

Optimizing Supplier Performance with the Analytical Hierarchy Process (AHP) Approach at PT. XYZ

Cahyo Hari Utomo^{1*}, Tukhas Shilul Imaroh²
Universitas Mercu Buana

Corresponding Author: Cahyo Hari Utomo cahyohari13@gmail.com

ARTICLE INFO

Keywords: Vendor Selection, Facility Management, AHP, Procurement

Received : 6, August

Revised : 22, August

Accepted: 23, September

©2025 Utomo, Imaroh : This is an open-access article distributed under the terms of the [Creative Commons Atribusi 4.0 Internasional](https://creativecommons.org/licenses/by/4.0/).



ABSTRACT

Choosing the right office facility vendor is a strategic factor in supporting smooth operations, cost efficiency, and compliance with safety and environmental standards. This research aims to design an objective, structured, and quantitative-based vendor evaluation system using the Analytical Hierarchy Process (AHP) method at PT. XYZ. The study involved two expert respondents from various departments who had direct authority in the selection of vendors. Data was collected through discussions and paired comparison questionnaires, then analyzed through the AHP stages, namely hierarchical preparation, priority weight calculation, and consistency test. The results showed that the criteria "Price and Delivery" had the highest priority weight, while "Quality" and "Service" ranked next. The vendor ranking places PT. Icon Technology is ranked first with a weight of 1.70. The consistency ratio value proves that the respondents' assessment is consistent and reliable. These findings confirm that the AHP method is effective in increasing the objectivity, transparency, and accountability of the vendor selection process. Practically, this evaluation model can be integrated into the formal procurement policy of PT. XYZ, while theoretically, this study expands the application of AHP to office facility management in the furniture industry and can be adapted to other sectors.

INTRODUCTION

In an era of fierce business competition, supply chain management is an important factor to increase the efficiency and competitiveness of companies. Suppliers play a role in ensuring the availability of raw materials, product quality, and smooth distribution. Therefore, supplier performance evaluation is a strategic activity, although it is not simple because it is influenced by uncertainty of quality, delivery accuracy, price fluctuations, and the demands of sustainability and business ethics.

Many companies still use traditional methods, such as only assessing prices or previous relationships, thus ignoring other strategic aspects such as innovation, sustainability, and risk management. In fact, supplier selection should be done with a multi-criteria approach (Buyukozkan & Cifci, 2011; Gencer & Gürpınar, 2007). This research focuses on the variables of price, delivery, quality, and service. Price affects cost stability, delivery relates to distribution reliability, quality ensures company standards, and service reflects supplier support and response.

The object of the research is PT. XYZ, a property services company that relies on IT suppliers for needs such as toners, laptops, and printers to support operations. PT. XYZ already has an intranet-based internal information system as a Decision Support System (DSS) to support decision-making. However, companies have faced the challenge of significant fluctuations in IT prices in the past five years, making it difficult to be consistent with budget planning and potentially increasing operational costs.

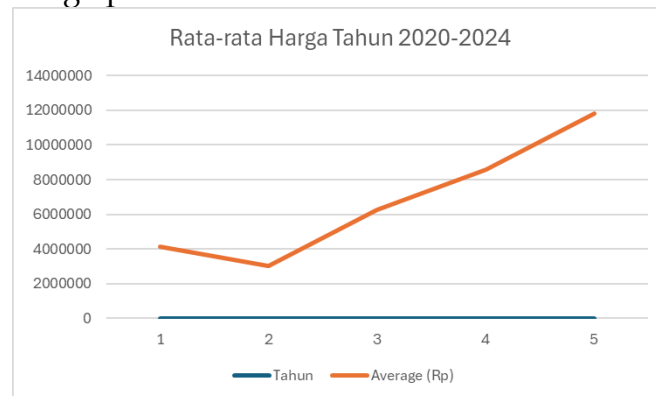


Figure 1. Average Price Fluctuations in 2020-2024

Source: Company Internal Data (2025)

Based on Figure 1 Average Price Fluctuations (2020–2024), it can be seen that there is significant price instability, from IDR 4,128,208 in 2020 down to IDR 3,034,084 in 2021, then increased sharply to IDR 11,824,498 in 2024. This condition makes it difficult to plan a budget and emphasizes the importance of comprehensive supplier evaluation.

The results of the observation also showed weaknesses in the delivery aspect, where delays in goods often occurred and interfered with the smooth running of the project. In terms of quality, there are still discrepancies in the specifications of goods that cause time and cost inefficiencies. Meanwhile, supplier services are considered quite good in terms of response and handling of complaints, but still lack in adjusting order volumes according to urgent needs.

Overall, PT. XYZ needs suppliers with stable prices, on-time delivery, consistent quality, and reliable service. To overcome this problem, the Analytical Hierarchy Process (AHP) approach is used as a Multi Criteria Decision Making (MCDM) method to assess suppliers objectively. The analysis is carried out through fishbone diagrams and the 5W+1H approach to identify the root of the problem and solutions, then prioritized with AHP so that the company can choose the best supplier measurably and strategically.

LITERATURE REVIEW

Theoretical Studies

In the Theory Review, various theories that are relevant to the topic or title of the research are discussed, namely supply chain management, procurement management, suppliers, supplier selection, supplier selection criteria, and the Analytical Hierarchy Process (AHP) with the hope that these theories can be a foundation that can help the author in solving problems in this research.

Supply Chain Management

Management is an art and science, in management there is a strategy in utilizing the energy and minds of others to carry out an activity that is directed at achieving predetermined goals (Appley and Oey Liang Lee, 2010:16).

Supply chain according to Russell (2000:372) is a supply chain formed from interconnected organizations, sources, and processes that shape and deliver products and services to the end consumer. According to Heizer and Render (2014:468), supply chain management is the coordination of all supply chain activities from raw materials to end customers. The goal is to maximize competitive advantage and value for the end consumer. Render and Heizer (2014:471–473) mention that there are 6 purchasing strategies in SCM: multiple suppliers, multiple suppliers, vertical integration (backward & forward), keiretsu network, virtual companies, and joint ventures. The components of SCM according to Turban, Rainer, & Potter (2004) are divided into:

1. Upstream Supply Chain (procurement activities from suppliers).
2. Internal Supply Chain (internal process converting inputs into outputs).
3. Downstream Supply Chain (distribution activity to end consumers).

Sustainable Development Goals (SDGs)

The SDGs are the United Nations sustainable development agenda (2015) with 17 goals covering economic, social, and environmental aspects. In the selection of suppliers, the relevance of the SDGs can be seen from the need to pay attention to efficiency as well as sustainability (e.g. the use of environmentally friendly materials, emission reduction, ethical business practices). This is in line with SDG 12 (Responsible Consumption and Production), SDG 13 (Climate Action), SDG 8 (Decent Work and Economic Growth), and SDG 9 (Industry, Innovation, and Infrastructure).

Supplier

Suppliers are in the initial supply chain, namely providers of raw materials, raw materials, components, and services (Irawan, 2008). According to

David (2011), suppliers support the manufacturing process because their quality affects the quality of the final product. According to Suciadi (2013), if suppliers fail to meet their needs, companies can experience serious problems such as stockout and high lead times. In conclusion, suppliers are a vital element that determines the continuity of the company.

Supplier Selection

Supplier selection is a strategic activity because it affects the smooth production process. Selection of suitable suppliers can reduce costs and increase competitiveness (Mehdizadeh & Ayobi, 2010). The main factors according to Stevenson (2018): price, quality, service, location, supplier inventory policy, and flexibility. Dickson (1966) identified 23 criteria for supplier selection, including: quality, delivery, performance history, warranty, production capacity, price, technical ability, financial position, communication system, reputation, behavior, packaging ability, geographical location, and previous business relationships.

Supplier Selection Criteria

The criteria should reflect the supply chain strategy and the characteristics of the item. In general it includes: quality, price, precision of delivery. However, companies can add other criteria as needed (Mirmousaa & Dehnavib, 2016).

Analytical Hierarchy Process (AHP)

AHP was developed by Thomas L. Saaty. AHP is a multi-criteria decision making method based on paired comparisons to determine priorities. Steps according to Suryadi & Ramdhani (2017):

1. Define problems and solutions.
2. Create a hierarchical structure (objectives → criteria → subcriteria → alternatives).
3. Compile a paired comparison matrix with the Saaty scale (1-9).
4. Self-Esteem and Consistency Test ($CR < 0.1$).
5. Perform priority synthesis.
6. The basic principles of AHP: decomposition, pairwise comparison, priority synthesis, and logical consistency.

Advantages of AHP (Marimin, 2014): unity, complexity, interdependence, hierarchical structure, measurement, consistency, synthesis, bargaining, consensus, and process repetition. The disadvantages: it is highly dependent on experts (subjective), requires consistency, and is not based on statistical tests.

Frame of Mind

The following is an overview of the logical flow of the framework of thought applied by the author in this study.

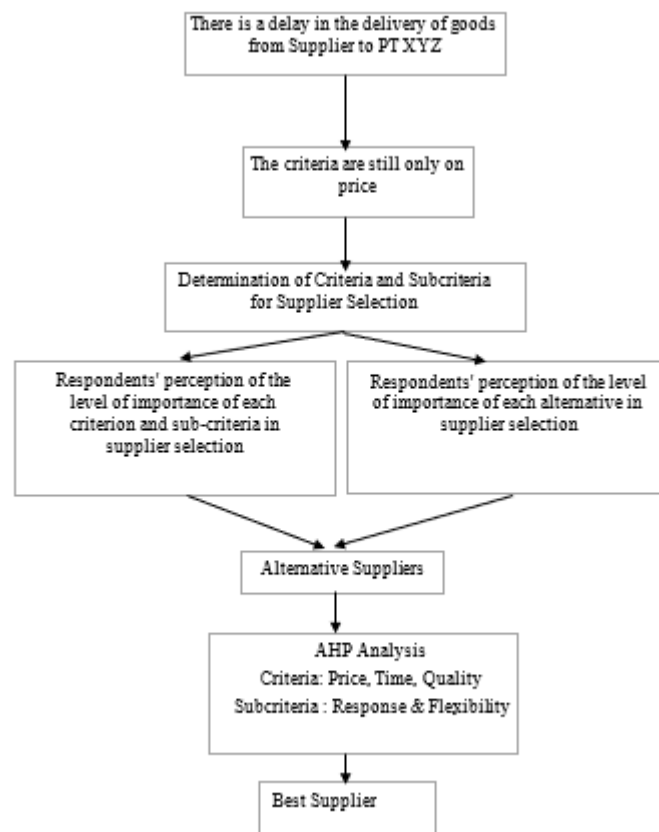


Figure 2. Frame of Mind

METHODOLOGY

The research method used is a quantitative descriptive analytical approach with the research object of PT. XYZ which is engaged in property services. The research data was obtained through observations, interviews, questionnaires, and internal company documentation, with respondents coming from the procurement and management parties who were directly involved in the supplier selection process. The main variables analyzed include price, quality, delivery, and service, which are established based on the strategic needs of the company.

Data analysis was carried out using the Analytical Hierarchy Process (AHP) method. The stages of AHP include the preparation of a hierarchical structure, paired comparison between criteria using the Saaty scale, calculation of priority weights through eigenvalues, and consistency testing ($CR < 0.1$). The weighting results are used to objectively determine the order of supplier priorities, thereby supporting measurable and consistent decision-making in selecting the best supplier.

RESEARCH RESULT

Data Analysis

Observations and Interviews

Observation was carried out directly at PT. XYZ to understand the process of selecting and evaluating supplier performance, including procurement procedures, distribution, quality control, and existing evaluation systems. In

addition, interviews with procurement managers, logistics staff, and quality control teams were conducted to obtain qualitative information regarding assessment criteria, supply chain constraints, and expectations for improving supplier performance. The results of these observations and interviews are the basis for the preparation of criteria and subcriteria in the Analytical Hierarchy Process (AHP) method.

Data Supplier

The following supplier data list contains information about the partners who provide goods and services that support the company's operational needs. The information presented includes the name of the supplier and the location of each one, which reflects the geographical distribution of the business partners. This data plays an important role as a basis for the procurement process, supplier performance evaluation, and business relationship management to remain efficient and effective.

Table 1. Supplier Data List

No	Code	Nama Supplier	Location
1	Supplier A	PT Icon Technology	Jakarta
2	Supplier B	PT Bhinneka Mentari Dimensi	Central Jakarta
3	Supplier C	PT Alpha Cipta Computindo	Central Jakarta

Source: Company Internal Data (2025)

The majority of suppliers located in Jakarta and Central Jakarta show that there is easy access to distribution, thus supporting smooth logistics and meeting the company's needs in a timely manner.

Criteria and Subcriteria

This study uses four main criteria in supplier evaluation, namely price, delivery, quality, and service, which are described into several indicators.

- Pricing: includes price quotes, discounts, and payment flexibility.
- Delivery: includes punctuality, order quantity suitability, and transportation efficiency.
- Quality: judged by the suitability of specifications, material strength, and quality consistency.
- Services: includes warranty, response to requests/complaints, clarity of product information, precision of adjusting order volumes, and setting of order schedules.

These four criteria are designed to provide a comprehensive picture of supplier performance and support the creation of sustainable cooperation.

Interview Results

Interview with Assistant Manager Purchasing and Senior Manager IT of PT. XYZ shows that most suppliers offer competitive prices with discounts, but payment flexibility is still limited and prices tend to fluctuate. The quality of

goods is generally according to specifications, although sometimes inconsistent as demand increases. The majority of deliveries are on time and in accordance with the quantity, although occasionally constrained by external factors. The service was rated quite good, especially in quick response, warranty, and product information, although there was a need for improvement in handling changes in order volume. In the future, the company hopes that there will be consistency in quality, payment flexibility, and more proactive communication from suppliers to support the efficiency and sustainability of cooperation.

Weighting of Supplier Performance Criteria Analysis

Table 2. Weighting Results of Criterion Analysis

Criterion	Score																	Criterion
	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	
Price									X									Delivery
Price															X			Quality
Price											X							Service
Delivery					X													Quality
Delivery												X						Service
Quality						X												Service

Source: Data processed by researchers (2025)

Based on the weighting results in Table 4.2, it can be seen that the price criteria have a higher level of importance than delivery, quality, and service, which is shown by the highest weighting score. This shows that the price factor is the main consideration in choosing a supplier, both in terms of price quotes, discounts, and payment flexibility. The delivery criteria occupy the next order of importance, which reflects the importance of timeliness and delivery numbers to maintain a company's supply chain smoothly.

Furthermore, quality is in the middle position, indicating that the company continues to pay attention to the accuracy and consistency of the quality of materials provided by suppliers. Finally, service is the criterion with the lowest weight, although it is still considered as a supporting factor to maintain a good cooperative relationship with suppliers, especially related to after-sales service and responsiveness in handling requests and complaints. This analysis shows that companies prioritize cost and distribution aspects as top priorities in optimizing their supply chain performance.

Price Criteria Analysis Weighting

Table 3. Price Criteria Weighting Results

Criterion	Score																	Criterion
	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	
Supplier A			X															Supplier B
Supplier A													X					Supplier C
Supplier B						X												Supplier C

Source: Data processed by researchers (2025)

Based on Table 4.3 Price Criteria Weighting Results, the inter-supplier comparison process shows that Supplier A (PT Icon Technology) obtained the highest score compared to the other two suppliers. This can be seen from the weighting position that is more dominant than Supplier B (PT Bhinneka Mentari Dimensi) and Supplier C (PT Alpha Cipta Computindo).

This position indicates that Supplier A offers a more competitive price, making it a more cost-advantageous option. Meanwhile, Supplier B occupies a middle position with a relatively balanced score. This shows that although the prices offered are not as competitive as Supplier A, they are still at a fairly competitive level and can be considered as an alternative. On the other hand, Supplier C is in the position with the lowest weighting, which reflects that the prices offered are relatively less competitive than the other two suppliers.

Weighting of Delivery Criteria Analysis

Table 4. Delivery Criteria Weighting Results

Criterion	Score																	Criterion
	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	
Supplier A															X			Supplier B
Supplier A				X														Supplier C
Supplier B		X																Supplier C

Source: Data processed by researchers (2025)

Based on Table 4. Delivery Criteria Weighting Results, it can be seen that each supplier has a different level of excellence in meeting the delivery criteria. Supplier B received the highest weight with a score of 8 against Supplier C, which indicates that Supplier B is considered the most superior in terms of reliability and accuracy of delivery compared to Supplier C. Meanwhile, Supplier A obtained a score of 6 against Supplier C, indicating that Supplier A also has good delivery performance, although not as superior to Supplier B. However, when compared to Supplier B, Supplier A gets a score of 7, which indicates that Supplier A is slightly below Supplier B in terms of delivery.

These results show that Supplier B has the most consistent advantage in the delivery criteria, which can be a key consideration in the supplier selection process. Supplier C seems to have the lowest position in this aspect, so further evaluation is needed if it wants to remain maintained in the supply chain. Overall, this weighting illustrates that reliability and delivery speed are one of the main differentiating factors among the three suppliers, and Supplier B is the most potential candidate in terms of delivery criteria.

Weighting of Quality Criteria Analysis

Table 5. Quality Criteria Weighting Results

Criterion	Score																	Criterion
	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	
Supplier A				X														Supplier B

Supplier A							X										Supplier C
Supplier B														X			Supplier C

Source: Data processed by researchers (2025)

Based on Table 5. regarding the results of weighting Quality criteria, it can be seen that the assessment is carried out using a scale of 1 to 9 to compare quality between suppliers. The results of the analysis showed that Supplier A had a quality advantage over Supplier B with a score of 6, which means that the quality of Supplier A was considered better. Furthermore, Supplier A compared to Supplier C obtained a score of 3, which indicates that although Supplier A is still superior, the difference in quality is not too great. Meanwhile, Supplier C obtained a score of 6 compared to Supplier B, which confirms that the quality of Supplier C is also rated better than Supplier B. Overall, the weighting results show that Supplier A and Supplier C have more prominent qualities than Supplier B, although the difference between Supplier A and Supplier C is relatively slighter.

Weighting of Service Criteria Analysis

Table 6. Service Criteria Weighting Results

Criterion	Score																Criterion	
	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8		9
Supplier A												X						Supplier B
Supplier A							X											Supplier C
Supplier B					X													Supplier C

Source: Data processed by researchers (2025)

Based on Table 4.6 regarding the results of weighting Service criteria, it can be seen that the assessment of services between suppliers shows that there is a difference in the quality of the services provided. Supplier B obtained a score of 4 against Supplier A, which means that Supplier B was considered to have a better quality of service than Supplier A. Furthermore, Supplier A obtained a score of 3 against Supplier C, which indicates that Supplier A's services are superior to Supplier C even though with a relatively small difference. Meanwhile, Supplier B obtained a score of 5 against Supplier C, which shows that Supplier B has a much better quality of service than Supplier C. Overall, the results of this weighting confirm that Supplier B is superior in terms of service compared to Supplier A and Supplier C.

Analysis of the Recapitulation of AHP Results

Table 7. Recapitulation of AHP Weighting Results

Criterion	Priority Weights	Supplier A (PT Icon Technology)	Supplier B (PT Bhinneka Mentari Dimensi)	Supplier C (PT Alpha Cipta Computindo)
-----------	------------------	---------------------------------	--	--

Price	0,40	1 (Best)	2	3
Delivery	0,30	2	1 (Best)	3
Quality	0,20	2	1 (Best)	3
Service	0,10	2	1 (Best)	3
Total Score	1,00	$0,40 \times 1 + 0,30 \times 2 + 0,20 \times 2 + 0,10 \times 2 = \mathbf{1,70}$	$0,40 \times 2 + 0,30 \times 1 + 0,20 \times 1 + 0,10 \times 1 = \mathbf{1,60}$	$0,40 \times 3 + 0,30 \times 3 + 0,20 \times 3 + 0,10 \times 3 = \mathbf{3,00}$
Ranking		1	2	3

(Note: Ranking scale 1 = best, 3 = worst. Priority weight based on AHP weighting results: Price 40%, Delivery 30%, Quality 20%, Service 10%)

Source: Data processed by researchers (2025)

Based on Table 4.7, it can be concluded that Supplier A occupies the first position (rank 1) with a total score of 1.70. The main advantage of Supplier A lies in the price aspect which has the highest priority weight (0.40) so that it contributes greatly to the final score. Although in terms of delivery, quality, and service, Supplier A is not as superior as Supplier B, overall his position is still better because the price factor is the company's top priority.

Supplier B is in second place (rank 2) with a total score of 1.60. The advantage of Supplier B lies in three non-price aspects, namely delivery, quality, and service. This shows that although the prices offered are not as competitive as Supplier A, Supplier B is superior in ensuring timely delivery, quality consistency, and after-sales service. This position makes Supplier B a strong alternative, especially if the company places more emphasis on quality sustainability and long-term operational reliability.

Meanwhile, Supplier C is in third place (rank 3) with a total score of 3.00, which shows the lowest performance among the three suppliers. Supplier C's weaknesses are consistent in all criteria, both in terms of price, delivery, quality, and service. This condition indicates that Supplier C needs a thorough evaluation, especially related to pricing strategies, distribution management, and improving the quality of products and services, in order to compete with the other two suppliers.

From these results, it can be seen that there is a trade-off in decision-making. Supplier A is financially superior, while Supplier B excels in non-price operational aspects. The company's final decision will largely depend on its strategic orientation: whether to place more emphasis on cost efficiency or on long-term supply reliability and quality. The results of the AHP weighting provide a strong basis for management to choose suppliers objectively, according to the needs and direction of the company's strategy.

DISCUSSION

Analysis of AHP Weighting Results

The AHP method is used to determine the priority criteria in supplier selection through paired comparisons with consistency measures (CR). The results of the analysis show that price has the highest weight, followed by

delivery, quality, and service. This confirms that cost efficiency is the main focus, although distribution and quality remain important. Supplier A excels in terms of price, Supplier B is better at delivery, quality, and service, while Supplier C ranks lowest in almost all criteria. Thus, Supplier A is right for cost efficiency, while Supplier B is more feasible if the company's priority is long-term supply stability and quality.

Fishbone Diagram Analysis

Fishbone analysis is used to identify the root cause of performance differences between suppliers. The causative factors are grouped into six categories (6M): Man, Machine, Method, Material, Measurement, and Environment. This approach helps companies understand the fundamental factors that affect supplier performance, while providing direction for improvement to improve supplier selection effectiveness and supply chain sustainability.

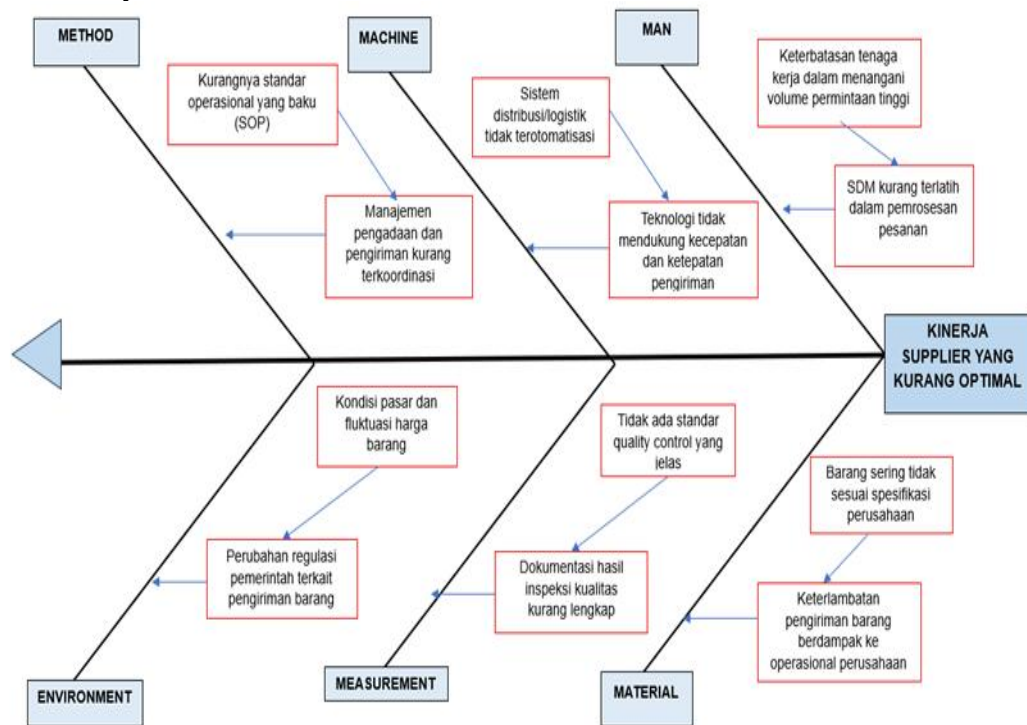


Figure 3. Fishbone Diagram Analysis

Diagram Fishbone

Based on fishbone's analysis, it can be concluded that the main problems in supplier performance come from several aspects. In terms of methods, the absence of standard operating procedures (SOPs) causes the procurement and delivery process to be inconsistent and makes it difficult to evaluate performance. From a technological aspect, the distribution and logistics system that is still manual causes delays, inaccuracies, and inefficiency of coordination. On the human resource factor, the limited number of workers and the lack of training reduce effectiveness in handling high volumes of demand. In terms of materials, the quality and suitability of goods that often do not meet specifications shows weak quality control. Problems also arise in the measurement aspect, where quality control standards and inspection documentation are not clear, so that

quality consistency is difficult to maintain. Meanwhile, external environmental factors such as price fluctuations and government regulations have also added to cost instability and distribution barriers. Overall, weaknesses in SOPs, technology, HR, and internal quality control are the dominant causes, which are exacerbated by external dynamics, thus impacting the effectiveness of the company's supply chain.

5W+1H Analysis

The 5W+1H analysis is used to examine supplier performance problems in more depth with a systematic approach. This method focuses on six main aspects, namely What, Why, Who, Where, When, and How, each of which helps to decipher the root of the problem from different points of view (Suárez-Barraza & Rodríguez-González, 2019). By using 5W+1H, problems can be clearly mapped starting from what happened, the underlying causes, the parties involved, the location and time of the problem, to the solutions that can be done (Budiyani & Hartini, 2023). This analysis is a complement to the fishbone diagram, thus providing a more comprehensive picture of the causes and steps to improve supplier performance.

Table 8. 5W+1H Analysis

Aspects	Question	Analysis Results
What	What happened?	Supplier performance is suboptimal: delivery delays, inappropriate quality of goods, weak distribution coordination, limited human resources.
Why	Why does this happen?	There are no standard SOPs, distribution systems have not been automated, labor skills are lacking, quality control is weak, and external influences such as price fluctuations and government regulations.
Who	Who is involved?	Suppliers as the main party, companies receiving goods, supplier workers, and the government as indirect regulators.
Where	Where does this problem occur?	In the supply and distribution chain of goods, especially the procurement, storage, distribution, and receipt of goods in the company.
When	When does this issue occur?	Repeatedly, especially when demand increases (peak production/sales season) or when there are regulatory changes and fluctuating market conditions.
How	How is the solution done?	Set clear SOPs, automate logistics systems, train human resources, strengthen procurement-distribution coordination, improve quality control, adjust raw material procurement strategies, and comply with government regulations.

Source: Data processed by researchers (2025)

Based on the 5W+1H analysis above, it can be concluded that supplier performance problems are not only influenced by internal factors such as lack of

SOPs, limited human resources, and weak quality control, but also by external factors such as fluctuations in market prices and government regulations. Therefore, improvement efforts must be carried out comprehensively, both from the managerial and operational sides, by prioritizing improving coordination, implementing modern logistics systems, and strengthening the quality of human resources. With the right strategy, companies can ensure that supplier performance becomes more optimal and supports the sustainability of the supply chain effectively.

Proposed Improvements in the Selection of Good and Quality Suppliers

Based on the analysis of AHP, fishbone, and 5W+1H, the selection of a quality supplier requires a comprehensive approach. AHP's results emphasize price as the main criterion, but delivery, quality, and service also play an important role. Meanwhile, fishbone and 5W+1H revealed the root of the problem such as the absence of standard SOPs, weak distribution systems, limited human resources, inconsistencies in material quality, and external factors in the form of regulations and market fluctuations. Therefore, companies need to balance all aspects, not just focusing on price.

Some of the proposed improvements include: (1) establishing more comprehensive supplier selection criteria through standard written documents; (2) implementing standard SOPs in procurement, delivery, and quality control; (3) conduct periodic evaluation and audit of supplier performance and outlined in official recommendation letters; (4) implementing supplier diversification to reduce the risk of dependency; (5) build long-term trust-based partnerships with an annual evaluation period; and (6) utilizing the Supplier Relationship Management (SRM) system for data-based performance monitoring.

With these measures, the company is expected to be able to choose suppliers who are not only competitive in terms of price, but also reliable in delivery, consistent in quality, and responsive in service, so that the supply chain is more stable, costs efficient, and customer satisfaction increases continuously.

CONCLUSIONS AND RECOMMENDATIONS

Conclusion

Based on the results of the research on supplier selection at PT XYZ, several conclusions can be drawn as follows:

- a. The criteria and sub-criteria for supplier selection have been determined using the AHP method with an emphasis on aspects relevant to the efficiency of Supply Chain Management (SCM). The main criteria used include price, quality, delivery, and service, which are then lowered into more detailed sub-criteria, such as price conformity with quality, consistency of product quality, timeliness of delivery, and speed of response to after-sales service. The results of the analysis show that price is the criterion with the highest weight, followed by delivery, quality, and service. This answers the first problem regarding the need for clearer criteria and sub-criteria to assess IT suppliers at PT XYZ.
- b. The best supplier for PT XYZ in purchasing IT goods is obtained from the results of weighting and calculation of AHP. Suppliers with the code Supplier

A rank highest because they have competitive prices, on-time delivery, and consistent product quality. Meanwhile, Supplier B and Supplier C are in the next position because they still have weaknesses in terms of service and delivery flexibility. This finding answers the second problem related to which supplier can provide the best performance for PT XYZ.

- c. Proposed improvements in supplier selection are directed to increase the effectiveness and efficiency of the procurement process to better support the company's SCM performance. Some of the suggested strategic steps include: (a) the preparation of more comprehensive supplier assessment criteria as a standard reference, (b) the application of standard operating procedures (SOPs) in supplier evaluation, (c) the implementation of periodic audits and evaluations of supplier performance, (d) supplier diversification strategies to reduce the risk of dependence, (e) the development of long-term partnerships for 1 year with quality suppliers to maintain supply consistency, and (f) the use of information technology through the Supplier Relationship Management (SRM) system. This recommendation answers the third problem regarding the improvement steps that need to be taken so that the selection of suppliers can be more effective and efficient and support SCM PT XYZ optimally.

Recommendation

Based on the results of the research and the conclusions that have been obtained, some suggestions that can be given are as follows:

- a. For companies, it is recommended to make the criteria and sub-criteria that have been set as a standard reference in the selection of suppliers. Supplier performance evaluation needs to be carried out periodically with measurable indicators, such as delivery accuracy, product quality, price, and service. In addition, companies should build long-term partnerships with well-performing suppliers to ensure the continuity of supply of IT goods and improve the company's efficiency and competitiveness.
- b. For further research, it is recommended to add other variables or criteria that have not been researched, such as sustainability aspects, regulatory compliance, and supplier reputation. This aims to make the next research more comprehensive, relevant to the development of industry needs, and can make a broader contribution to supplier selection decision-making.

ADVANCED RESEARCH

The results of this study open up opportunities for further research with a more comprehensive and adaptive approach to industrial dynamics. The research can further integrate new variables such as sustainability, regulatory compliance, reputation, and supplier technology innovation, so that the assessment focuses not only on cost and operational efficiency, but also on long-term sustainability aspects. In addition, the use of the hybrid multi-criteria decision making (MCDM) method that combines AHP with other techniques such as TOPSIS, Fuzzy AHP, or Analytic Network Process (ANP) has the potential to produce more accurate and contextual evaluations. Future research can also utilize big data analytics and machine learning to process supplier data

in real-time, so that the evaluation process becomes more predictive and proactive. Thus, advanced research not only strengthens the effectiveness of supplier selection decision-making, but also contributes to the development of a more resilient, sustainable, and competitive supply chain management model in the digital era.

REFERENCES

- Açikel, G., & Alemdaroğlu Temel, M. (2025). Analytic hierarchy process in determining aircraft basic maintenance training durations. *Aircraft Engineering and Aerospace Technology*, June. <https://doi.org/10.1108/AEAT-02-2025-0048>
- Ariadi, G., & Abdi, A. S. (2025). A Sustainable Supplier Selection Model: Integrating AHP and GRA for Enhanced Performance Evaluation. *Jurnal Ilmiah Akuntansi* •, 10(1), 41–54. <https://dx.doi.org/10.23887/jia.v10i1.85>
- Ariyanti, S., Ismail, A., & Gunaryono, A. (2020). Penilaian Kinerja Supplier Material Busa menggunakan Metode Analytic Hierarchy Process (AHP). *Jurnal PASTI*, 14(1), 15–25. <https://doi.org/10.22441/pasti.2020.v14i1.002>
- Budiyani, Y. A., & Hartini, S. (2023). Analisis Terjadinya Keterlambatan Pada Distribusi Cargo Curah Dari Kapal Ke Warehouse Menggunakan Metode Fishbone Diagram.
- Chen, W., Lei, L., Wang, Z., Teng, M., & Liu, J. (2018). Coordinating supplier selection and project scheduling in resource-constrained construction supply chains. *International Journal of Project Management*, 36(7), 923–936. <https://doi.org/10.1016/j.ijproman.2018.06.005>
- Chaerunnisa, I., & Hermawan, P. (2025). Improving Supplier Selection Process Using Analytical Hierarchy Process (AHP) and Framework ISO 31000: 2018 (Case Study: Picante Noodles Company). 4(3), 91–98. <https://doi.org/10.56472/25835238/IRJEMS-V4I3P110>
- Frido, A. (2025). Analisis Pengambilan Keputusan Menggunakan Metode Analytical Hierarchy Process (Ahp) Dalam Penentuan Supplier Kedelai. 12(2), 3044–3052.
- Guarnieri, P., & Trojan, F. (2019). Decision making on supplier selection based on social, ethical, and environmental criteria: A study in the textile industry.

- Journal of Cleaner Production, 231, 704–714.
<https://doi.org/10.1016/j.jclepro.2019.05.264>
- Holmes, F., Shukla, M., & Dhurkari, R. K. (2025). Design of multi-criteria decision framework for supplier evaluation and supply chain sustainability risk (SCSR) management. *British Food Journal*, 127(5), 1730–1755.
<https://doi.org/10.1108/BFJ-05-2024-0532>
- Ishak, A., & Parinduri, A. (2019). Pemilihan supplier menggunakan AHP dan TOPSIS. *Jurnal Sistem dan Manajemen Industri*, 3(2), 57–64.
- Kang, P. S., & Bhawna, B. (2025). Enhancing supply chain resilience through supervised machine learning: supplier performance analysis and risk profiling for a multi-class classification problem. *Business Process Management Journal*, August. <https://doi.org/10.1108/BPMJ-03-2024-0174>
- Kumar, A., Jain, V., Kumar, S., & Choudhary, A. (2019). Supplier selection for heavy locomotive in India: An integrated approach using Taguchi loss function, TOPSIS & AHP. *International Journal of Quality & Reliability Management*, 36(7), 1225–1243. <https://doi.org/10.1108/IJQRM-12-2018-0346>
- Lukmandono, L., Yulianto, T., & Prakoso, A. (2019). Pemilihan supplier industri manufaktur dengan pendekatan AHP dan TOPSIS. *Jurnal Teknik Industri*, 20(2), 115–124.
- Mahdiania, D., & Hasibuan, M. S. (2024). Penerapan Sistem Pendukung Keputusan Dalam Memilih Supplier Menggunakan Metode Analytical Hierarchy Process (AHP). *Jurnal Teknologi Sistem Informasi Dan Aplikasi*, 7(1), 310–317. <https://doi.org/10.32493/jtsi.v7i1.38269>
- Meena, P. L., Katiyar, R., & Kumar, G. (2023). Supplier performance and selection from sustainable supply chain performance perspective. *International Journal of Productivity and Performance Management*, 72(8), 2420–2445.
<https://doi.org/10.1108/IJPPM-01-2022-0024>
- Menggunakan, D., & Fishbone, M. (2025). MENINGKATKAN PRODUKTIVITAS DI PERUSAHAAN XYZ. 04(04), 2–7.

- Mukti, L. A., Yuniar, & Afifah, A. U. (2024). Suppliers Evaluation Based on Vendor Performance Indicator (VPI) and Analytical Hierarchy Process (AHP). *E3S Web of Conferences*, 484. <https://doi.org/10.1051/e3sconf/202448401015>
- Parasian, D., & Setyadi, A. (2019). Evaluasi kinerja supplier dengan metode AHP pada PT Pelita Abadi Sentosa. *Jurnal Ilmiah Teknik Industri*, 18(1), 43–52.
- Pishculov, S., Spalek, J., & Rodríguez, R. (2019). Revisiting analytic hierarchy process: Applying voting analytic hierarchy process (VAHP) for sustainable supplier selection. *Sustainability*, 11(16), 4425. <https://doi.org/10.3390/su11164425>
- Prayudy, P., & Imaroh, N. (2019). Penerapan metode AHP pada proses pemilihan supplier tandan buah segar kelapa sawit. *Jurnal Teknologi dan Manajemen Agroindustri*, 8(3), 201–210.
- Putra, E. S., & Sutawijaya, A. H. (2019). Analisis kriteria pemilihan supplier bahan baku pengemas karton untuk item Teh Pucuk Harum dengan metode Analytical Hierarchy Process (AHP). *Jurnal Manajemen dan Organisasi*, 10(2), 130–141.
- Rizani, N. C., & Laksmana, M. S. (2024). Analisis Evaluasi Metode Kerja pada Proses Pre-Delivery di PT. XYZ Menggunakan Fishbone Diagram dan 5W+1H. *Sainstech: Jurnal Penelitian Dan Pengkajian Sains Dan Teknologi*, 34(3), 76–86. <https://doi.org/10.37277/stch.v34i3.2152>
- Sahin, O., Kabak, Ö., & Topcu, Y. I. (2019). Analytic Hierarchy Process for hospital site selection. *International Journal of Healthcare Management*, 12(4), 310–318. <https://doi.org/10.1080/20479700.2018.1453962>
- Suárez-Barraza, M. F., & Rodríguez-González, F. G. (2019). Cornerstone root causes through the analysis of the Ishikawa diagram, is it possible to find them? A first research approach. *International Journal of Quality and Service Sciences*, 11(2), 302–316. <https://doi.org/10.1108/IJQSS-12-2017-0113>
- Sugeng Santoso, Juni Astriandari, Taufik Maulana, Aditya Ramadhan, Dicky Sumantri (2022), Penerapan Metode Analytical Hierarchy Process Dalam

Mengetahui Kriteria Minat Masyarakat Terhadap Penggunaan Automated People Mover System, Jurnal AL-AZHAR INDONESIA SERI SAINS DAN TEKNOLOGI, Vol. 7, No 3 September 2022, pp. 161168.DOI: <http://dx.doi.org/10.36722/sst.v7i3.1242>.

Zaroni, Z., Yuana, D., Abidin, Z., & Saribanon, E. (2025). Evaluasi Kinerja Pengadaan Suku Cadang Kapal pada Perusahaan Pelayaran. Jurnal Manajemen Transportasi & Logistik (JMTRANSLOG), 12(1), 109. <https://doi.org/10.54324/j.mtl.v12i1.1687>