Eduvest – Journal of Universal Studies
Volume 6 Number 6, June, 2026
p- ISSN 2775-3735- e-ISSN 2775-3727

ERP System Selection Analysis Using the Analytical Hierarchy Process (AHP): A Case Study of an Automotive Manufacturing Company

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Keywords
Enterprise Resource Planning (ERP); Analytical Hierarchy Process (AHP); Data Synchronization; Operational Efficiency; System Selection, Manufacturing Industry; Business Sustainability; Customer Trust

ABSTRACT
PT XYZ is an automotive component manufacturer facing a 15% data mismatch between production reports and inventory data. This issue has led to a 62% increase in operational costs, 12% product delivery delays, and a 40% risk of customer contract fines. To overcome these challenges, the company plans to implement an ERP system to improve data accuracy and operational efficiency. However, the main challenge remains determining which ERP system best suits the company's business need. This research aims to provide recommendations for the right ERP system for PT XYZ using the Analytical Hierarchy Process (AHP) method. This approach involved interviews with Inventory Supervisors, Finance Managers, Production Managers, and Business Directors, as well as analysis of criteria that have been validated through literature studies. AHP is used to prioritize key criteria, namely Ease of Use, Price, Adaptability, Scalability, and Time on the Market, and evaluate four ERP alternatives, namely Odoo Enterprise, SAP, Microsoft Dynamics, and Infor Cloudsuite. The results of the study show that Odoo Enterprise was chosen as an ERP system that is pal-ing according to the needs of PT XYZ. This selection is based on priority calculations using AHP with a consistency level of 0.07, which shows results that are valid enough to support decision-making. The implementation of the right ERP system is expected to be able to solve the problem of asynchronous data, support operational efficiency, sustainable business growth, and increase customer trust in PT XYZ.

INTRODUCTION

PT XYZ is a manufacturing company that produces automotive components, both two-wheeled and four-wheeled, which was established in 2011 and is engaged in the production of motor vehicle parts, such as retainers, P4 heads, piston valves, block pistons, cover pistons, and ring pistons. Based on the interview we have conducted with PT XYZ for the past three months, namely September, October, and November 2024, the company faced problems related to data out of sync between production reports and inventory data reaching 15%. This asynchronous data has a detrimental impact on the company's operational sustainability (Al-Ghalabi et al., 2024; Liu et al., 2023; Yavuz et al., 2023; Yu & Chiou, 2022; Zhang et al., 2024).

The impact of the data out-of-sync includes an increase in operational costs of up to 62%, product delivery delays of up to 12%, and the risk of contract fines with customers reaching

40%. This problem not only causes financial losses, but also has the potential to damage the company's reputation in the eyes of customers.

To overcome the impact of this problem, PT XYZ is committed to ensuring 100% more accurate data synchronization, improving operational efficiency, and minimizing potential losses in the future. An integrated technology-based strategic approach is needed that is able to support decision-making more effectively and ensure the sustainability of the company's business.

Based on the results of our interview conducted on September 27, 2024 with the Inventory Supervisor, Head of IT Division, Financial Manager, Production Manager, and Business Director of PT XYZ, they expressed a desire to implement an ERP system as soon as possible (Hadikusumo et al., 2023). This was especially emphasized by the Business Director of PT XYZ, which recognizes the urgency of this situation and decided that the implementation of the ERP system is a strategic step that must be taken immediately to improve the operational efficiency and accuracy of the company's data (Gandia, 2024; Tuli, 2022). However, companies are still having difficulty in choosing the ERP system that best suits their business needs (Cao et al., 2024; Ramdhani et al., 2024; Wynn & Rezaeian, 2024; Putra et al., 2025).

PT XYZ wants to implement an ERP system but still faces challenges in choosing the ERP system that best suits its business needs, a method is needed that can help companies in choosing the best solution from the available alternatives based on the relevant criteria (Czekster et al., 2019; Taherdoost & Madanchian, 2023). This study uses the Analytical Hierarchy Process (AHP) approach to provide appropriate recommendations in choosing the appropriate ERP system (Farahat et al., 2024; Cao et al., 2024). This approach is expected to not only help companies in getting an ERP system to be implemented, but also be able to overcome the problem of non-synchronous data, improve overall operational efficiency (Harianto et al., 2024), support sustainable business growth (Fahmid et al., 2024), and restore customer confidence in the capabilities of PT XYZ in meeting their needs in a timely and timely manner (Rahmawati et al., 2025).

The objectives of this research are to identify the key criteria for ERP system selection at PT XYZ, to prioritize these criteria using the Analytical Hierarchy Process (AHP) method, and to recommend the most suitable ERP system alternative (Odoo Enterprise, SAP, Microsoft Dynamics, or Infor CloudSuite) based on the prioritized criteria. The benefits of this research are twofold. Theoretically, this study contributes to the literature on multi-criteria decision-making (MCDM) and ERP system selection by demonstrating the application of AHP in an automotive manufacturing context in Indonesia. Practically, this research benefits PT XYZ by providing a structured, data-driven recommendation for ERP selection, enabling the company to resolve data synchronization issues, improve operational efficiency, and restore customer trust. For the manufacturing industry, the findings offer insights into the key criteria for ERP selection. For future researchers, this study serves as a reference for applying AHP in similar technology selection problems in other industrial sectors.

This research approach involved conducting interviews with several internal stakeholders of PT XYZ who hold strategic positions in decision-making and are directly involved in issues related to data synchronization across departments. The respondents were selected based on the relevance of their positions, length of work experience, and their understanding of the company’s business processes. In addition, each respondent possesses a professional

background and competency certifications that support decision-making related to the selection of an ERP system. The respondents' profiles are presented in Table 1.

Table 1. Respondent Profile

Initials	Gender	Position	Experience	Certifications
TT	Male	Business Director	14 Years	CPM, IoD, SAP Certified Application Associate – Business Process Integration
FS	Female	Finance Manager	8 Years	CMA, CFP, CFA, SAP Certified Application Associate – Financial Accounting (FI)
AS	Male	Production Manager	7 Years	PMP, Lean Six Sigma Green Belt, Certified Inventory Optimization Professional (CIOP), SAP Production Planning (PP) Certification
AN	Male	Head of IT Division	6 Years	ITIL, CompTIA Security+, Odoo Technical Certification, SAP Basis/Technical Certification
RS	Male	Inventory Supervisor	8 Years	CPIM, CSCP, Six Sigma Yellow Belt, Certified Inventory Optimization Professional (CIOP), SAP Materials Management (MM) Certification

Source: Author's interview data, 2024

Based on Table 1, it can be observed that all respondents have extensive work experience in their respective fields, ranging from six to fourteen years, and hold professional certifications relevant to their roles. These certifications cover areas such as project management, finance, information technology, production, and inventory management, including specific certifications related to ERP systems, such as SAP Certified Application Associate, Odoo Functional Certification, and Certified Inventory Optimization Professional (CIOP). With this combination of experience and certifications, all respondents are considered competent to provide objective assessments in the ERP system selection process using the Analytical Hierarchy Process (AHP) method. This competency also ensures that the resulting decisions comprehensively consider strategic, financial, technical, and operational aspects, in line with PT XYZ's needs for implementing an appropriate ERP system.

METHOD

The research methodology used was shown in Figure 1 which starts from the determination of the system criteria to be selected based on literature studies and interviews of internal office holders, which will then be validated by conducting interviews using questionnaires with office holders, furthermore, the results of the interviews will be processed to sequence priority rankings for criteria and alternatives, the results of this process are in the form of ranking of ERP system alternatives of value for each of its criteria.

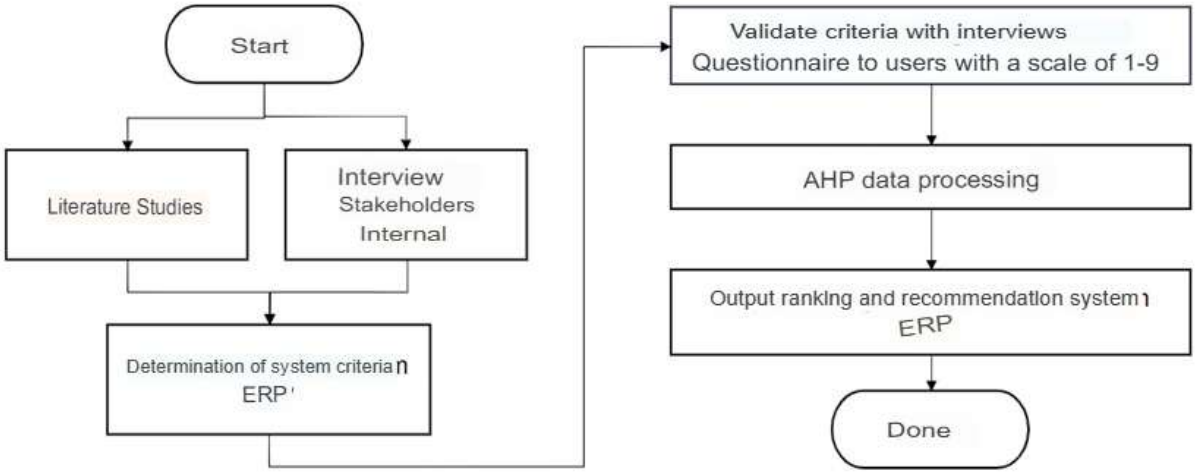

Figure 1. Research Framework

Source: Author's own work, 2024

1. Data Collection for Selection of Criteria

This study uses a literature review to gather the criteria needed for ERP selection in companies. The results of the criteria from the literature study will be validated by conducting stakeholder interviews from PT XYZ's internal company. Based on the results of the validation criteria, there are five criteria that will be used in this study which are described in Table 2. These five criteria will then go through further data processing using the AHP method.

Table 2. Criteria Table

No.	Criteria	Brief Description
1	*Ease of Use*	Ease of use of ERP system with a user-friendly appearance.
2	*Scalability*	Ease of adding modules and enlarging *databases* as business processes in the company grow
3	*Adaptability*	Ease of adapting ERP modules to business processes in the company
4	*Time in the Market*	The duration of the ERP product or *vendor* is already in the ERP industry
5	*Price*	Costs that need to be incurred to acquire or implement an ERP system

Source: Adapted from López et al., 2017, and validated through stakeholder interviews, 2024

Table 2 is a derivative of the results of interviews and several types of criteria that are commonly used in applying AHP to determine the right ERP in large-scale manufacturing companies, quoted from Yrithze López (2024) using these criteria with an uncertainty result of 0.03 (3%). With the acquisition of a very small uncertainty result from the tolerance limit of 0.1 (10%), the author applies these criteria to determine the ERP in the company PT XYZ.of 0.1 (10%) then the author applies these criteria to determine the ERP in the company PT XYZ.

2. Validation & Ranking criteria with Interviews

After the criteria are determined, then this penalty fills out an interview to be measured. Respondents will provide a criterion assessment using a scale of 1-9 described in Table 3.

Table 3. Priority Scale Explanatory Table

Scale of Importance	Definition	Brief Description
1	*Equal*	In comparison, both have the same value of importance to the object
2	*Weak / Slight*	
3	*Moderate*	One object is slightly more important than the other
4	*Moderate+plus*	
5	*Strong*	One object is more important than the other
6	*Strong+plus*	
7	*Very strong*	One object is much more important than the other
8	*Very-very strong*	
9	*Extreme*	Costs that need to be incurred to acquire or implement an ERP system

Source: Adapted from Saaty's AHP scale, 1980

The filling out of the interview is carried out with relevant stakeholders whose filling will be accompanied by filling in the priority matrix based on predetermined criteria. The next process is the processing of data from filling in the matrix using Expert Choice software which is considered quite common to be used in processing data for AHP. The results of the processed data are in the form of priority assessments of the criteria, then an alternative ERP assessment of the criteria will also be produced. This data will be used to provide feedback on which ERP alternative is in accordance with the needs of the company PT XYZ based on the criteria considered.

3. Implementation of AHP on the selected criteria

The next stage is to conduct an interview by providing a questionnaire containing criteria and rankings based on the selection of criteria and validation that have been determined. The result of filling out this questionnaire is the assessment of stakeholders in assessing criterion 1 with others. Each criterion has a scale value of importance to the other criteria, and then these values are compared to obtain an inconsistency vector. Based on previous research cited from Yrithze López (2024), the tolerance limit of the uncertainty value is 10% or 0.1. The smaller the uncertainty the better, the better the implementation of AHP. To support this, someone who understands the company as a whole, knows the company's needs and understands what ERP is. This study interviewed 4 stakeholders in the questionnaire, including Inventory Supervisor, Financial Manager, Production Manager, and Business Director. With the hope that the scrutiny of the stakeholders has an uncertainty value that is still below tolerance.

RESULT AND DISCUSSION

This study used Expert Choice software as a tool to help calculate the criteria and alternative matrices. The sequence of the processes carried out is as follows:

1. Fill in the matrix of each respondent to determine the priority of the criteria
2. Fill in the matrix of each criterion for comparison with available alternatives
3. Perform the overall calculation to see the alternative results with the best score of each criterion
4. Evaluate the consistency rate of the final result

In Figure 2 there is a picture of the hierarchical order of the targets, criteria, and alternatives to be selected.

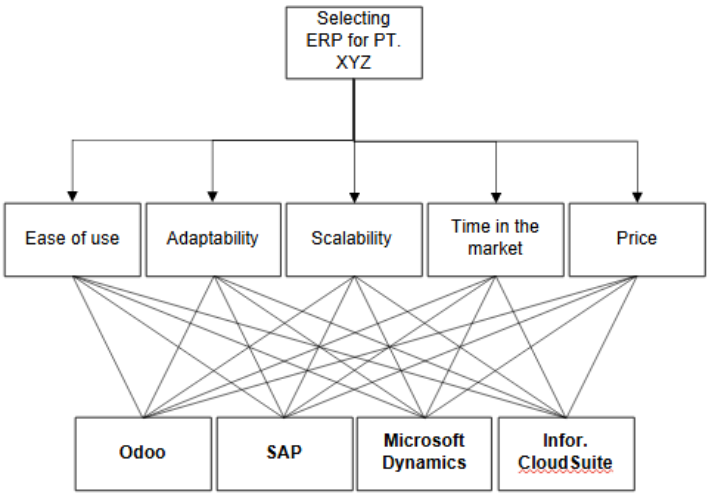

Figure 2: Hierarchy of targets, criteria, and alternatives for decision-making
Source: Author's analysis using Expert Choice software, 2024

At the top level is the target of this research, namely Choosing ERP for PT XYZ

At the next level, it is a list of criteria that are considered for choosing an alternative ERP.

At the bottom level, there is a list of alternative ERP systems that will be selected based on the criteria that have been determined at the previous level. There are six matrices that need to be filled in by respondents, one is a priority matrix for the target, five matrices for each criterion that need to be filled in for each alternative

Variabel	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	Variabel
Price																		Ease of Use
Price																		Scalability
Price																		Time in the Market
Price																		Adaptability
Ease of Use																		Scalability
Ease of Use																		Time in the Market
Ease of Use																		Adaptability
Scalability																		Time in the Market
Scalability																		Adaptability
Time in the Market																		Adaptability

Figure 3: Priority matrix
Source: Author's analysis using Expert Choice software, 2024

Figure 3 is an example of a priority scale comparison matrix on the criteria filled in by the respondents. The results of this matrix are then processed in Expert Choice for each comparison, then it will appear the ranking of the criteria and also the selected alternative results.

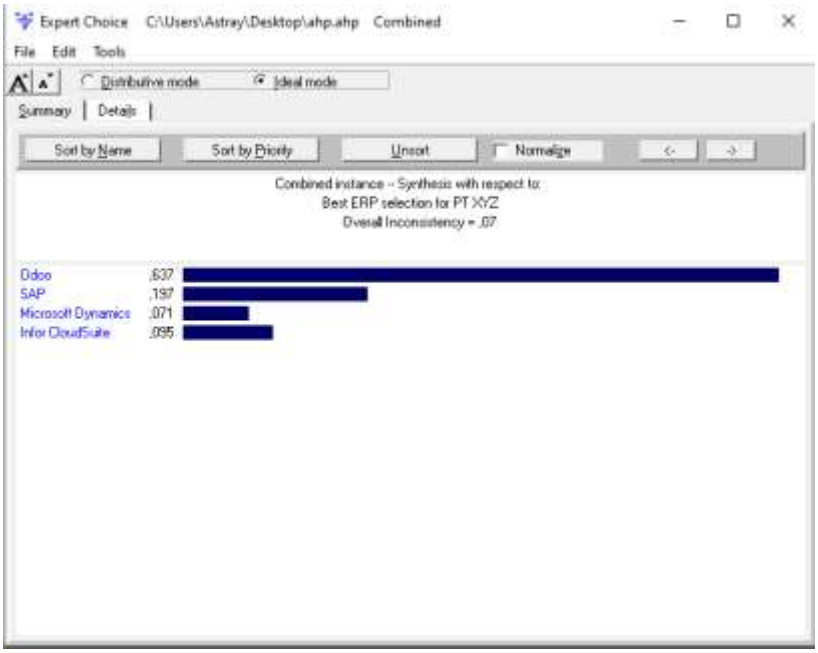

Figure 4: Sorting of ERP Alternatives selected based on criteria

Source: Author's analysis using Expert Choice software, 2024

Figure 4 is the result of the calculation process from Expert Choice which shows the ranking order of the selected ERP system alternatives. The order obtained is Odoo Enterprise, Infor CloudSuite, SAP, followed by Microsoft Dynamics. The results obtained have an inconsistency rate of 0.07 which has a value below 0.1, which means that the results of this study are valid.

After the calculation is done, it can be seen that Odoo Enterprise has the highest-ranking value compared to other alternatives. This can be used by PT XYZ as a reference for making decisions in the selection of ERP systems in accordance with the five criteria discussed earlier. The calculation figures of this process are relative to the assessment of the office holders of PT XYZ, which if the assessment of the same alternative or criteria, if carried out by another company, can produce different results.

CONCLUSION

Case study on PT XYZ is motivated by the company's need to choose the most suitable ERP product based on criteria that have been determined through literature studies and validation with stakeholders. The Analytical Hierarchical Process (AHP) method is used to prioritize criteria using paired comparisons, thus providing a structured and systematic approach in decision-making. In conclusion, the results of the application of the AHP method show an evaluation of five criteria, namely Ease of Use, Price, Adaptability, Scalability, and Time on the Market as well as four ERP alternatives, namely Odoo Enterprise, SAP, Microsoft Dynamics, and Infor Cloudsuite. From these alternatives, Odoo Enterprise was chosen as the ERP product that best suits the needs of PT XYZ. This selection is based on the results of priority sequencing through the AHP method with a consistency rate of 0.07, which indicates that the results given are consistent enough to be used as decision-making. Based on these findings, several recommendations are proposed. For PT XYZ management, it is recommended

to immediately proceed with the implementation of Odoo Enterprise as the selected ERP system, starting with a pilot project in one department to minimize disruption before full-scale rollout. Additionally, the company should provide comprehensive training for all users to ensure successful adoption of the new system. For the implementation team, it is advised to establish clear key performance indicators (KPIs) related to data synchronization accuracy, operational cost reduction, and delivery timeliness to measure the success of the ERP implementation. For future researchers, it is suggested to conduct post-implementation studies to evaluate the actual impact of Odoo Enterprise on data synchronization and operational efficiency at PT XYZ, as well as to apply the AHP method with additional criteria or alternative ERP systems, such as cloud-based or open-source solutions, in other manufacturing companies to validate the generalizability of these findings.

REFERENCES

Al-Ghalabi, R. R., Alsheikh, G. A. A., Al-Shamaileh, L. R., & Altarawneh, A. (2024). Impact of digital HR technology between green human resources and environmental performance in Jordanian banks. *Heritage and Sustainable Development, 6*(1), 267–286.

Cao, Y., Cao, Y., Rajak, M. K., & Stojanović, R. (2024). A new integrated rough multi-criteria decision-making model for enterprise resource planning software selection. *PeerJ Computer Science, 10*, Article e2096. https://doi.org/10.7717/peerj-cs.2096

Czekster, R. M., Webber, T., Jandrey, A. H., & Marcon, C. A. M. (2019). Selection of enterprise resource planning software using analytic hierarchy process. *Enterprise Information Systems, 13*(6), 895–915. https://doi.org/10.1080/17517575.2019.1606285

Fahmid, I. M., Suhartini, E., & Amri, K. (2024). Enhancing sustainability integration in sustainable enterprise resource planning (S-ERP) system: Application of transaction cost theory and case study analysis. *Sustainable Operations and Computers, 5*, 98–112. https://doi.org/10.1016/j.susoc.2024.03.002

Farahat, A., Mahmoud, M. A., & Elbaz, A. (2024). Evaluation of ERP software selection criteria with fuzzy AHP approach: An application in the metal production enterprises in the aviation industry. *International Journal of System Assurance Engineering and Management, 15*(6), 2765–2784. https://doi.org/10.1007/s13198-024-02287-x

Gandia, P. F. A. T. (2024). Factors affecting ERP system implementation among selected organizations: A proposed operational strategies. *International Journal for Multidisciplinary Research, 6*(4). https://doi.org/10.36948/ijfmr.2024.v06i04.25307

Hadikusumo, R. A., Nafiska, M. Z., Alfiyah, A., Syamsuddin, S., & Navianti, D. R. (2023). Implementation of an enterprise resource planning (ERP) system and its impact on manufacturing company operational efficiency. *Global International Journal of Innovative Research, 1*(2), 194–199. https://doi.org/10.59613/global.v1i2.29

Harianto, K. J., Tarigan, Z. J. H., Pratama, I., & Siagian, H. (2024). The effect of digital ERP implementation, supply chain integration and operational performance on business performance. *International Journal of Data and Network Science, 8*(2), 1013–1024. https://doi.org/10.5267/j.ijdns.2024.1.007

Liu, R., Yue, Z., Ijaz, A., Lutfi, A., & Mao, J. (2023). Sustainable business performance: Examining the role of green HRM practices, green innovation and responsible leadership through the lens of pro-environmental behavior. *Sustainability, 15*(9), 7317.

https://doi.org/10.3390/su15097317
López, Y., Luna, D., & Talavera, A. (2017). Selection of ERP based on analytical hierarchical process and fuzzy inference systems. In *2017 IEEE XXIV International Conference on Electronics, Electrical Engineering and Computing (INTERCON)* (pp. 1–4). IEEE.
Putra, F. E., Nugraha, R., & Oktaviana, D. (2025). Impact of ERP system implementation on operational and financial efficiency in manufacturing industry. *Journal of Economic Education and Entrepreneurship Studies, 5*(3), 112–125. https://doi.org/10.26858/je3s.v5i3.4328
Rahmawati, I. D., Sulistyowati, W. A., & Santoso, B. (2025). Rekomendasi sistem ERP untuk akurasi data operasional studi kasus stock dan inventory CV ABC. *Ranah Research: Journal of Multidisciplinary Research and Development, 7*(3), 1–14.
Ramdhani, M. A., Hidayat, D. R., & Pertiwi, K. D. (2024). Systematic review of enterprise resource planning (ERP) system implementation in organizations: Challenges and successes to company performance. *Bitnet: Jurnal Pendidikan Teknologi Informasi, 9*(2), 1–15.
Taherdoost, H., & Madanchian, M. (2023). Multi-criteria decision making (MCDM) methods and concepts. *Encyclopedia, 3*(1), 77–87. https://doi.org/10.3390/encyclopedia3010006
Tuli, F. (2022). Implementation of ERP systems in organizational settings: Enhancing operational efficiency and productivity. *Asian Business Review, 12*(3), 89–96. https://doi.org/10.18034/abr.v12i3.676
Wynn, M., & Rezaeian, M. (2024). Reassessing critical success factors for ERP implementation in the digital era. *Digital Transformation and Applications, 20*(1), 151–174.
Yavuz, O., Uner, M. M., Okumus, F., & Karatepe, O. M. (2023). Industry 4.0 technologies, sustainable operations practices and their impacts on sustainable performance. *Journal of Cleaner Production, 387*, 135951. https://doi.org/10.1016/j.jclepro.2022.135951
Yu, W.-H., & Chiou, C.-C. (2022). Effects of sustainable development of the logistics industry by cloud operational system. *Sustainability, 14*(16), 10440. https://doi.org/10.3390/su141610440
Zhang, Q., Ullah, A., Ashraf, S., & Abdullah, M. (2024). Synergistic impact of internet of things and big-data-driven supply chain on sustainable firm performance. *Sustainability, 16*(13), 5717. https://doi.org/10.3390/su16135717