micro businesses. After filling LPG in accordance with safety standards, the SPBE will deliver it to agents, with a capacity of approximately 11 to 14 trucks per day, each truck capable of carrying 560 LPG cylinders.

The agents then distribute the gas to sub-agents or gas distribution points. To monitor distribution to the community, the researcher conducted a study at the 3 kg LPG gas distribution point UD. Fitri. UD. Fitri is a gas distribution business that has been operating for approximately two years, supplying 3 kg LPG cylinders. The owner of the LPG gas station is a native resident of Karo Regency, living in Sempajaya Village, and is named Mrs. Fitri. UD. Fitri's gas station has 200 3 kg gas cylinders, all of which were obtained through agents. On average, UD. Fitri can sell between 40 and 50 3-kg cylinders, with an estimated total of 280 to 350 cylinders per week. Distribution activities are not limited to the Sempajaya Village area but also extend beyond the village, covering parts of Karo Regency.

LPG gas cylinder owners not only sell directly to households, but depot owners also sell to retailers or businesses, such as warungs or stalls. Approximately 10 retailers are involved in distributing UD. Fitri. The relationship between the distribution center and retailers is the distribution process closest to consumers. Through the distribution center, retailers obtain LPG cylinders, which are then distributed back to the community. Usually, after the gas is ordered, it can be delivered directly by the depot owner, or retailers can pick up the gas directly at the depot. If the depot owner delivers the gas, an additional fee of Rp. One thousand per cylinder will be charged, so the price of a 3 kg cylinder of LPG gas will be Rp. 18,000 per cylinder. Additionally, if the price rises above Rp. 18,000, it depends on the retailer who sells the LPG back to the community.

**Supply Chain Management Flow Chart for UD. Fitri Gas Depot in Karo Regency**
**Product Flow**

It is well known that there are three primary types of flows in supply chain management: product flow, financial flow, and information flow. As seen in the product flow, which involves raw materials from nature as the primary input for the production of liquefied petroleum gas (LPG), companies transform or modify these raw materials into semi-finished goods, suppliers provide materials to support the production process, companies perform assembly, distributors distribute the products, and retailers sell the finished goods to the end consumers, who are the general public.

The extraction of raw materials for LPG begins in nature, carried out by PT. Hulu Energi conducts exploration, searching for and discovering natural gas sources, which are then produced to generate gas from gas fields or locations where natural gas has been discovered, not only in Indonesia, but also from PT. Hulu Energi also imports natural gas from several countries, including the United States, the United Arab Emirates, Saudi Arabia, Qatar, and others. The produced gas is then processed into a product ready for use. The processed gas is then distributed to SPBE, which is responsible for filling LPG cylinders with gas processed by PT. Hulu Energi by safety standards. After filling, SPBE is responsible for delivering or distributing the filled gas

DOI: 10.37531/amar.v5i1.2552

cylinders to agents who will then distribute them to end consumers. The SPBE is also responsible for managing inventory by reviewing stock levels, scheduling deliveries, and managing shortages. Agents then receive LPG according to the order quantity, which they then redistribute to sub-agents or distribution points that have partnered with them. Agents distribute their LPG to various distribution points. Finally, distribution points sell the LPG directly to end consumers or through retailers.

**Information Flow**

Information regarding the ordering and delivery of LPG gas at UD. Fitri's distribution center begins with the agent placing an order for LPG gas with the SPBE (LPG Fueling Station). The SPBE then receives the order and dispatches the LPG gas via truck to the agent according to the order quantity, and the agent receives the gas as ordered. Next, the agent will distribute the LPG gas to sub-agents or distribution points that have officially partnered with them. Agents distributing LPG gas to distribution points will only send the gas if the distribution point has placed an order in advance through the "My Pertamina" app, according to the scheduled time. After the distribution center places an order, the agent will send the LPG gas using truck transportation according to the quantity ordered. The distance traveled in the delivery process from the agent to the distribution center is 12 km, with transportation costs borne by the sender, i.e., the agent.

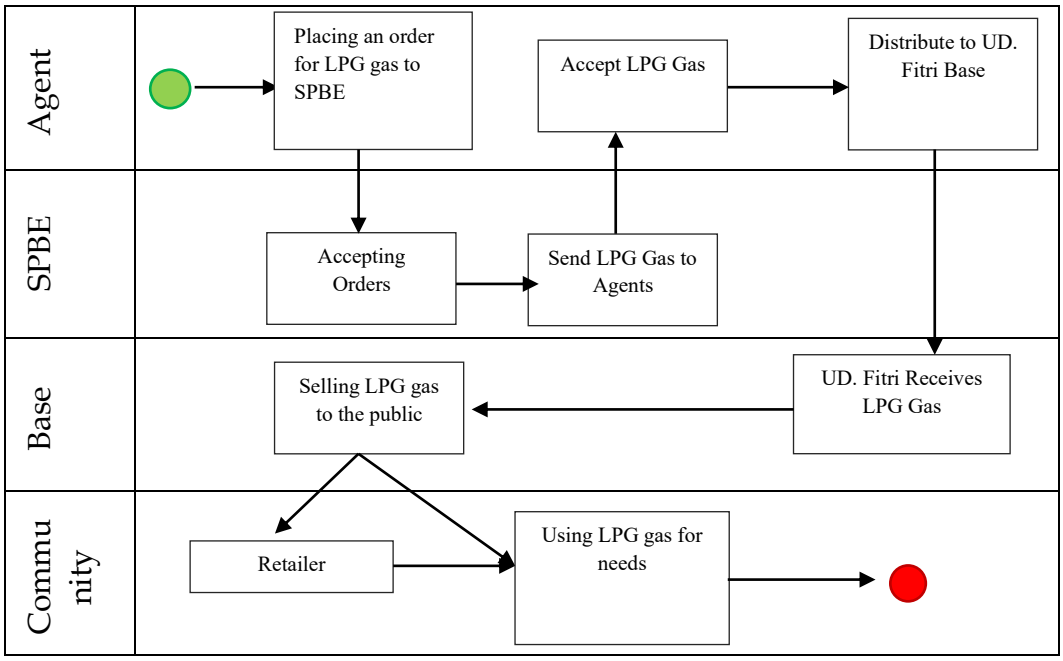


**Figure 2. Distribution Flow**

In the LPG gas ordering process, the agent determines a schedule for each distribution center at the UD. Fitri receives a weekly order schedule, which is three times a week, on Tuesdays, Wednesdays, and Saturdays. Each order requires the distribution center to exchange empty or sold LPG cylinders, totaling 100 cylinders per schedule. Once the distribution center receives the LPG cylinders, they are sold to the public and retailers—the distribution process is carried out by UD. The process for Fitri to retailers begins with an order. Once the order is placed, the gas cylinders are delivered by the depot owner using motorized vehicles or cars, and

DOI: 10.37531/amar.v5i1.2552

retailers can collect them directly from the depot. The public can also purchase LPG cylinders from the nearest retailer; however, prices at retailers may differ from those at the depot.

In the distribution of 3 kg LPG gas cylinders by the depot, it is known that there are no specific rules regarding the maximum amount of sales that the depot can make to retailers. Generally, the depot will adjust the availability or stock of goods to meet the demand of retailers who are already customers at the LPG distribution center UD. Fitri, gas is distributed to each retailer in quantities of 10 to 15 cylinders. Government regulations only emphasize that the selling price of LPG must comply with the Het (maximum retail price) to ensure that low-income households receive subsidized 3 kg LPG cylinders accurately and to reduce misuse of subsidies that could harm the public.

Financial Flow

In the distribution of LPG, agents sell to distribution centers at a set price, and the distribution centers then sell to retailers for Rp. 17,000 to Rp. 18,000 per cylinder. Retailers sell to consumers at Rp. 19,000 to Rp. 21,000 per cylinder. Gas distribution point UD. Fitri strives to meet consumer demand according to needs by minimizing overall costs and focusing on physical costs during the supply chain operation, such as transportation costs. Based on interviews conducted by the researcher at the UD. Fitri's gas distribution center faces challenges in distributing gas from agents to consumer distribution centers, such as delays in delivery and discrepancies between the number of orders placed and the number of cylinders delivered. For example, if a distribution center orders 150 LPG cylinders, the agent may only deliver 100 cylinders. This also affects the distribution from the depot to retailers. The discrepancy in the quantity delivered by the agent supplying LPG cylinders to the depot causes the depot to reduce or deliver goods that sometimes do not match the quantity ordered by retailers, thereby also affecting the distribution carried out by the UD. Fitri. For this reason, depots must be smart in maintaining available supplies and distributing the available LPG to retailers who have placed orders.

Delivery delays may occur due to transportation issues, such as flat tires or other obstacles en route to the depot. In addition to transportation issues, unforeseen natural disasters have also impacted deliveries, such as the landslide on the Medan-Berastagi highway several months ago, which blocked the road and prevented vehicles from passing, causing delays in gas deliveries from agents to distribution centers. Delays in delivering goods from the distribution center to retailers are caused by the limited transportation capacity of the distribution center, which cannot transport large quantities of LPG gas to multiple retailers at once. Furthermore, transportation issues such as flat tires, the distance between the depot and retailers, and unexpected road conditions, including traffic jams, often cause delays in goods delivery, which affects the delivery schedule and sometimes results in late deliveries. Additionally, discrepancies in the quantity of deliveries ordered by retailers at the distribution center are caused by the limited supply available at the distribution center, which must also allocate the available LPG gas to multiple retailers. This is also caused by agents who sometimes deliver LPG gas that does not match the depot's order. In the LPG gas ordering process, the depot utilizes the “My Pertamina” application, which is exclusively available to officially registered depots

DOI: 10.37531/amar.v5i1.2552

collaborating with agents. Not only must orders be placed, but sales reports must also be updated daily using the "My Pertamina" application. The use of the "My Pertamina" application for ordering and sales reporting is one of the innovative steps taken to facilitate relevant parties, such as distribution centers, in minimizing errors in ordering goods and updating sales reports on a daily basis. This also makes it easier for distribution centers as they do not need to visit agents to place orders; goods ordered through the application will be delivered directly by agents.

Effective inventory management and ensuring that goods are available when needed by all parties involved in the distribution of LPG will enhance business efficiency and effectiveness. Parties involved in the supply chain are interconnected and influence each other according to the stakeholder theory proposed by Edward Freeman in his book Strategic Management: A Stakeholder Approach (1984) states that a business can be understood as a system for creating value for stakeholders, who are considered to be those who influence or are influenced by the business (Freeman, 2010). The involvement of all interested parties can influence the distribution process by ensuring that available goods are delivered to the correct location at the right time and promptly. In the context of supply chain management, stakeholder theory can help businesses and entrepreneurs understand and meet the interests of all parties involved in the supply chain. This is done by measuring supply chain performance and ensuring that the interests of all parties involved in the distribution process are met. In addition, proper distribution must also account for uncertain situations by producing and delivering goods on time while maintaining the quality of the products.

To ensure that LPG gas products comply with storage and safety standards, the following steps are taken by the UD distribution center. Fitri, by applicable regulations, involves inspecting gas cylinders by measuring their weight using scales or measuring devices set to 3 kg. This is typically done before selling to consumers. If the owner finds that the gas weight is less than 3 kg, a report is filed, and the LPG gas is returned to the agent, who will exchange it for a cylinder meeting the standard specifications. In carrying out LPG distribution activities, collaboration among all parties is essential, including the government, Pertamina, SPBE, agents, sub-agents, distribution points, retailers, and consumers. The distribution process is highly dependent on and mutually influences all parties involved in the supply chain.

## CONCLUSION

The 3 kg LPG gas station UD. Fitri in Karo Regency has five workflow processes that play an important role in distribution, namely LPG SPBE, agents, stations, retailers, and consumers. It also has three supply chains, namely product flow, information flow, and financial flow. Based on the research findings, the UD. The Fitri gas distribution center operates effectively, as evidenced by smooth distribution processes and consistent adherence to storage and safety standards, including accurate measurement of gas weight and maintenance of fire safety measures. However, challenges such as delays in delivering goods to the distribution center and reductions in ordered quantities from agents have not met the primary objectives of supply chain management.

The issues of delivery delays experienced by the distribution center and retailers indicate that the supply chain process for distributing 3 kg of LPG gas is not yet effective. The problems of delays and discrepancies between the ordered

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quantity and the delivered quantity are inconsistent with the criteria for supply chain effectiveness, which prioritize timely delivery and cost efficiency. This may be caused by insufficient checks on the transportation to be used, resulting in transportation delays due to damage and occasional unexpected delays caused by natural disasters and traffic jams that are beyond human prediction. Deliveries that do not match orders can be caused by errors in updating daily sales reports by several depots. This can affect the number of orders sent by agents to various depots, including the UD—Fitri gas depot.

Suggestions for the UD. Fitri should establish and manage a scheduling system for retailers by dividing days and times for ordering LPG gas. For example, Retailer A can place LPG gas orders twice a week on Mondays and Wednesdays, while Retailer B can follow the same schedule as Retailer A but on different days and times. This is to ensure a balanced supply and demand—additionally, UD. Fitri should consider the travel distance for deliveries to retailers to minimize the risk of late deliveries and factor in distribution costs for deliveries to retailers by avoiding and reducing excessively long travel distances. This will help reduce distribution costs in the event of sudden increases in fuel prices for vehicles, ensuring that the distribution process remains efficient.

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