Policy for Operations Strategy of Municipal Waterworks (PDAM) in West Java, Indonesia

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ABSTRACT

Municipal Waterworks (PDAM) is a state-owned water supply company that serves consumers throughout Indonesia. One of its offices is located in West Java province, which has a large population. The water absorption in this region is excellent because the province is surrounded by mountains. Nonetheless, the company is plagued by many problems, such as poor water quality and disappointing service. Therefore, we attempt to solve these issues by implementing a policy for operations strategy. This work is a descriptive study. Data are collected from literature reviews and field studies; the latter includes observations and interviews with retailers and consumers. Findings indicate that although PDAM has implemented an effective policy for operations strategy, many issues, such as poor water quality and disappointing service, still exist. Thus, PDAM must conduct regular assessments of its water quality and customer service.

Keywords: PDAM, Operational, Strategy, Policy

1. INTRODUCTION

Municipal Waterworks (PDAM) is a state-owned company that runs the water treatment service because the government has full authority over the industry. In other words, water is owned by the state and not by individuals.

Water treatment is conducted all over Indonesia. Many PDAM offices are located throughout Indonesia and its inter-islands: 107 in Java, 87 in Sumatra, 49 in Borneo, 46 in Sulawesi, 29 in Bali and Nusa Tenggara, and 17 offices in Maluku and Papua. The customers in Java account for 57.5% of all consumers. One of the offices in Java is located in West Java, which has a considerably greater population and water absorption area than East Java and Central Java (S., Bellafolikani, 2013: 3).

Water is needed by all communities. Water balance is affected by various factors, such as the steady growth of the population, the prevalence of overcrowding, the spread of urban areas, the expansion of cultural and industrial technologies, the decrease in the carrying capacity of environmental support, and the reduction of conservation areas (S., Bellafolikani, 2013: 2).

PDAM must establish policies and strategies to address these problems. One such measure is the policy for operations strategy. The policy for operations strategy is concerned with management operation decisions covering product design, quality, process design, location selection, layout design, human resources, work design, supply chain management, inventory, and maintenance [Heizer (2006), Manahan P Tampubolon (2014: 27–28].

Consumers perceive that the policy for operations strategy is not implemented properly. This issue is twofold. First, PDAM customers complain that the water distribution service provided by the company often does not ensure a good flow of water.

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Second, many complaints are related to the water quality. Customers often complain that the water is dirty, brownish, and smelly. The water distributed by PDAM is often murky and muddy, and in some cases, it can even be contaminated by mosquito larvae and tiny worms. This condition occurs when the water has been stored in a water tub for more than three days, particularly during the rainy season. These problems have raised concerns among all customers.

This study aims to examine the policy for operations strategy implemented by PDAM in West Java.

2. LITERATURE REVIEW

Theoretical Foundations of the Policy of Operations Strategy

Production is an activity or process that involves the transformation of input into output. This activity is related to the production of a product. In its development, the term "production" was replaced by the term "operations" because production is related not only to the manufactured product but also to the provided services. However, in practice, the term can be used as a placeholder for both fields (products and services).

In production or operation management, each step cannot be separated and is related to the main decision. This decision that pertains to 10 decisions or more is called the decision of 10 operations or productions, which are referred to as follows: product design, process design, quality, location selection, layout, human resources, work design, supply chain management, inventory, scheduling, and maintenance.

Heizer (2006) and Manahan P. Tampubolon (2014: 27–28) stated that operational policy is a decision of operations management consisting of product design, quality, process design, location selection, layout design, human resources, work design, supply chain management, inventory, and maintenance.

The operational policy states the goal that an operation must achieve. This kind of operational policy should be implemented for each decision category mentioned earlier (process, capacity, supply, human resource, and quality). Thus, several policies can be identified within a production system. In some cases, the policies may even contradict one another. Therefore, establishing the operational policy means finding a trade-off among many various existing options to reach the desired goal.

Operational policy is categorized into four elements of operations strategy. Other elements in the operations strategy model are the input or output activities from the development process of the operation strategy. The policy must be capable of identifying how the operation targets will be achieved. The operational policy to be developed for each category of the main decision are as follows:

Process

The decision in this category is intended for the physical design of the production process. Decisions involve formulating the procedures for making products or for providing services. Process design is closely related to product design and requires coordination between the marketing and the operation divisions.

Quality of Items

The operation is responsible for the quality of produced goods or the provided services. This decision emphasizes the quality dimensions in designing a product and its quality control.

Capacity

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The decision of capacity is aimed at providing the optimum (not below and not beyond) output volume for the organization. This decision is related to the long-term, mid-term, and short-term development of capacity design.

Supply

Supply managers must make decisions about when an order should be placed and how many items should be in that order. They manage the logistics starting from the purchasing, the storing of raw materials, the processing of the products, and up to the creation of the final products.

Tactics and Output

Tactics should follow the strategy development. Tactical decisions are generally divided into short time periods (one or two years) and are implemented to develop the operations strategy. Tactical decisions are generally made by mid-level and low-level management to implement strategies that have been established by high-level management. Examples of tactical decisions are selecting a supplier from a list of suppliers, deciding the number of supplies for certain spare parts, deciding who will be hired, allocating the budget, and identifying the next targets.

The result is typically measured with the target in a similar situation, and it will be used to determine whether the strategies and tactics will be accomplished. The result of operations will be measured in terms of costs, quality, delivery, and flexibility. If the result is unsatisfactory, then the management will modify every tactic and strategy as needed. The measurement of the result is closely related to the cycle and feedback available from the benefit of the implemented strategy.

According to Heizer (2006), the 10 decisions of operations management that support the mission and the applied strategy can be elaborated as follows:

1. Designing product and service. The designing of the product and service refers to the application of the main part of the transformation process to be implemented. The decisions that pertain to costs, quality, and human resources are dependent on the design decision. In designing products, the goal is usually to produce the highest quality at the lowest cost.
2. Quality. The quality expectation of customers must be met by implementing regulations and procedures to recognize and to achieve quality.
3. Process and capacity design. The option of process is available for both product and service. The decisions that are already enacted are binding on the management in technology, quality, use of human resources, and specific maintenance. The commitment for expenditure and capital will determine the baseline structure of the company.
4. Location selection. A manufacturing company or an organization's location largely determines corporate success. A mistake in this decision made at present would affect efficiency in the future.
5. Layout design. The flow of raw materials, required capacity, level of employees, technological decision, and need for supplies will affect the layout.
6. Human resource and work design. Human workforce is an expensive but integral part of the overall designed system. Therefore, the quality of work environment, the needed talent and skills, and the appropriate wages should be determined clearly.
7. Supply chain management. This decision determines what to produce and what to purchase depending on quality, delivery, and innovation, all of which must be at

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satisfactory cost levels. Trust must be established between buyers and sellers to facilitate an effective purchase.

8. Inventory. The supply decision can be optimized or maximized if considered from the perspectives of customer satisfaction, suppliers, production design, and human resource.
9. Scheduling. An efficient production schedule must be developed at the request of human resources, and the facilities that should be prioritized must be identified.
10. Maintenance. This decision pertains to establishing and maintaining the reliability and stability of the company.

3. RESEARCH METHODOLOGY

This work adopts the descriptive method to provide systematic, factual, and accurate descriptions or images of the retail strategy implemented by PDAM. This approach is consistent with that suggested by Aaker. David A., V. Kumar, George S. Day (2004: 71–73). This study employs a qualitative approach to obtain comprehensive, holistic, and meaningful data.

The data collection techniques utilized in this work are as follows:

1. Literature study
   To complete the primary data, we gathered secondary data from literature reviews. The secondary data collection was performed by reviewing textbooks and other relevant supporting publications, such as journals and result analyses of the data from the PDAM at West Java.
2. Observation
   The shelter and water treatment station of PDAM at West Java was directly observed.
3. Interview
   First, we asked customers questions concerning their complaints or the problems that they encountered when they were using the water treatment of PDAM. Second, interviews were arranged with the Head of Research and Development of PDAM. The interviews lasted for three hours.

4. RESULTS AND DISCUSSION

The policy for operations strategy implemented by PDAM was as follows:

1. Product and service design
   Designing refers to attaining the highest quality at the lowest cost. In the payment of bills, not only clean water but also dirty water is charged, and it depends on the use of each customer.
2. Quality
   The quality expectation of customers was set. Regulations and procedures were enacted to assess and improve the quality. The most common complaints were related to water quality services. The customers complained about dirty, murky, and smelly water. PDAM declared that the water first ejected from IPAL PDAM is clean. The dirty water had formed because of sediment deposition, fluorine gas, and iron as the water flowed in the pipelines, exposure to sunlight and other substances that did not flow away, and lack of circulation. The chemical level also influenced the final output of water production even though it is still deemed safe to consume. Furthermore, many customers also complained about the occasional stopping or slowing down of water flow.

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The dirty water occurred because the water flowed from the source through paddy fields, occasionally exposing it to domestic waste or dumpsters. The above issues impede the purification of water. Water exposed to domestic waste requires several purification stages before it becomes potable. The lack of initiative from the community to protect the environment is another cause of water scarcity and the contamination of groundwater.

During the dry season, the water becomes cleaner because it is not contaminated by groundwater and other substances. During the rainy season, the water is occasionally used for field irrigation or is contaminated by rubbish, indicating the need for the water to undergo several filtering processes.

3. Process and capacity design

Process options were available for products and services. The decision of the process will bind the management by technology, quality, use of human resources, and specific maintenance. The commitment for spending and capital will determine the baseline structure of the company.

Maintenance is related to the water quality and the supply equipment. The cleanliness of pipelines must be maintained to ensure clean water for the customers. In addition, if a customer's water pump is broken, then a new pump is provided as a replacement immediately to ease the water distribution.

The produced water quality fulfills all the conditions and terms regulated by the government through the Health Ministry.

The technology used by the company is deemed good. A computerized system is used to detect the water distribution to customers in seconds every day. In addition, it can detect water shortage due to customers who use water pumps.

In addition, bills can be paid through ATM or auto debit, indicating that the company has a business partnership with the bank.

4. Location selection

PDAM selected the mountain region as the location for raw materials to maintain the quality of the water to be distributed to the customers. The raw materials are located in an area outside of PDAM. For example, in Cirebon, the water source is located at Kuningan Regency. The distribution of drinking water is adjusted in the location or the domicile itself. For example, the PDAM of Lembang area or the PDAM at Badak Singa provides water to the PDAM of Bandung for the customers who live in the North Bandung area.

5. Layout design

The layout design of PDAM is related to the water flows as the raw material. The water resource is available and is located in the basement or beneath the building of PDAM because of the legacy of the last Dutch government, which intended to ease the water distribution derived from the water source or the river. In addition, such a strategy also makes the water treatment easier and undisturbed.

6. Human resources and work design

The employees of PDAM serve customers every day. PDAM employees are regional civil servants who serve the customers professionally. However, when field workers do not check the water pumps in the field, the water bills increase, which disappoints customers.

However, according to PDAM, non-inspection occurs when the customers' home is empty, preventing them from checking it directly. PDAM customers can also deliver their complaints. For example, the PDAM of Bogor has received 163 complaints through their Twitter account @PDAMKotaBogor. The Facebook account of PDAM Bogor has

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also become a social media platform where customers can express their complaints. The Facebook account of PDAM Kota Bogor has recorded and received 11 complaints from customers.

One of the complaints from a customer is the mismatched calculation between the water usage and the water bills. In such cases, the customer can submit their objections to the central office of PDAM, which will then investigate the cause of the discrepancy. If the overcharging complaints are valid, then the payment will be refunded.

7. Supply chain management
   This decision pertains to what should be produced and what should be purchased depending on quality, delivery, and innovation, all of which must be at satisfactory cost levels. Building trust between the customers and the company is essential.
   The supply chain consists of the following:
   a. Supplier. This aspect is related to the source of water as a main material.
   b. Distribution system. This part is related to the distribution of water to the customers.
   c. Retail. This aspect is related to the water supply. The water supply is not only for the consumption of customers but also to be sold to those who are not customers yet. For example, when an area lacks water, people can buy water brought by PDAM through water tanks. Such customers are typically residents of a housing complex or a neighborhood suffering from a lack of water.
   d. Customers. The customers who use PDAM facilities are the general public, business owners, and industrialists (factories).
8. Inventory
   The company implements a "make to stock" system, which anticipates the water shortage during the dry season, because the water supply during the dry season cannot fulfill the customers' needs properly. For example, Bandung has two major water sources, namely, Cikalong River and Cikapundung River. The capacity of the water entering the shelters of PDAM from these sources normally reach more than 2.000 liters per second. However, during the dry season, the water volume of these water sources decreases steadily. The supply of raw material refers to the availability of the main materials that need to be processed. In PDAM, the raw material is the water. Work in process inventory indicates the supply that has been processed but is still unfinished. The inventory in this process is directed to the water used for processing. In this case, clean water is available for consumption after being processed through several filtering procedures.

   The land use change that starts from the river's upstream to the downstream has also caused a great fluctuation in the water volume during the rainy and dry seasons, causing a sharp reduction of water debit in the river as the raw materials for drinking water during the dry season. The decrease in the water debit from the water source during the dry season causes the pollutants in the river to become even more concentrated. Consequently, the water quality will deteriorate, and the cost for drinking water treatment will increase. In urban areas, where the surface water source is less than that in other areas, PDAM will use groundwater instead to meet the customers' need for clean water.

   Along with population increase, more groundwater needs to be pumped up to fulfill the needs of all customers for clean water. However, the growth in population size and the land use change will influence the absorption of the rainwater into the ground, ultimately lowering the amount of groundwater.

   Supply inventory is a supply activity that serves as a support in operation or production processes, and it ensures the success of the company. Examples of supplies

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include the pipelines used for water distribution, water pumps, and water purifying chemicals. Merchandise inventory refers to the inventory that functions as a merchandise that will be resold as marketable goods. In PDAM, the water supply is accommodated first in the shelter until the filtering process into clean water is completed. Finished goods inventory refers to the supply obtained from the output of operations or productions, and it is still stored in the company's warehouse. The output is also categorized as a supply, because a customer's request may be made at an unspecified time. In PDAM, the water supply is not used for daily routine only but also for providing major scales. For example, if a group requires water service, then PDAM can fulfill this demand by providing water through water tanks.

9. Scheduling
   The production schedule is related to the water distribution according to the residency itself, and it runs for 24 hours every day. However, because of the great number of houses and inhabitants, water distribution is sometimes delayed.

10. Maintenance
    Maintenance is related to the water quality and the supply equipment. In this case, it is also related to the water pumps owned by the customers. The cleanliness of the pipelines must be maintained to ensure the cleanliness of the water distributed to the customers. Moreover, if the water pumps owned by the customers are broken, then PDAM will replace the water pumps immediately to guarantee efficient water distribution.
    If a customer's water pump is broken, then they can acquire a new one. This approach is a part of the maintenance service of the water pump from PDAM to achieve customer satisfaction.

5. CONCLUSION AND SUGGESTIONS

CONCLUSION

Although PDAM has implemented a policy for operations strategy, several issues, such as poor water quality and occasional unsatisfactory service, still exist.

SUGGESTIONS

1. PDAM must regularly assess water quality and customer service.
2. PDAM must create artificial lakes for storage of more water to improve the water supply services during the dry season and fulfill the needs of customers.

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