

Wheelchair Supplier Selection Using the Analytical Hierarchy Process Method

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Abstract

This study is about the analysis of wheelchair supplier selection using the analytical hierarchy process (AHP) method. It has been conducted at CV. Calvino Medika Indonesia within 3 months. The problem in this study is that there are no criteria for selecting wheelchair suppliers, so that supplier performance is not optimal; wheelchair suppliers have not been the best. The aim of this study is to develop a series of crucial selection criteria for wheelchair suppliers. Determine the right wheelchair supplier. The study's sample consisted of individuals working in the administration and sales marketing divisions, as well as the Director of CV at Calvino Medika Indonesia. The data collection techniques used in this study included observation and questionnaires. Expert choice software and MS Excel processing support the purposive sampling method in this study. The results of this study are as follows: The most influential criteria in selecting wheelchair suppliers are quality criteria (36.1%), the second priority that influences is price (27.2%), the third priority that influences is delivery (18.2%), the fourth priority that influences is adaptive (7.60%), and the fifth priority that influences is service (27.2%). Based on the criteria and sub-criteria used in supplier selection, PT Inti Sumber Hasil Sempurna emerges as the top supplier, scoring 59.2%, while PT. Asada Putra Mandiri comes in second, scoring 40.8%.

Keywords: supplier, analytical hierarchy process, expert choice, criteria, CV. CMI.

INTRODUCTION

Every company faces the challenge of being able to compete globally in the face of increasingly rapid market developments. The increasingly rapid development of information technology, communication, and manufacturing processes affects the product life cycle, which is becoming shorter. In response to this, companies must adapt to change and continue to innovate in order to stay competitive in the market. To remain superior and survive in increasingly tight competition, companies must focus on increasing productivity, efficiency, and quick and easy service. Continuous innovation is the key to maintaining competitiveness and providing added value to customers. Therefore, companies must be able to create various products and services that are better than their competitors. If a company wants to survive and remain relevant in a competitive market, achieving excellent performance is very important. For this reason, companies need to plan and implement the right strategy to

achieve these goals. With an effective strategy, companies can face market challenges better, improve performance, and maintain their position in the global market.

Companies really need to foster beneficial cooperation with suppliers, both for short-term and long-term interests. A well-established long-term relationship can provide various benefits for the company, such as more stable shipping costs and ease in meeting urgent requests. With a strong relationship, suppliers tend to immediately meet the company's needs, especially in emergency situations (Ariani and Dwiyanto, 2013). Suppliers play a very vital role in ensuring the availability of raw materials needed by the company. The smooth availability of raw materials will support the smooth production process and the quality of the products produced. Therefore, a positive relationship with suppliers greatly influences the continuity of the company's operations and its competitiveness in the market. However, if the supplier is not responsible for meeting the company's demands, various problems can arise, such as long lead times and stockouts. This can hamper the production process and cause delays in product delivery to customers, which in turn can harm the company's reputation and reduce customer satisfaction.

Companies are increasingly adopting supply chain management as a strategy to increase competitiveness and support their development processes. Effective supply chain management can help companies optimize distribution flows and meet product needs. However, each stage in the supply chain also has the potential to cause problems, such as delays in product provision, instability of the production process, decreased profit levels, low product quality, and complaints from customers. The need for raw materials or components supplied by suppliers plays a crucial role in the smooth running of the production line. If the supply of raw materials or components is late or does not match production needs, this can hamper the production process and affect the availability of products desired by customers. Therefore, choosing the right supplier is crucial for the success of the supply chain and the overall production process. The main purpose of supplier selection is to reduce the risks associated with late supply, poor quality, or high costs. In addition, by choosing the right supplier, companies can maximize buyer value by obtaining raw materials or components at competitive prices, excellent quality, and on-time delivery. This decision will increase efficiency, strengthen the company's competitiveness, and minimize disruptions in the company's operations.

Companies currently have a wide range of suppliers to meet their evolving raw material needs. Selecting a supplier is crucial as it significantly influences the production process, results in high-quality products, and offers benefits to the company. Every company must establish criteria such as quality, price, delivery, service, and adaptability. Additionally, a supplier evaluation is necessary to determine the supplier's performance. In order to compete and offer the best service to customers, companies must consider factors related to their suppliers. Suppliers significantly contribute to the optimization of the company's production process, thus necessitating the establishment of specific criteria for selecting suppliers. Companies must understand the types of suppliers required for raw material supply, then establish the selection criteria to make informed decisions about which suppliers to choose. Pujawan (2016) asserts that selecting a supplier is a strategic undertaking, particularly when the supplier will provide essential items or serve as a long-term supplier. The criteria employed must align with the supply chain strategy and the attributes of the goods in question.

CV. CMI has started its business in the pharmaceutical, medical device, and laboratory equipment industries. As a company engaged in the pharmaceutical industry, medical devices, and laboratory equipment, CV.CMI strives to provide quality and professional

services. One example is a wheelchair with its spare parts. CV.CMI wheelchair sales in recent months have increased quite rapidly due to direct sales to various businesses and government agencies. All products and spare parts used come from several companies engaged in the manufacture of medical equipment. On the other hand, issues arise due to suppliers' sub-optimal performance, leading to a shortage of timely products and frequent delays in product delivery.

The current problem case at CV.CMI is that it often experiences increased shipping costs from before, very high spare part prices but of low quality, and long delivery times. A decision-making method is required to optimize product suppliers for effectiveness and efficiency. The AHP method is one method of decision-making that involves conducting assessments and establishing criteria. By structuring a hierarchy of criteria, stakeholders, and results and assigning various considerations as weights or priorities, this method solves complex problems. This method serves as a means for companies to select suppliers who meet the highest quality standards.

METHOD

The selected population in a study closely aligns with the problem under investigation. The population refers to the total number of objects that share the same characteristics and possess the authority to provide input and decision opinions. The total population at CV. CMI is 8 people; the sample in this study is 5 people who work in the administration and sales marketing divisions, as well as the director. This study employs field research as its data collection method, carrying out direct research on the company under investigation. We obtain the necessary data through two main techniques: observation and questionnaires. Observations are carried out by directly observing the researcher's object to obtain the actual data needed. Additionally, we use questionnaires as a data collection technique, giving respondents a set of questions or written statements to respond to. Customers who know the answers to each statement relevant to the research objectives submit this questionnaire, scoring the answers from 9 to 1, with 9 being the highest value (Sugiyono, 2009). This study employs the AHP method for data analysis. Expert Choice software assists in carrying out the calculations.

RESULT AND DISCUSSION

Wheelchair Supplier Selection Criteria Analysis

The quality criterion, which holds the highest weight value of 36.1% after processing questionnaire data from five respondents, is the first and most important criterion in this study. This indicates that product quality is the main factor influencing decisions in selecting suppliers. In accordance with the Priority of Importance (Weight) Criteria for Supplier Selection listed in Table 4.20, the quality criterion gets top priority in the company's considerations. The company prioritizes the quality of the products they sell as an effort to maintain customer satisfaction and create a positive experience for consumers. Good product quality not only strengthens the company's reputation but also supports the achievement of the company's vision and mission in providing high-value products for customers. The company can maintain a long-term, mutually beneficial relationship with customers by maintaining product quality. In addition, excellent product quality greatly affects the selling price and customer satisfaction. High-quality products can increase competitiveness in the market, allowing companies to set more competitive prices and provide more value to customers. This in turn contributes to increased customer loyalty and the company's long-term success in facing market competition.

The price criteria are ranked second in supplier selection, with a value of 27.2%. Given the company's recent financial decline in income, the price factor holds significant importance. In a situation like this, the company needs to consider the price of goods in order to maintain its financial stability. Therefore, competitive prices from suppliers are a crucial factor in decision-making. The results of this study are also in line with previous studies, which show that price is one of the main criteria that companies consider in choosing suppliers. Companies that face financial constraints tend to be more selective in choosing suppliers who offer more affordable prices but still maintain excellent product quality. Thus, price criteria play an important role in maintaining cost efficiency and ensuring the continuity of company operations. The significance of this price criterion underscores the need for companies to adopt a strategic approach in selecting suppliers who can offer the most competitive prices without compromising the quality of their products. This will have a direct impact on the company's profits and allow the company to survive and thrive even in challenging market conditions.

Delivery criteria rank third in supplier selection with a value of 15.2%. Delivery is an important part of supply chain management, which includes the integration of transportation, procurement, and warehousing activities. According to Burg in Lysons (2000), efficient delivery is a cost-effective tool that can support the smooth production process and ensure that products arrive on time to customers. Therefore, delivery criteria are an equally important factor in determining the right supplier for a company. Meanwhile, adaptive criteria rank fourth in supplier selection with a value of 10.9%. This criterion refers to the supplier's ability to adapt to the company's needs, both in terms of changes in product demand and the ability to meet the requested specifications. This study shows that companies prioritize suppliers who can quickly adapt to change, although this criterion is not as important as delivery or price. The results of this study align with previous research, highlighting the importance of delivery and adaptability, albeit at a lower weight than quality and price. This criterion contributes to the smooth flow of products and long-term relationships with suppliers who can understand and respond to the company's needs well.

Service criteria rank last in supplier selection with a value of 7.60. The book *Strategic Proactive Procurement* (Burt & Pinkerton, 2006) considers a systematic process involving decisions about when and how much to buy, as well as ensuring the timely delivery of required products in accordance with quality and quantity specifications, to be more important than service criteria. While we don't overlook service, we prioritize other factors like quality, delivery, and adaptability when choosing the right supplier. Product quality, efficient delivery, and adaptability, or the supplier's ability to adjust products to company demand, proved to be more important criteria in this study. These criteria show a vital role in ensuring the smooth operation of the company, because they directly affect the production process and customer satisfaction. This shows that companies prioritize suppliers who are able to meet quality and delivery timeliness requirements and can adapt quickly to changes in market needs or demands. This study is also in line with previous studies, which highlight the importance of adaptive criteria, namely the supplier's ability to adjust to company demand. In this case, services that include aspects of communication with suppliers are important but not comparable to other criteria that more directly affect operational success and the sustainability of business relationships.

Alternative Analysis of Wheelchair Supplier Selection

Calvino Medika Indonesia has selected two suppliers in the procurement process: PT. IntiSumber Hasil Sempurna and PT. Asada Putra Mandiri. The analysis revealed that PT.

IntiSumber Hasil Sempurna outperformed PT. Asada Putra Mandiri. PT. IntiSumber Hasil Sempurna obtained a percentage of 59.2%, while PT. Asada Putra Mandiri was in second place with a percentage of 40.8%. These results illustrate that PT. IntiSumber Hasil Sempurna better meets the criteria prioritized by the company in selecting suppliers. Expert Choice software carried out the data processing, enabling a comparison of criteria between the two suppliers. In this study, PT. IntiSumber Hasil Sempurna demonstrated superior performance in meeting several important criteria, including product quality, price, and delivery, which are the main factors in assessing supplier selection. This is in line with the company's goal of maintaining customer satisfaction and ensuring smooth production processes by selecting suppliers who can provide quality products at competitive prices and on-time delivery.

The research results indicate that PT. IntiSumber Hasil Sempurna (IHS) excels in several key supplier selection criteria. In terms of quality, PT. IHS is ranked first because they send products with better quality than PT. Asada Putra Mandiri (APM). PT. IHS rarely sends wheelchairs with visible defects, whereas PT. APM's products frequently exhibit similar defects. In terms of pricing, PT. IHS outperforms PT. APM by offering lower prices, resulting in greater benefits for the company. PT. IHS maintains its top ranking in terms of delivery due to its ability to send products faster, a crucial factor for companies to meet their product needs on time. Meanwhile, PT. APM holds the second position in terms of delivery. Although PT. IHS is superior in several criteria, such as quality, price, and delivery, PT. APM shows superiority in the adaptive criterion, where they are better able to read and adjust products to the company's needs, placing PT. APM in first place in this criterion. In terms of service, PT. IHS maintains its top ranking as it responds to company requests significantly faster than PT. APM. Overall, although PT. APM has advantages in terms of adaptability, PT. IHS remains superior in terms of quality, price, delivery, and service, making it the best choice as a supplier for the company.

Supplier Selection Decision

From the overall alternative weight table, the selection of the most influential optimal supplier shows that PT. IntiSumber Hasil Sempurna (IHS) occupies the first priority with a percentage of 59.2%, far superior to PT. Asada Putra Mandiri (APM), which is in second place with a percentage of 40.8%. This indicates that PT. IHS significantly outperforms PT. Asada Putra Mandiri (APM) in several key selection criteria. Both companies have implemented the international quality standard ISO 9001, which shows their commitment to product quality. However, PT. IHS has an additional advantage with the implementation of Good Manufacturing Practice (GMP) in each of its products. The implementation of GMP shows that PT. IHS not only pays attention to overall product quality but also ensures that each production process meets stricter safety and quality standards, which further strengthens its position as the company's main choice. In addition, PT. IHS products have technological advantages compared to their competitors, providing added value in terms of efficiency and quality. With superior technological capabilities, PT. IHS is able to provide more innovative products and better meet the company's needs. Therefore, after evaluating various criteria, PT. IHS emerges as a more optimal supplier.

This demonstrates that if the company chooses a supplier based on quality criteria, it selects the supplier that meets the highest standards in this category. Based on the quality criteria, the company selected PT. IntiSumber Hasil Sempurna (IHS) for its high-quality requirements. Product quality is the ability of an item to provide results or performance that are in accordance with or even exceed what the customer wants" (Kotler and Keller, 2016, p. 164). With good technology, PT. IHS is able to fulfill the company's desire for high-quality

goods, which is the main factor in selecting a supplier. According to Mulyadi Nitisusastro (2012, p. 162), "Product quality is a characteristic of a product or service that depends on its ability to satisfy stated or implied customer needs." Consumers highly value high product quality when selecting a wheelchair. Consumers expect a product of good quality to be reliable and last longer, thereby providing long-term satisfaction for the user. Therefore, PT. IHS is able to answer the company's needs by providing high-quality products that meet market expectations and established standards. The results of the study for the company show that the criteria in selecting suppliers that must be considered include quality, price, service, delivery, and adaptability. By considering these five criteria, the company can make more appropriate decisions in choosing the supplier that best suits the company's needs and long-term goals, especially in maintaining high product quality and meeting customer expectations.

The research results indicate that PT. Inti Sumber Hasil Sempurna provides the best price offer, offering lower prices while maintaining better product quality. PT. IHS meets the subcriteria with a value of 0.586, superior to PT. Asada Putra Mandiri, which obtained a value of 0.414. This shows that PT. IHS not only provides more competitive prices but also maintains product quality that is in accordance with the company's needs, thus providing added value to the company. In the delivery sub-criteria, PT. Inti Sumber Hasil Sempurna excels due to its ability to fulfill the company's requirements, as evidenced by its score of 0.580. In the delivery sub-criteria, PT. IHS outperformed its competitor, PT. Asada Putra Mandiri, with a score of 0.420. Speed and punctuality of delivery are important factors in ensuring the smooth operation of the company, so PT. IHS is more reliable in this regard. PT. Asada Putra Mandiri outperforms PT. IHS with a score of 0.615 in terms of adaptability, which measures the supplier's ability to analyze the product desires requested by the company. However, PT. Asada Putra Mandiri's product quality falls short of PT. IHS, which received a score of 0.385. For the service criteria, PT. Inti Sumber Hasil Sempurna is again in the top position with a score of 0.608, superior to PT. Asada Putra Mandiri, which got a score of 0.392. The study concludes that PT. Inti Sumber Hasil Sempurna is the most suitable supplier for CV. Calvino Medika Indonesia, satisfying the quality, price, delivery, and service criteria essential for the company's growth.

CONCLUSION

After conducting research on the selection of wheelchair suppliers at CV. Calvino Medika Indonesia and obtaining research results, it can be concluded that the most influential criteria in the selection of wheelchair suppliers are quality criteria with a percentage value of 36.1%, the second priority that influences is price with a percentage value of 27.2%, the third priority that influences is delivery with a percentage value of 18.2%, the fourth priority that influences is adaptive with a percentage value of 10.9%, and the fifth priority that influences is service with a percentage value of 7.60%. Based on the criteria and sub-criteria in the selection of suppliers, overall, the supplier PT IntiSumber Hasil Sempurna is considered the best supplier with a percentage value of 59.2%, compared to the supplier PT. Asada Putra Mandiri with a percentage value of 40.8%. This indicates that PT IntiSumber Hasil Sempurna is the most suitable wheelchair supplier for the company to consider as a long-term partner, as its overall value surpasses that of other suppliers.

The author's research yielded the aforementioned analysis and conclusions, suggesting that the company and relevant parties should consider the relative importance of each criterion in meeting product needs. That way the company can choose these criteria to get a more appropriate supplier according to the company's needs. The company can utilize the

results of this study to replace the existing criteria and sub-criteria. In addition to selecting suppliers, the company can use AHP analysis to solve other multi-criteria problems as a decision support tool. We advise the company to expand its supplier options to secure more profitable suppliers for the company's growth.

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