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Value Chain Analysis Models for Enterprise Resource Planning (ERP) - Based Odoo Inventory Implementation Using the Accelerated SAP (ASAP) Method

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ABSTRACT

The automotive service industry faces escalating challenges in inventory management, necessitating digital transformation strategies that can overcome traditional operational limitations. While prior studies have examined Odoo Enterprise Resource Planning (ERP) adoption in Indonesian SMEs, few combine Porter's value chain analysis with the accelerated SAP (ASAP) implementation methodology, and even fewer connect the resulting operational gains to the creative, customer-facing service work that differentiates automotive service businesses from competitors. This research addresses that gap by exploring the implementation of the Odoo ERP system at Tama Jaya Motor, using the accelerated SAP methodology to address critical inventory management challenges, including inaccurate stock recording, inefficient goods movement tracking, and delayed procurement processes. Using a qualitative case study design that combines a literature review, a key-informant interview with the business owner, and documentation analysis, this study identifies that the main issues in inventory management can hinder operational efficiency and business competitiveness. Here, we propose a systematic approach using Porter's value chain analysis to map and optimize business functions across primary and supporting activities, with a focus on integrating sales, inventory, operations, finance, and customer service modules. The implementation results demonstrate significant operational improvements, including increased stock recording accuracy, reduced time to make procurement decisions, and improved service time efficiency. These findings advance understanding of the transformative potential of integrated information systems in automotive service businesses, offering a robust framework for digital transformation that enhances operational efficiency, reduces costs, and improves overall business competitiveness. In a broader context, this research not only addresses immediate technological needs but also provides insights into strategic digital integration, highlighting the critical role of advanced ERP systems in modern, creative-economy-adjacent business management. Ultimately, this study presents a practical approach to navigating the complexities of technological innovation in service-oriented industries, demonstrating how systematic implementation can drive meaningful operational improvements.

Keywords: Accelerated SAP (ASAP), ERP, Inventory, Odoo, Value Chain Analysis

INTRODUCTION

The automotive service industry currently faces increasingly complex challenges inventory management, requiring digital transformation strategies to overcome traditional operational limitations. Effective inventory management is crucial for achieving operational efficiency and business competitiveness in a competitive market. According to Harsono et al. (2023), good inventory

management focuses not only on stock control but also on optimizing procurement and goods movement processes.

As explained by Purwanto et al. (2023), Odoo, as an integrated open-source platform, enables more organized and efficient inventory management. The Odoo inventory module provides critical features, such as real-time stock monitoring, automatic reorder points, and detailed reporting, that specifically accommodate automotive workshop needs. Previous research indicates that many automotive workshops still rely on manual methods prone to errors, such as inaccurate stock recording and inefficient goods tracking (Mukti & Latipah, 2024). The benefits of Odoo implementation in businesses are supported by several prior studies. Research by Guryadi and Rohmah (2021) shows that web-based inventory systems can improve recording accuracy up to 95%. Meanwhile, Fadilah (2021) demonstrates that digitalization of stock management can accelerate procurement decision-making processes by up to 60% compared to manual systems. By combining these insights with the Accelerated SAP methodology, this research explores the implementation of Odoo Enterprise Resource Planning (ERP) at Tama Jaya Motor.

Despite the growing body of research on Odoo ERP adoption in Indonesian small and medium enterprises, most existing studies examine either the technical configuration of Odoo modules (Purwanto et al., 2023; Henny et al., 2025) or the operational outcomes of implementation in a single business function, such as point-of-sale and accounting integration (Wenardi et al., 2025) or inventory optimization alone (Luarwan et al., 2025). Few studies combine Porter's Value Chain Analysis with a structured implementation methodology such as Accelerated SAP (ASAP) to systematically map how ERP adoption affects both primary and support activities across an entire automotive service organization, and none, to the authors' knowledge, situate this integration within the context of an automotive service business that also functions as part of the wider creative and technical service economy, where customization, personalization of service, and customer experience design are themselves value-creating activities (Anatan & Nur, 2023). This study addresses that gap by using Value Chain Analysis as a diagnostic framework prior to ASAP-based implementation, thereby providing an empirical account of how a structured, phase-based ERP rollout translates into measurable improvements across the value chain of a creative-adjacent service SME. This methodology is selected for its ability to expedite ERP system implementation while focusing on specific organizational needs, as demonstrated in recent SME-focused ERP deployments (Henny et al., 2025). Specifically, this research will answer several key questions:

1. How can Odoo ERP implementation improve inventory management at Tama Jaya Motor?
2. What is the impact of the Accelerated SAP methodology on ERP system implementation efficiency?
3. How can Odoo module integration optimize the company's business functions?

In this context, we propose a systematic approach using Porter's value chain analysis to map and optimize business functions across primary and support activities (Guryadi & Rohmah, 2021). This approach focuses on integrating modules for Sales, Inventory, Operations, Finance, and Customer Service. The research found that key issues in inventory management can impede operational efficiency and business competitiveness. By implementing Odoo ERP, implementation results demonstrate significant improvements in stock recording accuracy, reduced procurement decision-making time, and enhanced service time efficiency. The contribution of this research lies not only in addressing urgent technical problems but also in providing insights into strategic digital integration. It highlights the critical role of advanced ERP systems in modern business management (Harsono et al., 2023). Thus, this research offers a robust framework for digital transformation that enhances operational efficiency, reduces costs, and improves overall business competitiveness.

METHODS

This research employs a qualitative approach to thoroughly investigate the implementation the Odoo ERP system at Tama Jaya Motor. According to (Henny et al., 2025), qualitative research methods are particularly suitable for understanding complex organizational processes and technological implementations within their natural context.

A. Data Collection Methods

The research incorporates three primary data collection methods, each designed to gather valuable insights and address the research objectives comprehensively. These methods are outlined as follows:

1. Literature Study

   According to Taherdoost (2021) and Dewi (2021), a literature study serves as a fundamental method for establishing the theoretical foundation of the research. A comprehensive review of relevant academic literature, including academic journals, conference proceedings, and scholarly publications, was conducted. The focus areas include ERP implementation, inventory management systems, and value chain analysis in the automotive service industry. This method also identifies gaps in existing knowledge and supports a deeper understanding of the research topic.

2. Structured Interviews

   The structured interview, based on the methodology outlined by Taherdoost (2021), was conducted with Mr. Amron, the owner and manager of Tama Jaya Motor, at the business's in Pasar Kemis, Tangerang. The owner was purposively selected as the key informant because he held direct oversight of all business functions affected by the ERP implementation, procurement, inventory, sales, and customer service, and was the primary decision-maker throughout the project, making him the most knowledgeable single source on the organization's operational challenges and the implementation process as a whole. The interview followed a semi-structured guide, lasted approximately 30 minutes, and was conducted on-site. This approach employed a series of standardized questions to gather specific, systematic information regarding:

   a. Current inventory management practices
   b. Operational challenges and bottlenecks
   c. User requirements and expectations
   d. Implementation concerns and potential solutions, Structured interviews allow for the collection of both qualitative and quantitative data, providing a rich source of primary information for the research.

3. Documentation Analysis

   Documentation analysis, following the framework suggested by Bowen (2009), was utilized to examine written materials, including internal publications, business process documentation, inventory records, and operational reports collected over a three-month observation period at Tama Jaya Motor. This method provides valuable secondary data that complements the primary data collected. By analyzing these documents, the research gains insights into the current system's strengths and limitations, as well as the broader context and background of the study.

These three methods are often combined within a single study to leverage their complementary strengths and mitigate individual limitations. Literature study establishes the theoretical groundwork, structured interviews provide first-hand insights, and documentation analysis offers contextual and historical data. The quality of the data collected depends significantly on the researcher's ability to execute these methods effectively, ensuring alignment with the research context and objectives.

Because data collection relied on a single key informant, the researchers took steps to of bias beyond the interview alone. The owner's account was cross-checked against documentation analysis (e.g., stock cards, purchase orders, and service logs) and against the patterns reported in prior studies on Odoo ERP implementation in comparable Indonesian SMEs (Luarwan et al., 2025; Wenardi et al., 2025; Henny et al., 2025), so that claims made in the interview were not accepted at face value but weighed against independent records and external evidence. The original interview recording could not be retained for the duration of this study, notes taken during and immediately after the interview were used for analysis. This reliance on a single informant, without an audio record available for later re-verification, is acknowledged as a limitation of this study and is discussed further in the Discussion and Conclusion sections.

B. Value Chain Model Porter

The concept of the value chain originates from viewing organizations as systems composed of interconnected subsystems, each involving inputs, transformation processes, and outputs. These components rely on and consume resources such as money, labor, materials, equipment, facilities, land, administration, and management. The way value chain activities are executed influences costs and impacts profitability. Organizations typically perform numerous activities ranging from hundreds to thousands in converting inputs into outputs. These activities are broadly categorized into primary and support activities, which every business undertakes in some form. This framework, as validated by Porter (1985), provides a comprehensive approach to understanding both primary and support activities in the organization. According to Porter (1985), primary activities include:

1. Inbound Logistics - Managing supplier relationships and handling tasks such as receiving, storing, and distributing inputs.
2. Operations - Conducting processes to convert inputs into outputs (products or services).
3. Outbound Logistics - Activities related to collecting, storing, and delivering outputs.
4. Marketing and Sales - Efforts to inform customers about products or services, encourage purchases, and facilitate transactions.
5. Service - Ensuring the product or service remains functional and effective for the buyer after delivery.

Support activities are as follows:

1. Procurement - Acquiring necessary inputs or resources for the organization.
2. Human Resource Management - Encompassing recruitment, hiring, training, development, compensation, and, if needed, termination or layoffs.
3. Technological Development - Focusing on tools, hardware, software, processes, and technical expertise involved in transforming inputs into outputs.
4. Infrastructure - Providing essential functions like accounting, legal, finance, planning, public affairs, government relations, quality assurance, and general management, which integrate and support the organization's various components.

By analyzing these interconnected activities, organizations can identify inefficiencies, reduce costs, and enhance their value proposition to customers. This model emphasizes that competitive advantage stems not just from the overall performance of a firm but from optimizing each specific activity within its operational framework. The insights gained from value chain analysis can lead to improved profitability and market positioning by focusing on both cost leadership and differentiation strategies.

C. Accelerated SAP (ASAP)

According to Henny et al. (2025) and Harsono et al. (2023), Accelerated SAP (ASAP) methodology provides a structured approach for system implementation, consisting of five key phases that ensure efficient and effective deployment.

1. Project Preparation
   This phase involves preliminary project tasks such as defining objectives, identifying resource requirements, and establishing project governance. Key activities include creating a project charter, organizing project teams, conducting needs analysis, and outlining technical and operational requirements. Initial stakeholder meetings are also held to align on goals and strategies.
2. Business Blueprint
   During this phase, a detailed blueprint of the organization's current business processes is developed and analyzed to identify opportunities for improvement. Standardized procedures, such as process flowcharts and value chain analyses, are used to map out the desired future state after implementing the new system. This document becomes a roadmap for the realization phase.
3. Realization
   The realization phase translates the business blueprint into actionable tasks. This includes configuring the system to meet organizational needs, customizing ERP software, migrating data, and testing system components. Necessary interfaces and reporting tools are developed and validated to ensure integration and functionality. Training for project teams is also conducted at this stage.
4. Final Preparation
   This phase focuses on finalizing the implementation. Activities include comprehensive system testing, user training, and data migration from legacy systems. Modifications based on testing feedback are applied to ensure the system is fully functional and aligned with business objectives.
5. Go-Live & Support
   In the final phase, the system transitions to live operation. Support mechanisms are established to monitor performance, address potential issues, and provide assistance to users. Closing activities, such as project review and documentation, ensure a smooth handover and continuous optimization.

The structured and iterative approach of the ASAP methodology enables organizations to implement ERP systems effectively, ensuring alignment with business goals while minimizing disruptions.

RESULTS

The implementation of the Odoo inventory module at Tama Jaya Motor was carried out in stages, including initial configuration, data migration, system testing, up to full operation. This system is designed to replace the manual method that has been used and has caused problems such as inaccurate stock recording and delays in procuring spare parts. After the module was implemented, several significant improvements were discovered.

A. Data Collection

Based on the data collected through the research methods, several key findings were obtained. Detailed information about products, including their specifications and pricing, was gathered, providing valuable insights into the inventory structure and cost management at TAMA JAYA MOTOR. Photographic documentation was also collected, showcasing the physical inventory layout and operational processes, which revealed inefficiencies in space utilization and product categorization.

Structured interviews with stakeholders highlighted several challenges, such as the reliance on manual inventory tracking, leading to delays and discrepancies, as well as inconsistent stock levels and limited demand forecasting capabilities. Stakeholders expressed a need for an automated inventory system with real-time updates, enhanced accuracy, and seamless integration, though concerns regarding cost, training, and transition downtime were noted.

Document analysis further revealed inconsistencies in record-keeping and frequent issues with stockouts and overstocking, emphasizing the need for a more efficient system. These findings highlight the importance of implementing a tailored ERP system to address current operational inefficiencies and support better decision-making through improved inventory management practices.

When compared against prior studies, these findings reinforce a recurring pattern in Indonesian automotive and retail SMEs: manual, paper-based inventory recording consistently produces stock discrepancies and delayed reordering, a pattern also documented by Wenardi et al. (2025) at Ani Mart and by Luarwan et al. (2025) at JAPFA Best Serpong. In the interview, the owner, Mr. Santoso, identified the same three concerns emphasized in those prior studies: (1) lack of real-time visibility into stock levels, (2) fragmented communication between the sales and procurement functions, and (3) the need for a single system that could be trusted without manual re-verification. These concerns were corroborated independently by the documentation analysis, which showed multiple stock cards with conflicting balances for the same items, consistent with what the owner described. Because this account rests on a single informant rather than multiple cross-checked interviews, it should be read as the perspective of the person with the broadest view of the business rather than as a fully triangulated multi-respondent account; this limitation is addressed further in the Discussion

B. Value Chain Model Porter

1. Primary Activities Analysis:
   i. Inbound Logistics: The ERP system assisted in managing the inventory of spare parts, oils, and tires from suppliers, as well as tracking the receipt of goods and automatically updating stock levels.
   ii. Operations: The system helped in scheduling and recording service processes, as well as managing the allocation of resources (mechanics and equipment).
   iii. Outbound Logistics: The system enabled the recording of spare parts deliveries to customers and the management of service queues and customer motor pickup.

iv. Marketing & Sales: The system incorporated a CRM module to manage customer data, track promotions, and administer loyalty programs.
v. Service: The system facilitated the scheduling of periodic servicing and the tracking of each customer's service history.

2. Support Activities Analysis:
   i. Firm Infrastructure: The financial and accounting modules of the ERP system enabled comprehensive reporting, while the integration of all business processes improved overall operational efficiency.
   ii. Human Resource Management: The system managed employee data, work schedules, and payroll.
   iii. Technology Development: The Odoo ERP system itself represented a significant technological advancement for the company, and its integration with the website enabled online information and service booking.
   iv. Procurement: The purchasing module of the ERP system was used to manage the procurement of spare parts and equipment from suppliers.

C. Accelerated SAP (ASAP)

Using the Accelerated SAP (ASAP) methodology, the implementation process at Tama Jaya Motor followed a structured and phased approach, yielding key outcomes and insights that underscored the importance of a systematic and iterative implementation strategy. This approach allowed the organization to align its operational objectives with technological advancements while minimizing potential risks and disruptions.

1) **Project Preparation:** In the project preparation phase, initial steps for implementing the Odoo system were carried out systematically. This included defining the project scope and identifying the modules to be integrated, focusing on the Inventory and Sales modules for Tama Jaya Motor’s digital transformation. Clear and measurable objectives were set, such as improving stock recording accuracy and streamlining procurement, emphasizing operational performance improvement.

   Data collection was comprehensive, involving existing documents, interviews with business owners, and direct observation of current processes. This multi-source approach ensured the system design aligned with Tama Jaya Motor's specific needs and workflow. The researcher collaborated **closely** with the organization, which committed to sharing data and supporting the implementation. The objectives, required resources, and current operational challenges were outlined to conduct a thorough needs analysis and justify the project.

2) **Business Blueprint:** The business blueprint for Tama Jaya Motor was developed using Porter's Value Chain Analysis and an Inventory Process Flowchart to map current processes. Initial analysis revealed challenges like manual stock recording, non-centralized procurement, and lack of integration between sales, inventory, and finance. Here the business blueprint of the models of inventory.

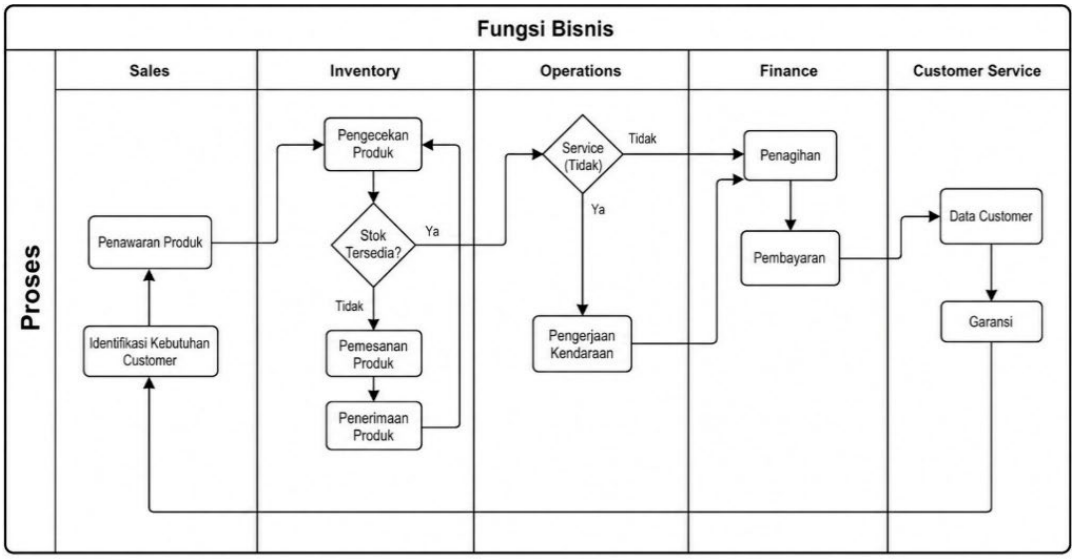

Figure 1. Inventory Business Process Flowchart

The proposed solution integrated the Inventory module for automatic stock recording in Inbound Logistics, used the Sales module to streamline customer order management in Operations, and connected the Inventory module to a centralized system for Outbound Logistics, enhancing transparency and efficiency.

3) **Realization:** The realization phase focuses on executing the plans laid out in the business blueprint. This involves configuring the Odoo ERP system according to the identified business requirements, including migrating existing data into the new system and installing necessary modules that align with operational needs. The researcher ensures that each module is tailored to meet the specific requirements of Tama Jaya Motor, facilitating an effective transition from manual processes to an integrated ERP solution. Here are the main steps in using the Odoo inventory module at Tama Jaya Motor:

a) Login to the Odoo System

Users are required to log in using the credentials that have been provided. After successful login, the main Odoo interface will display the various available modules, including the inventory module.

b) Initial Inventory Settings

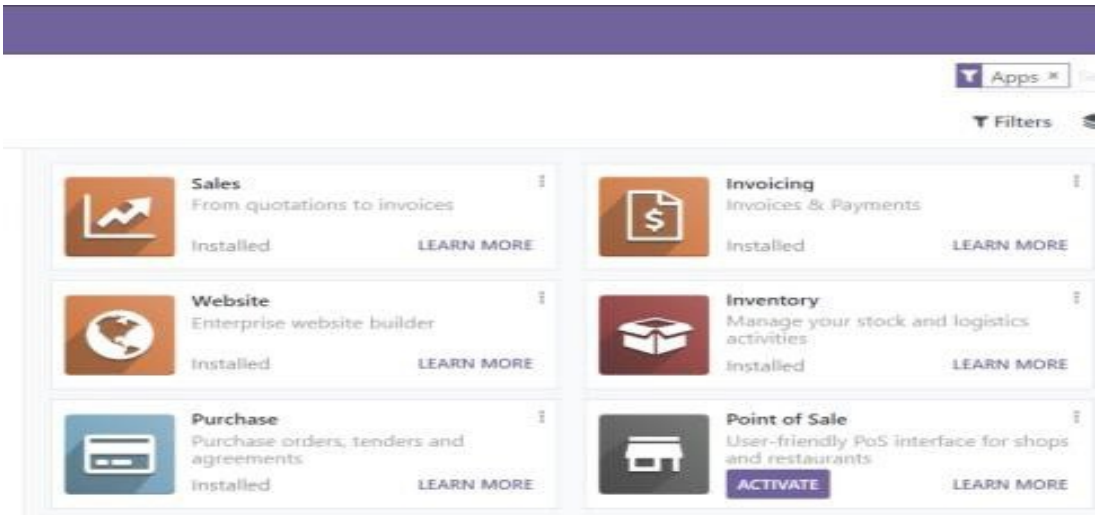

Figure 2. Downloading the Inventory Module

After successfully logging into the Odoo database that has been created, the next step is to download and install the inventory module application. This module is designed to help companies, in this case Tama Jaya Motor, to monitor and manage stock efficiently. The process of installing and configuring the inventory module includes the following steps are Installing Core Inventory Management Features and Basic Warehouse Setup Configuration.

c) Inputting Products

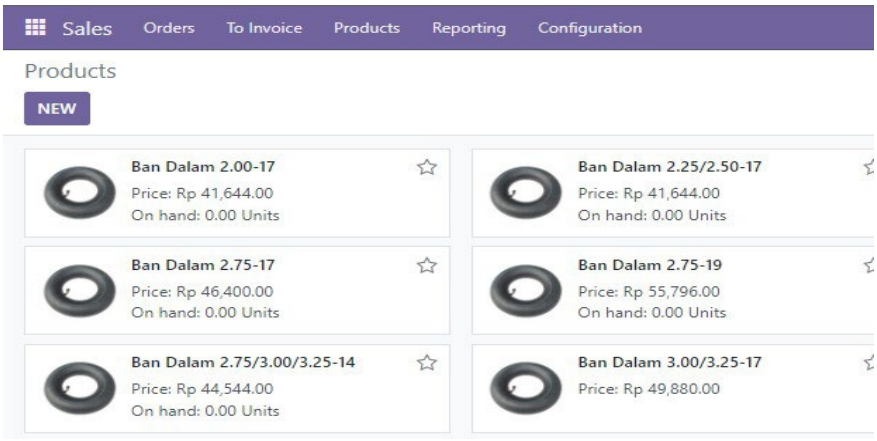

Figure 3. Tama Jaya Motor Products

The product data input process is an essential initial step in inventory management using Odoo. This stage includes several main aspects are Determining the Unit of Measure (UoM) and Grouping Products into Categories. In addition to, in the product data input process, some important information that must be filled in includes are Product Name, Selling Price, Purchase Price, and VAT (Value Added Tax). By entering this information completely and accurately, the Odoo inventory system can provide more structured data, support report analysis and facilitate the process of monitoring and managing stock.

d) Adding Supplier Data to the System

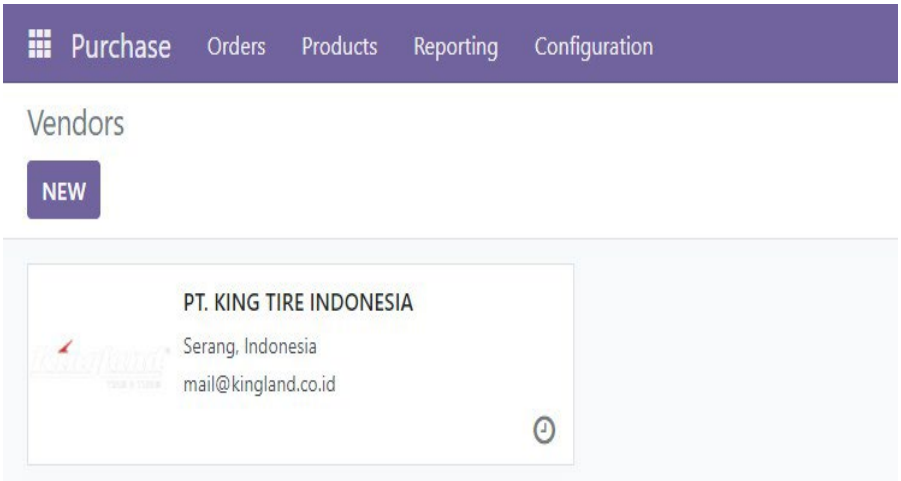

Figure 4. Tama Jaya Motor Supplier

Another important step in inventory management is entering supplier data into the Odoo system. At Tama Jaya Motor, the main supplier for tire products is PT. King Tire

Indonesia. This company is responsible for supplying all types of tires, both inner tubes and outer tubes, sold by Tama Jaya Motor. The information entered into the system includes are Supplier Name, Contact and Address Information, Products Supplied, Purchase Terms and Transaction History. By recording detailed supplier data, the inventory system can help facilitate the re-ordering process, track relationships with suppliers, and ensure continuous stock availability. PT. King Tire Indonesia is also a strategic partner ensuring that Tama Jaya Motor inventory needs are always met on time.

e) Supplier Ordering Process

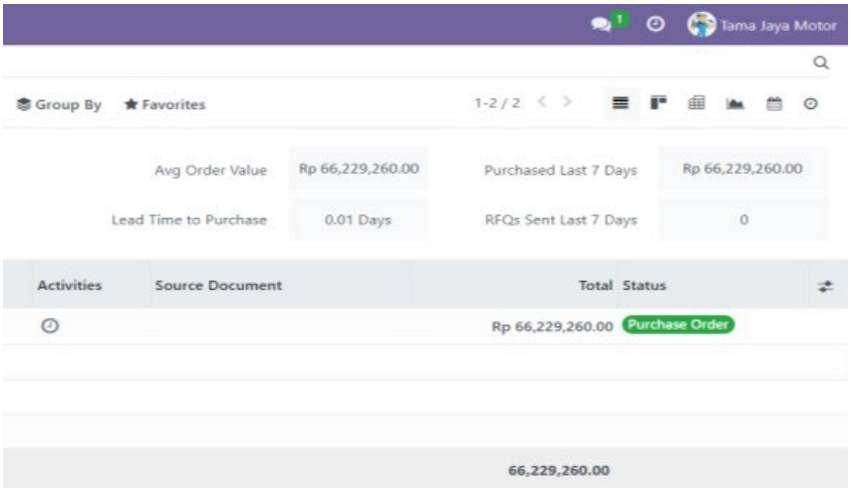

Figure 5. Supplying Goods

After the supplier data is entered into the system, the next step is to carry out the ordering process for the required goods. Tama Jaya Motor routinely supplies goods from PT. King Tire Indonesia to meet operational needs and maintain the availability of stock of tire products sold. The process of ordering goods includes the following stages are Identify Stock Needs, Purchase Order Creation, Order Confirmation and Payment, and Receipt of Goods. With an integrated ordering process in the Odoo system, Tama Jaya Motor can ensure efficient stock management, reduce the risk of procurement delays, and maintain smooth operations. PT. King Tire Indonesia, as a supplier partner, can also provide faster and more targeted services according to Tama Jaya Motor's needs.

f) Automatic Update on Inventory Stock After Purchase of Goods

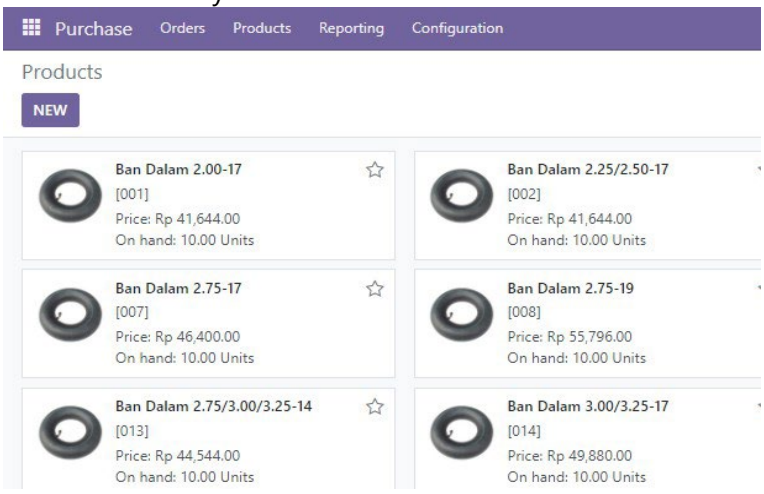

Figure 6. Tama Jaya Motor Stock of Goods

After purchasing goods from suppliers, the Odoo system automatically updates inventory stock based on received goods data. For example, inner tubes and outer tires from PT. King Tire Indonesia are recorded in the inventory module, ensuring real-time stock accuracy. This automation reduces errors, saves time, and enhances inventory data accuracy, leading to more efficient goods management, smoother operations, and improved customer service.

4) **Final Preparation:** In the final testing phase of the Odoo implementation at Tama Jaya Motor, two key activities were prioritized: comprehensive user training and detailed system testing. User training focused on equipping staff with the knowledge and skills to effectively use the new system, emphasizing core areas such as inventory management, procurement, and customer order processing. This hands-on approach aimed to ensure a smooth transition from manual to automated processes, address potential knowledge gaps, and build user confidence.

   System testing verified that Odoo met the operational and functional requirements outlined in the business blueprint. This included testing procurement processes to confirm efficient handling of supplier interactions and purchase orders, stock management to ensure accurate real-time inventory tracking and reorder alerts, and customer order management for seamless order entry, integration with inventory, and automated invoicing. Any identified issues were documented and promptly resolved, with stress tests conducted to evaluate system performance during peak business periods. These thorough training and testing efforts ensured the Odoo implementation was both technically sound and practically viable, minimizing risks and building a foundation for a successful system go-live. The outcome was a reliable tool that supported Tama Jaya Motor's long-term operational efficiency and growth.

5) **Go Live & Support:** The final phase of the Odoo ERP implementation at Tama Jaya Motor involves transitioning to live operation, ensuring the system functions effectively and minimizes disruptions. Key activities include establishing support mechanisms for performance monitoring and user assistance, with dedicated teams for troubleshooting and regular system updates. Training sessions are provided to boost user confidence and adoption.

   The structured ASAP methodology ensures seamless integration into workflows, addressing challenges like stock inconsistencies and procurement inefficiencies. This phase results in significant operational efficiency, improved decision-making, and long-term business growth, marking the ERP implementation as a transformative success for Tama Jaya Motor.

D. Implementation Results

The implementation of the Odoo ERP system at Tama Jaya Motor led to major improvements in inventory management and cross-departmental integration. The procurement process became faster, reducing lead times and minimizing stockouts, ensuring timely service. Real-time data synchronization across inventory, sales, and finance provided accurate information, improved coordination, and supported data-driven decision-making. The positive impact is shown in the chart below, which highlights the increase in sales volume and revenue after the ERP system was implemented:

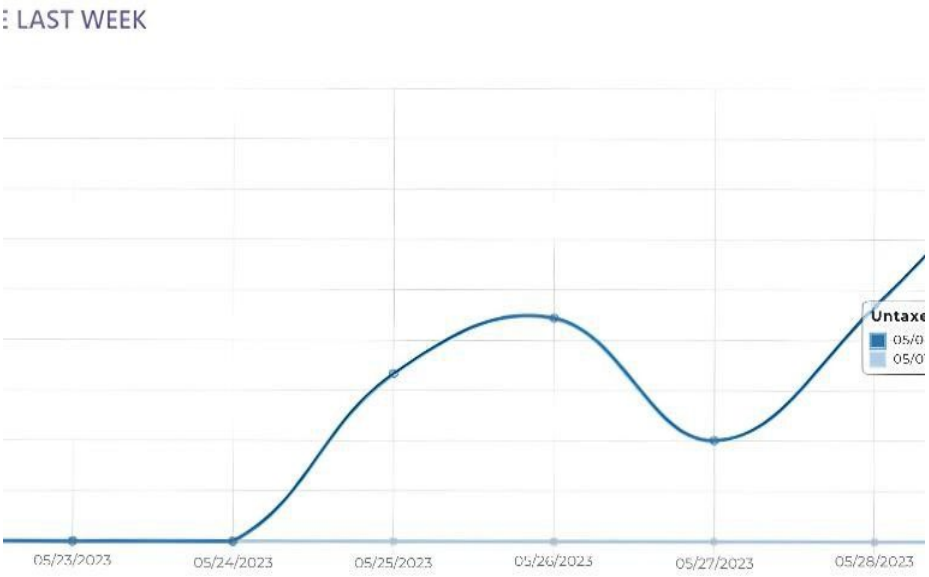

Figure 7. Tama Jaya Motor Stock Improvement

The structured approach guided by the Accelerated SAP (ASAP) methodology, including planning, testing, and user training, ensured the system's successful integration. Overall, the Odoo ERP system transformed Tama Jaya Motor's operations, enhancing efficiency and positioning the company for continued growth in the competitive automotive industry.

DISCUSSIONS

The findings of this study demonstrate that implementing the Odoo Enterprise Resource Planning (ERP) system using the Accelerated SAP (ASAP) methodology successfully improved inventory management at Tama Jaya Motor. The migration from manual inventory recording to an integrated ERP platform enhanced inventory accuracy, procurement efficiency, stock visibility, and coordination among business functions. These findings indicate that ERP implementation should be viewed not only as the adoption of digital technology but also as a strategic initiative for business process transformation that creates organizational value through integrated information management. From the perspective of Porter's Value Chain, the implementation of Odoo ERP strengthened both primary and support activities by integrating information across inventory, procurement, sales, finance, customer relationship management (CRM), and human resource management. The inventory module improved inbound logistics through automated stock recording and purchase management, while integration with sales and procurement reduced delays in inventory replenishment and improved product availability. Consequently, operational activities became more efficient because decision-makers were able to access accurate and real-time information. These findings support Porter's argument that organizations achieve competitive advantage by optimizing value-creating activities rather than focusing on isolated operational improvements.

The structured implementation process provided by the ASAP methodology also played an essential role in the success of this study. The sequential phases of Project Preparation, Business Blueprint, Realization, Final Preparation, and Go-Live & Support ensured that business requirements were thoroughly analyzed before system configuration. This structured approach minimized implementation risks, facilitated user adaptation, and ensured that each ERP module aligned with the company's operational processes. The findings suggest that implementation methodology is equally as important as technology selection because a well-planned implementation increases user acceptance and organizational readiness.

The improvement in inventory management identified in this research is consistent with previous studies examining Odoo ERP implementation in Indonesian SMEs. Luarwan et al. (2025) emphasized that integrating inventory information with procurement activities enables organizations to monitor supplier performance, evaluate inventory trends, and develop more accurate purchasing strategies. In the present study, procurement decisions became more responsive because purchasing personnel could immediately identify inventory shortages through the ERP dashboard and initiate purchasing activities without relying on manual communication. This integration reduced unnecessary procurement delays while minimizing the risks of stock shortages and excessive inventory accumulation.

The findings also align with the implementation of Odoo ERP at Ani Mart, where Wenardi et al. (2025) found that integrating the Point of Sale (POS), inventory, and accounting modules significantly improved transaction recording, stock management, and financial reporting. The replacement of manual documentation with an integrated ERP system reduced administrative workloads while improving reporting accuracy. Similar operational improvements were identified in Tama Jaya Motor, particularly regarding inventory monitoring and data accessibility. Furthermore, the use of Porter's Value Chain as an analytical framework in this study is consistent with the approach adopted by Wenardi et al. (2025), who utilized Value Chain Analysis to identify critical operational activities before selecting appropriate Odoo modules. Their research demonstrated that technology implementation becomes more effective when ERP modules are selected according to organizational requirements rather than simply digitizing existing manual processes. Similarly, this study shows that combining Value Chain Analysis with the ASAP implementation methodology enabled Tama Jaya Motor to prioritize inventory management as the primary area requiring digital transformation, resulting in better alignment between technology capabilities and business objectives.

Beyond operational improvements, this study demonstrates that ERP implementation supports managerial decision-making by providing centralized, accurate, and real-time information. Managers are now able to evaluate inventory availability, purchasing history, supplier performance, and stock movements using integrated dashboards instead of fragmented manual records. This capability enhances planning accuracy and organizational responsiveness while reducing uncertainty during operational decision-making. These findings reinforce previous research indicating that ERP systems improve organizational agility by enabling data-driven decision-making across multiple business functions (Luarwan et al., 2025; Wenardi et al., 2025).

Overall, this study confirms that implementing Odoo ERP using the ASAP methodology provides an effective framework for improving inventory management, operational efficiency, and organizational integration. The consistency of these findings with previous studies conducted by Luarwan et al. (2025), Wenardi et al. (2025), and Patimah et al. (2025) strengthens the argument that combining Value Chain Analysis with a structured ERP implementation methodology enables SMEs to achieve sustainable digital transformation while improving business performance and competitive advantage.

Beyond its operational contribution, this study also speaks to the creative business and technology context that MEDIANTARA foregrounds. Automotive service businesses such as Tama Jaya Motor increasingly compete not only on price and turnaround time but on the quality of customer-facing, creative service work, including vehicle customization advice, personalized maintenance recommendations, and tailored customer communication, activities that fall squarely within Porter's Marketing and Sales and Service categories. Reliable, real-time inventory data is a precondition for this kind of creative, value-added service: staff cannot design a compelling customer experience around parts availability, service timing, or personalized recommendations if the underlying stock and order data cannot be trusted. In this sense, the ERP-enabled efficiency gains documented here free

staff time and managerial attention away from reactive stock firefighting and toward the creative, relationship-based activities that differentiate an automotive service SME from its competitors, a pattern consistent with broader findings on how digital transformation enables Indonesian MSMEs, including creative-economy actors, to redirect effort toward higher-value, customer-facing work (Anatan & Nur, 2023; Wang et al., 2023; Melisa, 2026). Framed this way, the Value Chain and ASAP-based approach used in this study is not only a technical inventory fix but a foundation for the kind of creative business competitiveness that this journal's scope addresses.

This study has an important limitation regarding its primary data collection. The interview component relied on a single key informant, the business owner, rather than multiple respondents across different functional roles (e.g., warehouse, sales, and finance staff), and the original interview recording was not preserved for later re-verification. While the owner's account was cross-checked against internal documentation and against patterns reported in comparable prior studies (Luarwan et al., 2025; Wenardi et al., 2025; Henny et al., 2025), a single-informant design cannot fully rule out the possibility that other staff members experienced the implementation differently. Future research on similar ERP implementations should include interviews with multiple respondents across roles, along with retained audio recordings and transcripts, to allow more robust triangulation and reduce reliance on any single perspective.

CONCLUSION

The implementation of the Odoo ERP system at Tama Jaya Motor effectively addressed key challenges in inventory management, such as inaccurate stock recording, inefficiencies in goods tracking, and delays in procurement. Using the Accelerated SAP (ASAP) methodology, the project achieved significant improvements, including enhanced stock recording accuracy, which reduced errors common in manual systems, and optimized procurement processes that minimized the risk of stock shortages. These outcomes demonstrated that digitalization through ERP systems is an effective strategy for boosting operational efficiency, cutting costs, and enhancing competitiveness in the automotive service industry. The structured approach provided by the ASAP methodology ensured that the system was tailored to meet Tama Jaya Motor’s specific needs, facilitating smoother operations and better service delivery. This transformation has positioned Tama Jaya Motor to better meet customer expectations and remain competitive in the market. For further development, the following are suggested:

1. Enhancing Other Modules: Adding complementary modules such as Finance and CRM for more comprehensive system integration.
2. Further Training: Conducting regular training for staff to ensure that all system features are utilized optimally.
3. Implementation in Other Branches: Implementing the same system in Tama Jaya Motor branches or business partners to create operational uniformity.
4. Further Research: Examining the effect of this system on long-term customer satisfaction and its impact on overall business growth.

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Analysis of Internal Capabilities in The Event Pitching Process: A Case Study of DAMN! Inc

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ABSTRACT

The Meetings, Incentives, Conventions, and Exhibitions (MICE) industry in Indonesia is growing rapidly, driving the proliferation of Event Organizer (EO) companies, yet an EO's success in securing projects depends heavily on the internal capabilities that support a competitive pitching process. This study analyzes the internal capabilities of DAMN! Inc and their contribution to each stage of the pitching process, while also evaluating their strategic value as a source of competitive advantage. A descriptive qualitative approach with a single case study method was employed. Data were collected through triangulation of semi-structured interviews with six cross-divisional informants, field observation during actual pitching conditions, and documentation including pitching invitations, client briefs, and proposals. Internal capabilities were analyzed using the McKinsey 7S Framework and evaluated using VRIN criteria from a Resource-Based View (RBV) perspective. Findings reveal that three elements, Staff, Skills, and Shared Values, consistently satisfy all VRIN criteria and form the core of the company's sustainable competitive advantage, while Structure and Systems remain generic and informal, making them operational vulnerabilities. DAMN! Inc's competitive advantage stems from a capability configuration that is complementary and causally ambiguous to outsiders, making it difficult for competitors to replicate as a whole. This study recommends standardizing the cross-divisional brief handover process and formalizing the pitching workflow SOP as steps toward sustained strengthening of the company's competitive position.

Keywords: Event Pitching, Internal Capabilities, McKinsey 7S Framework, Resource-Based View, VRIN

INTRODUCTION

Indonesia's tourism industry has shown a significant post-pandemic recovery, with foreign exchange earnings reaching USD 16.71 billion in 2024, nearly matching the pre-pandemic peak of USD 16.91 billion in 2019 (Swabawa et al., 2025). This recovery has also driven the Meetings, Incentives, Conventions, and Exhibitions (MICE) sub-sector, whose market value in Indonesia reached USD 2,319.7 million in 2023 (Astute Analytica, 2024). This growth has fueled the proliferation of Event Organizer (EO) companies as technical operators that plan and execute clients' event requirements (Arfiyanto & Faris, 2016), with the number of national events projected to average 9,209 per year and demand for EO services growing by 18% (Kompasiana, 2025).

This intensifying competition requires every EO to build strong differentiation (Turnip & Benazira, 2025), since the sole pathway for an EO to secure a project is through the pitching process, namely the competitive submission of proposals and concept presentations to prospective clients (Synta, 2023). Pitching is not merely an idea presentation but a comprehensive evaluation of a

company's capacity to execute an event optimally, encompassing experience, financial capability, organizational structure, and technical capability (Berridge, 2010; Westerbeek et al., 2002). Pricing and creative concept quality are consistently identified as the primary determinants of pitching success (Aryanti & Rudatin, 2022; Berridge, 2010).

DAMN! Inc, legally registered as PT Drupadi Artha Mulia Nusantara, is a Jakarta-based corporate EO that has operated for more than a decade and has handled over 758 projects since its founding in 2014 (DAMN! Inc, 2026). For DAMN! Inc, pitching is the sole gateway to securing projects. Throughout 2025, the company received and processed 203 pitching briefs, yet won only 53 projects, a win rate of 26.11% (DAMN! Inc, 2025). No published win-rate benchmark exists for Indonesian event organizers against which this figure can be directly compared. As an indicative reference from an adjacent creative-pitching sector, industry surveys of advertising and marketing agencies report average new-business pitch win rates in the region of 32 to 50 percent, though these operate under different competitive and cost structures (AgencyAnalytics, 2025; Duval Partnership, 2022). DAMN! Inc's 26.11 percent should therefore be read not as underperformance against a validated norm but as a descriptive baseline for a single firm, whose interpretation is one motivation for the internal-capability analysis undertaken here. Internal evaluation identified three recurring loss patterns: budget mismatch, concepts insufficiently aligned with client needs, and cases of "formality pitching" in which the client had already predetermined its preferred vendor. In this study, formality pitching denotes a tender that is procedurally open but substantively pre-decided: the client issues an invitation and receives proposals to satisfy an internal procurement or budgeting requirement, while the winning vendor has effectively been chosen in advance, so that competing agencies expend full pitching resources on a contest whose outcome is not genuinely contestable. The first two factors align with success determinants documented in the literature, yet both are fundamentally outcomes of a company's internal capabilities rather than standalone variables (Rahmatullah et al., 2023; Westerbeek et al., 2002).

Beyond price and creative concept quality, Berridge (2010) further observed that in competitive event-agency pitches the manner of presentation can matter as much as the idea itself, since clients evaluating an event that does not yet exist often lack sufficient technical grounds to assess execution risk before delivery. This makes the internal configuration of resources and skills within an EO, rather than isolated pitching techniques applied only on presentation day, the deeper explanatory variable behind win rates. Studies that treat pitching success primarily as a function of technique or procedural compliance (Aryanti & Rudatin, 2022; Rizki, 2024) stop short of asking which organizational elements generate that technique consistently, an inward-facing question this study takes up directly.

Prior studies on pitching and internal capabilities have generally been conducted separately. Rizki (2024) and Synta (2023) focused on the technical aspects of proposal preparation and project management without examining the underlying internal capabilities; Aryanti and Rudatin (2022) identified nine general stages of the pitching process without linking them to a specific company's capability conditions; while organizational capability studies such as Lubis (2022) on the Resource-Based View (RBV) and Tracey and Blood (2012) on the McKinsey 7S Framework were conducted in industry contexts different from EOs. This gap indicates the absence of research that specifically bridges the internal capability analysis of an EO company with the day-to-day practice of its pitching processs Beyond this empirical gap, a theoretical gap is also evident in how prior studies have applied organizational capability frameworks independently rather than sequentially.

Barney's (1991) VRIN criteria supply that missing evaluative layer, but VRIN applications within the RBV tradition, including Lubis (2022) and Rahmatullah et al. (2023), have generally treated a firm's resources as an undifferentiated bundle instead of decomposing them into interacting organizational

elements. Tracey and Blood (2012) demonstrated that the seven 7S elements can be diagnosed jointly within a single organization, a craft brewery, but did not subject each element to a VRIN evaluation, leaving open which elements of an internally aligned configuration are strategically valuable rather than simply mutually consistent. More recent applications have extended the 7S diagnosis to service and knowledge-based organisations and to Indonesian creative MSMEs (Jain & Kansal, 2023; Anam & Churiyah, 2023), yet these too map internal alignment without ranking the elements by strategic value, reinforcing the need for the evaluative layer that VRIN supplies. Sequencing the two frameworks, first mapping alignment through the 7S lens and then evaluating strategic value through VRIN, as undertaken in this study, addresses this methodological gap and has not, to the researchers' knowledge, previously been applied to a project-based creative service firm such as an event organizer. Combining the two frameworks is therefore not merely additive but compensatory: the 7S Framework identifies which internal elements are present and mutually aligned but is silent on their strategic worth, whereas VRIN adjudicates strategic worth but presupposes that the relevant resources have already been identified and does not, on its own, reveal how they interlock into an organisational configuration. Applied in sequence, 7S supplies VRIN with an element-level unit of analysis, and VRIN supplies 7S with the evaluative layer it lacks, yielding a diagnosis of which aligned elements are also genuine sources of sustainable advantage — an analytical value neither framework delivers alone.

Based on this gap, the present study aims to (1) analyze the condition of DAMN! Inc's internal capabilities, and (2) analyze how these internal capabilities contribute to supporting each stage of the pitching process, in order to formulate development recommendations that can strengthen the company's competitiveness in winning pitches.

METHODS

This study applies a descriptive qualitative approach using a single case study method (Sukmadinata, 2014), with the research object being DAMN! Inc's internal capabilities within its pitching process. DAMN! Inc was selected based on the company's high pitching activity intensity (203 briefs in 2025) and its more than decade-long track record in Indonesia's MICE industry, making it representative for addressing the research questions.

Internal capabilities were analyzed through the seven elements of the McKinsey 7S Framework, as adapted by Tracey and Blood (2012), namely Strategy, Structure, Systems, Staff, Skills, Style, and Shared Values, whose strategic value was then evaluated using VRIN criteria (Valuable, Rare, Imperfectly Imitable, Non-Substitutable) from a Resource-Based View perspective (Barney, 1991). Consistent with recent applications that treat VRIN primarily as a diagnostic instrument for assessing the intrinsic quality of firm resources (Zimuto & Zvarimwa, 2022), the criteria here adjudicate the strategic value of each 7S element rather than model market dynamics. The pitching process was analyzed with reference to the nine stages identified by Aryanti and Rudatin (2022), from the receipt of an invitation through to the announcement of the winner.

Data were collected from March to May 2026 at DAMN! Inc's Jakarta office through triangulation of three techniques. First, in-depth semi-structured interviews were conducted with six informants selected through purposive sampling to represent the key divisions in the pitching process: Graphic (MGC), and Production (PRO). Second, field observation was conducted passively and continuously from January 2026, with the researcher positioned as an observer-as-participant, and intensively on 19–20 May 2026, when DAMN! Inc was running three active pitches in parallel, including the pitch for the GIIAS 2026 event, allowing observation of internal capabilities under actual work pressure. Third, documentation was collected in the form of pitching invitations, client briefs, vendor registration documents, and two pitching proposals (one won, one lost) for comparative analysis.

Data were analyzed using the interactive model of Miles et al. (2014), comprising data reduction, data display, and conclusion drawing/verification conducted simultaneously. Data trustworthiness was maintained through source and technique triangulation, referring to the Lincoln & Guba trustworthiness criteria, with the intensive observation session also serving as a cross-verification process against the preceding interview findings. Analytically, this interactive model was operationalised in three explicit stages. First, interview transcripts, observation notes, and documents were coded deductively against the seven McKinsey 7S elements, which formed the initial coding frame, while data that did not fit an existing element were retained inductively. Second, within each element the codes were grouped into themes describing that element's condition in the pitching process, and evidence from different sources and informants was cross-checked so each theme rested on triangulated rather than single-source data. Third, each element was evaluated against the four VRIN criteria, with a criterion recorded as met only where supported by convergent interview and observational evidence, partially met (~) where evidence was mixed, and not met (—) where the element proved generic or replicable; this element-level classification is the basis of the competitive-advantage assessment in Table 1.

RESULTS

Findings indicate that DAMN! Inc's seven McKinsey 7S elements do not contribute equally to the company's competitive advantage in the pitching process. On the Strategy element, DAMN! Inc applies a structured brief-selection mechanism based on event type fit, budget estimation, manpower capacity, location, and timeline feasibility; AEX confirmed that the company once declined a national-scale pitch because the team's capacity was deemed insufficient at the time. Concept development follows an Observe-Imitate-Modify (ATM) approach, starting from a deep understanding of the client's objective. This element is closely intertwined with Shared Values, manifested in three core values: Bold–Different–Forward, Responsive and Always Ready, and Quality Beats Quantity. Documentation of incoming pitching invitations further revealed considerable variation in channel and completeness, ranging from formal e-mails with fully attached client briefs to brief WhatsApp messages lacking budget or scale information, indicating that DAMN! Inc's screening capability begins the moment a brief is received rather than only at the formal accept/decline decision. Pitches with comparatively modest budgets were nonetheless still pursued when the client was judged to hold long-term relational value, indicating that the selection logic weighs relational value alongside immediate financial return.

On the Structure element, coordination runs functionally, with the Account Executive (AE) as the sole official communication channel with the client and the central link to all internal divisions. The AE receives the client brief, after which the Planner conducts a breakdown and brainstorming session with the Art Director before distributing the brief in parallel to the 2D, 3D, Motion Graphic, and Production teams. Field observation during the GIIAS 2026 pitch confirmed that the AE actively monitored each division's progress through a WhatsApp Group and periodic online check-ins throughout the process. However, a structural gap was identified at the handover point between the creative team and the 3D team: briefs passed down were frequently described by D3D as insufficiently detailed, a condition that triggered repeated and inefficient revision cycles rather than a single clean execution pass.

On the Systems element, the pitching workflow relies on a consistent set of tools: Adobe Illustrator, Photoshop, After Effects, and Premiere Pro for the 2D and Motion Graphic teams, and SketchUp and 3ds Max for the 3D team, alongside generative AI tools such as Gemini, ChatGPT, Envato AI, and MidJourney used to accelerate production under tight deadlines. Document submission runs through e-mail or the client's digital vendor portal depending on each client's procurement system.

Despite this consistency, field observation confirmed that the entire workflow, from brief intake through post-pitch evaluation, operates informally based on team habit and has not been documented in a written standard operating procedure (SOP), leaving the system dependent on the continuity of specific individuals, particularly at the Planner position, which the company acknowledged experiences comparatively high turnover.

On the Staff element, the pitching team consists of 10 Account Executives, 7 Planners including a Creative Head with a MICE educational background from Politeknik Negeri Jakarta and prior experience at Expo Dubai 2020, 7 2D designers with graphic design backgrounds, 6 3D designers with interior architecture backgrounds and close to eight years of average experience, 4 Motion Graphic staff active in the creative industry since 2018, and 4 Production staff with long and varied career histories. PLN described the Planner team as "not merely adequate, but genuinely capable," while PRO characterized the four-person Production team as generally sufficient though occasionally stretched under simultaneous pitching loads. Team chemistry built over more than a decade allows coordination to remain adaptive even when three active pitches run simultaneously alongside another large ongoing project, without destructive friction between divisions; D2D, who previously worked at a smaller EO where design roles were not fully specialized, noted the contrast with DAMN! Inc's more clearly defined and solid role structure.

On the Skills element, each division holds critical competencies that mutually reinforce one another. The Planner interprets client briefs using a 5W1H framework combined with an Observe-Imitate-Modify (ATM) approach, drawing references from Pinterest, Behance, generative AI tools, and direct site visits to comparable events. The 2D team produces key visuals consistent with each client's brand character, including a recycling strategy that adapts and varies visual assets from prior pitches to improve production efficiency. The 3D team generates realistic booth, stage, and venue-layout visualizations using SketchUp and 3ds Max, while the Motion Graphic team produces animated bumpers under extremely tight deadlines with AI assistance. The Production team evaluates technical feasibility and Occupational Health and Safety (K3) considerations for each proposed concept. MGC noted that the consistent inclusion of motion graphics in every pitching proposal is "not commonly done by other EOs," functioning as a visual differentiator, while D2D, drawing on experience at a previous EO, observed that DAMN! Inc "maintains a fairly high quality standard across production, design, concept, and client service" relative to competitors. The use of generative AI functions as a production aid that accelerates output rather than a substitute for the team's creative judgment and client-specific business understanding.

On the Style element, the leadership style is collaborative, egalitarian, and based on two-way discussion. Regroup sessions are held two to three times, and sometimes more, per pitch, described by PLN as occasions where "we are team players; all input is accommodated, and no one insists on defending their own idea alone." Every division is given space to voice its perspective, including the Production team, which may redirect a design if the concept is judged unfeasible on budget grounds, and briefing between the Planner and design teams runs bidirectionally rather than as one-way instruction. Field observation during the three simultaneous active pitches in May 2026 confirmed that no destructive friction emerged between divisions even under hectic conditions; obstacles were blame culture when a pitch is lost further sustains team resilience, as PLN emphasized that post-pitch evaluation is focused on improvement rather than assigning responsibility: "the culture at DAMN! Inc is not to blame one another; we move on and focus on doing our best for the next project."

On the Shared Values element, five values were identified as consistently manifested in day-to-day work behavior rather than existing merely as slogans: (1) an orientation toward concept relevance to the client's objective, with every proposal built on a specific understanding of whether the client is pursuing awareness, hard selling, or loyalty; (2) a team-player spirit free of sectoral ego,

in which input from every division is accommodated without any division insisting exclusively on its own idea; (3) a no-blame culture following a lost pitch, with evaluation focused on improvement rather than fault; (4) the Bold-Different-Forward principle, treating creativity as a continuous process and every project as a laboratory for innovation; and (5) a long-term commitment to clients and vendors, reflected in active post-pitch follow-up and a consistent, on-time vendor payment record. PRO linked this last value directly to production outcomes, noting that DAMN! Inc's key production-side advantage is "its commitment to timely vendor payment, supported by the company's healthy cash flow." These values were observed directly under high-pressure field conditions rather than inferred solely from interview accounts.

Table 1. Summary of Damn! Inc's Internal Capability Assesment Based on VRIN Criteria

7S Element	Valuable	Rare	Inimitable	Non Substitutable	Competative Status
Strategy	✓	✓	—	—	Significant advantage, vulnerable to long-term imitation
Structure	✓	—	—	—	Operational foundation, brief hsndover needs improvement
Systems	✓	~	~	~	High operational value, SOP formalization needed
Staff	✓	✓	✓	✓	Strong advantage, team chemistry hard to replicate
Skills	✓	✓	✓	✓	Strongest advantage, directly affect win rate
Style	✓	✓	—	—	Supporting advantage, reflection od Shared Values
Shared Values	✓	✓	✓	✓	Strongers advantage, foudations of all elements

Note:✓ = criterion met; ~ = partially met; — = not met

Source: Primary data, processed (2026)

A comprehensive VRIN assessment of the seven elements shows that Staff, Skills, and Shared Values fully satisfy all four VRIN criteria, thereby forming the core of the company's sustainable competitive advantage. Strategy and Style satisfy the Valuable and Rare criteria but are not yet fully Inimitable or Non-Substitutable, while Structure and Systems fully satisfy only the Valuable criterion. A summary of this assessment is presented in Table 1. This pattern indicates a three-tier structure of competitive advantage within DAMN! Inc's capability configuration: a fully protected core (Staff, Skills, Shared Values), a significant but imitable middle tier (Strategy, Style), and an operationally valuable but easily replicated foundation (Structure, Systems). The basis for each classification can be made explicit. Staff, Skills, and Shared Values were coded as fully VRIN because supporting evidence converged across sources: their value appears in outcomes (e.g. MGC's account of motion graphics as a differentiator "not commonly done by other EOs" and D2D's comparison with a former employer's quality standard), their rarity in capabilities competitors are observed not to match, their inimitability in decade-long team chemistry and tacit coordination, and their non-substitutability in the absence of any tool or hire that reproduces the same internalised values. Strategy and Style met Valuable and Rare but not Inimitable or Non-Substitutable, because the brief-selection rule and collaborative regroup practice, though effective, are procedural and could be adopted by a comparably mature competitor. Systems met Valuable strongly but the others only partially (~), because the parallel workflow is a widely known principle whose advantage lies in the tacit, undocumented coordination sustaining it. Structure met Valuable alone, its functional coordination being standard practice and its brief-handover gap a weakness rather than an advantage.

Contribution of Internal Capabilities to the Pitching Process Stages

Beyond the condition of each 7S element, the intensive observation during the parallel handling of three pitches in May 2026 allowed the mapping of how these elements support the pitching process. DAMN! Inc's process follows a sequence largely consistent with the nine general stages identified by Aryanti and Rudatin (2022), from the receipt of a pitching invitation to the announcement of the winner, but is enriched by four additional stages that reflect the depth of the company's internal capabilities: preliminary research and analysis, internal review and revision prior to submission, presentation rehearsal, and post-pitch internal evaluation and knowledge base updating. Consolidating these stages into an operational workflow, the pitching process typically runs within a three-to-five-day window, and occasionally within two days under peak pressure, with the parallel cross-divisional execution stage made possible only when the creative brief handed down by the Planner is sufficiently specific for each division to proceed independently.

At the intake and selection stage, the Strategy element is the dominant contributor, as the brief-selection mechanism based on event type fit, budget estimation, manpower capacity, and timeline feasibility determines whether a brief proceeds to the concept development stage. Concept development itself relies heavily on Skills and Shared Values, where the Planner's 5W1H interpretation of the brief is filtered through the ATM (Observe-Imitate-Modify) approach and grounded in the value of Quality Beats Quantity. Once a concept direction is set, execution moves into a parallel, cross-divisional stage supported jointly by Structure and Staff: the Account Executive relays the brief to the Planner, who breaks it down for the 2D, 3D, Motion Graphic, and Production teams to work simultaneously. It is precisely at this handover point that the structural gap between the creative team and the 3D team becomes most consequential, translating a Structure weakness identified in the 7S assessment into repeated revisions at the internal review stage.

The internal review and revision stage, together with the presentation rehearsal stage, is supported chiefly by Style, through the two-to-three regroup sessions per pitch in which every division, including Production, may challenge a design on technical or budget grounds. This collaborative, egalitarian style allows inconsistencies to surface before the client-facing presentation rather than during it. Finally, the post-pitch internal evaluation and knowledge base updating stage is sustained by Shared Values, particularly the no-blame culture that keeps evaluation focused on improvement rather than assigning fault, as emphasized by PLN. Taken together, these findings indicate that no single 7S element supports the pitching process in isolation; rather, each stage draws on a different combination of elements, and it is the same elements identified as fully VRIN, Staff, Skills, and Shared Values, that recur most consistently across the stages that most directly determine pitching outcomes.

DISCUSSION

The finding that staff, Skills, and Shared Values form the core DAMN! Inc's competitive advantage confirms that the company's competitive position rests on human-based intangible assets: multidisciplinary team chemistry built over more than a decade, cross-sector skill depth internalized as tacit knowledge, and a collaborative, no-blame work culture. This is consistent with Dierickx and Cool's (1989) proposition that strategic assets accumulated through long-term experience are inherently difficult for competitors to acquire instantly (time compression diseconomies). The strong alignment observed between Style and Shared Values also aligns with the concept of psychological safety (Edmondson, 1999), whereby a psychologically safe work climate encourages cross-divisional team members to openly voice creative input and constructive criticism without fear, as reflected in the two-way regroup dynamics between the Planner and design teams.

The Strategy element's satisfaction of the Valuable and Rare VRIN criteria, without yet reaching full Inimitability, is consistent with Porter's (1996) proposition that strategic fit, the deliberate alignment of a firm's activities with a chosen competitive position, is itself a source of advantage even when the underlying decision rule is not proprietary. DAMN! Inc's structured brief-selection mechanism, illustrated by its decision to decline a national-scale Smartfren pitch on capacity grounds, exemplifies a firm choosing not to compete on every front, echoing Porter's (1996) argument that strategy is defined as much by what a firm declines to do as by what it pursues. Because such selection criteria are procedural, however, and can in principle be learned by competitors of comparable organizational maturity, the element remains only imperfectly imitable, consistent with its VRIN classification in Table 1. The persistence of this selectivity also depends on Shared Values that privilege long-term relational value over short-term revenue; without that internalized value, the pressure to accept every incoming brief to maximize short-term income would erode the very selectivity that makes Strategy valuable, indicating a causal dependency between the two elements that the original 7S hexagon (Waterman et al., 1980) does not itself specify direction for.

Conversely, the vulnerability of the still-generic and informal Structure and Systems elements indicates that DAMN! Inc's competitive advantage is not yet fully protected at the operational level. The ambiguous brief-handover gap and the absence of a written SOP create a dual risk: workflow inefficiency due to repeated revisions, and the potential loss of tacit knowledge during turnover at critical positions such as Planner. This risk resonates with Cohen and Levinthal's (1990) argument on the importance of a documented organizational absorptive capacity so that knowledge does not remain entirely dependent on specific individuals. Thus, while Structure and Systems are not primary sources of competitive advantage, they function as the operational foundation that determines the extent to which the advantages held in Staff, Skills, and Shared Values can be consistently leveraged. The parallel cross-divisional workflow that allows DAMN! Inc to complete a full pitch deck within three to five days is further illuminated by the concept of concurrent engineering (Krishnan & Ulrich, 2001), in which multiple functional teams work simultaneously on interdependent components of a single deliverable rather than sequentially, and by organizational ambidexterity (Gibson & Birkinshaw, 2004), whereby the 2D, 3D, and Motion Graphic teams simultaneously explore new creative directions for each brief while exploiting established production routines and reusable visual assets to meet compressed deadlines. Both mechanisms are structurally contingent rather than self-sustaining: concurrent engineering functions only if the Planner's initial brief to each division is unambiguous enough for teams to proceed independently, which is precisely why the Structure weakness at the creative-to-3D handover translates directly into the inefficiency this study identifies. This also explains why Systems satisfies the Valuable criterion strongly but Rare and Inimitable only partially: the parallel workflow itself is a widely known project-management principle that competitors could adopt, but the tacit coordination that keeps it functioning without a written SOP, built from years of shared habit among the same individuals, is what is actually difficult to replicate.

The collaborative, non-hierarchical leadership style observed at DAMN! Inc, most visibly in the two-to-three regroup sessions held per pitch, lends further support to the proposition that team creativity flourishes under conditions of autonomy and supportive risk-taking (Amabile, 1996). Because members of the Production team can openly challenge a creative direction on budget grounds without triggering defensive conflict, the ideas that ultimately reach the client have already been stress-tested internally in a way that a more hierarchical structure would suppress. The no-blame culture observed after a lost pitch is likewise consistent with organizational resilience theory (Vogus & Sutcliffe, 2007), which holds that a firm's capacity to learn from failure without triggering defensive routines is itself a competitive resource, particularly relevant for a firm that wins barely a quarter of

the pitches it enters. Yet in the VRIN analysis, Style satisfies only the Valuable and Rare criteria, because it functions, in this study's reading, as a behavioral expression of Shared Values rather than an independently chosen leadership approach. Competitors could in principle declare a similarly collaborative culture, but without an equivalent multi-year history of internalized values underpinning it, such a declaration would remain superficial. This causal ordering, in which Shared Values generates Style rather than the reverse, refines the original 7S Framework's treatment of the seven elements as mutually reinforcing without specifying directionality among them (Waterman et al., 1980).

The consistent inclusion of 3D visualization and motion graphics in DAMN! Inc's proposals illustrates a further mechanism through which Skills converts into competitive advantage, one rooted in services marketing rather than design alone. Because an event does not yet exist at the moment of pitching, the client is asked to commit significant funds against something inherently intangible (Zeithaml, Parasuraman, & Berry, 1985; Shostack, 1977). Moving-image visualization functions as a tangible cue that allows the client to evaluate a service quality that would otherwise remain unobservable prior to purchase (Berry & Parasuraman, 1991), narrowing the gap between what a proposal promises and what a client can actually perceive before deciding. Because this capability depends on an in-house, multidisciplinary 3D and Motion Graphic team rather than outsourced production, it satisfies both the Rare and Inimitable VRIN criteria simultaneously: a competitor could hire individual 3D or motion graphic freelancers, but could not immediately replicate the tacit coordination between designers who have refined a shared visual language across hundreds of prior pitches.

A further, less visible determinant of pitching quality is DAMN! Inc's relational capital with its vendor network. A consistent, on-time payment record cultivates reciprocal loyalty in the form of price priority and rapid turnaround from vendors precisely when quotations must be finalized under tight deadlines, a dynamic consistent with the relational view of competitive advantage (Dyer & Singh, 1998; Lavie, 2006) and with supply chain resilience theory (Ponomarov & Holcomb, 2009), which frames a firm's capacity to sustain a reliable supplier network under pressure as an operational advantage not easily replicated by new entrants. In sociological terms, this reflects an accumulation of social capital, trust and reciprocity norms built through repeated exchange (Putnam, 2000; Nahapiet & Ghoshal, 1998), that a new competitor cannot purchase outright but can only build over an equivalently long history. In 7S terms, this capability sits at the intersection of Shared Values, the same long-term relational orientation the company extends to clients, and Systems, operationalized through a centralized vendor procurement database that shortens quotation turnaround.

DAMN! Inc's pitching process demonstrates how internal capabilities operate stage by stage rather than uniformly. Compared with the nine pitching stages identified by Aryanti and Rudatin (2022), DAMN! Inc's pitching process exhibits a similar pattern but with additional stages that reflect the depth of its internal capabilities, such as preliminary research and analysis, internal review and revision prior to submission, presentation rehearsal, and post-pitch internal evaluation and knowledge

base updating. This finding extends Aryanti and Rudatin's (2022) framework by demonstrating that the effectiveness of general pitching stages is highly dependent on the quality of the internal capabilities that respond to them, a linkage not yet explicitly explored in prior research.

Overall, DAMN! Inc's competitive advantage does not rest on a single element but on a capability configuration that is complementary and causally ambiguous. A competitor may be able to replicate the coordination structure or adopt similar work tools in a relatively short time, yet would find it far more difficult to simultaneously build multidisciplinary team chemistry, cross-sector skill depth, and

shared values that are genuinely internalized into everyday work behavior. These findings provide empirical evidence that the McKinsey 7S Framework and VRIN criteria can be applied synergistically and sequentially to assess the internal capabilities of project-based service firms, while bridging the study of the event pitching process with organizational capability analysis, two strands of literature that have thus far developed separately.

CONCLUSION

This study concludes that DAMN! Inc's internal capabilities are not evenly distributed across all McKinsey 7S elements but are concentrated in Staff, Skills, and Shared Values, which consistently satisfy all four VRIN criteria and form the core of the company's sustainable competitive advantage in the pitching process. These three elements contribute tangibly throughout the pitching stages, from probing client needs and developing concepts, to executing the proposal in parallel across divisions, to delivering a convincing presentation to the client, and further extend into the internal review, rehearsal, and post-pitch evaluation stages identified in this study. Conversely, the still-generic and informal Structure and Systems elements represent critical points requiring strengthening, as both determine the extent to which the advantages held in other elements can be optimally leveraged at the operational level. Together, these findings answer the two objectives of this study by describing the condition of DAMN! Inc's internal capabilities and by demonstrating how each capability contributes to a specific stage of the pitching process.

Theoretically, this study contributes to the literature by demonstrating that the McKinsey 7S Framework and VRIN criteria can be applied sequentially, first to map internal capabilities and then to evaluate their strategic value, in a project-based service firm outside the industry contexts in which they were originally developed. It further extends the nine-stage pitching process identified by Aryanti and Rudatin (2022) by showing that the effectiveness of each stage is contingent on a specific combination of internal capabilities rather than on generic procedural compliance, a linkage not previously made explicit in the pitching literature. Practically, the strategic implication for DAMN! Inc is that its priority going forward lies not in building new capabilities, but in protecting and stabilizing its already-superior core capabilities through strengthening the still-vulnerable supporting elements. To this end, this study recommends four development steps: standardizing the visual brief template from Planner to the 3D team, developing a knowledge management system based on internal case-study documentation, reviewing the Motion Graphic team's time allocation within the workflow, and formalizing the pitching workflow SOP in written form. Although these recommendations are addressed to DAMN! Inc, the underlying principle generalises analytically to other event organizers and, more broadly, to project-based creative service firms that compete through pitching — design studios, advertising and branding agencies, and architecture or consulting practices. For such firms, the study implies that competitive advantage is unlikely to be secured by acquiring new tools or replicable procedures, which competitors can match quickly, and is better pursued by protecting the harder-to-imitate configuration of experienced-team chemistry, cross-disciplinary skill depth, and internalised shared values, while shoring up the operational elements — documented workflows and knowledge-retention systems that determine whether those core capabilities can be exercised consistently. The sequential 7S–VRIN diagnosis demonstrated here offers such firms a transferable method for locating which of their own elements warrant protection and which warrant formalisation.

This study is subject to several limitations. First, it relies entirely on the company's internal perspective without incorporating the client's perspective on what ultimately determines a winning pitch. Because the client is the party that ultimately decides the outcome of a pitch, an internal-only

vantage can establish which capabilities the company believes to be decisive but cannot confirm which of them actually move a client's selection; the present findings should therefore be read as an account of internally perceived sources of advantage, and future work incorporating the client's perspective is needed to validate them against the criteria buyers actually apply. Second, the observation window was confined to a single active pitching period in May 2026, which has not captured how DAMN! Inc's capability configuration behaves under lower or more sustained pitching volumes. Third, as a single case study, the findings describe the specific capability configuration of one corporate EO and are not intended to be statistically generalized to the wider MICE industry.

For future researchers, it is recommended to explore the client's perspective to obtain a fuller picture from both sides of the selection process, to develop comparative studies of internal capabilities across EOs of different scales, and to consider quantitative approaches for measuring the relationship between internal capability dimensions and pitching success rates using broader longitudinal data.

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Implementing an Open-Source ERP for a Small Retail Business: A Case Study of Inventory Management Optimization at Rendy Audio

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ABSTRACT

This study focuses on integrating an inventory management system for Rendy Audio, a small retail company with only four employees that installs and customizes vehicle audio systems, using the open-source ERP Odoo. The purpose of a centralized digital system that connects inventory operations with real-time procurement and sales data is to improve order processing, inventory management, and stock visibility. Rendy Audio intends to use Odoo's Inventory module to automate manual processes, reduce stock discrepancies, and gain real-time visibility into stock levels, order statuses, and inventory locations. This study follows a four-phase methodology that includes preparation and planning, data collection and analysis, system design and prototype, and deployment including user training. The results suggest that utilizing Odoo improves customer service, reduces order processing time, and improves inventory tracking accuracy. These findings support Odoo ERP's efficacy as a scalable and reasonably priced inventory management solution tailored to the needs of small merchants.

Keywords: Car Audio Customization, Inventory Management, Odoo ERP, Small Retail Business, Real-Time Stock Management

INTRODUCTION

A sound revolution is taking place in the field of automotive entertainment. As Meilanitasari & Ibrahim (2023) wisely note, the increased desire of consumers for customized, high-end in-vehicle sound experiences has led to a spectacular expansion of the automobile audio sector. From speakers alone to multiple configurations that can combine a variety of speakers such as tweeters and subwoofers, amplifiers and other multimedia devices, this industry is evolving over time and offers a wide range of improvements that can be made. Cables, fuses, and other equipment for installation are some of the components that Rendy Audio must have to meet client needs and facilitate their installation. These items are very important to be managed properly in order to maintain installation performance and ensure customer satisfaction (AlMuhayfith & Shaiti, 2020; Takehiro Hasegawa & Shotaro Tani, 2022). However, irregular supplies, delays, and other disruptions brought on by traditional inventory management methods which are usually manual increase operating costs and lower customer satisfaction. Small businesses with few employees face particular difficulties with inventory management because they lack professional teams or costly proprietary software, claim hansen et al. (2023) and almuhayfith & shaiti (2020). Rendy audio's small independent company, which has only four people, had similar problems, in terms of inventory and order processing. A solution that worked well for these needs would also need to be relatively inexpensive due to the small population. Rendy audio uses an open source erp program such as odoo to respond to the needs of smbs that come with its own abilities to be customized to fit the unique needs of your particular business. The systems offer assets that are adaptable using to the organization's current engagements and organization. According to Olson et al. For example, reports such as Mercurial (2018) and Davyn

Limited (2023) suggest that compared to traditional proprietary systems, there are indispensable elements like inventory analytics, existing order construction, and recording information in real time form which can be found for a fraction of the cost.

Olson et al. (2018), while further explaining that open squat ERP systems will enhanc-e accuracy and operational flexibility. Rendy Audio capitalizes on this by adopting Odoo's Inventory module that consolidates critical tasks and enables the business to link inventory details with sales and procurement. This integration is helpful not only to decrease stock inconsistencies and other human errors but also provides real-time inventory visibility (Bayu et al., 2019; Erkayman, 2019). Increased cross-departmental Performance, better decision-making, and integration of these functions can be driven with Oozu (Teittinen et al., 2013). Bayu et al. indicated that such integration is highly demanded by the retail industry where services need to be quick, and orders are required to fulfil orders with very high accuracy to maintain a competitive advantage (2019).

Ibrahim et al. The planned approach on ERP implementation detailed in JSCM (2022) defines a four-phase methodology, which this study applied in the context of Rendy Audio's unique operational needs. The first part of preparation and planning involves assessing the company's unique inventory needs what products and equipment are often used, trends in consumer demand, and so on and aligning the existing ERP setup with business objectives. The second stage of this problem solution is to collect data and analyze data, this is the stage of collecting data that is detailed about stock data and patterns of ordering, so that the configuration of the ERP system matches the operational activities that are running at Rendy Audio. Stage three is to develop a system design and prototype to design an easy-to-use interface that fits with Rendy Audio's current workflow. The last phase is user implementation and training, and it needs to make certain that staff members are skilled enough to utilize the ERP system correctly to speed up everyday tasks.

Research by Hansen et al. and Yulianto et al. (2023), Davyn Limited (2023) states that ERP systems have provided benefits such as enhanced inventory tracking accuracy, shorter order processing times, and improved responsiveness to customer inquiries – all advantages that have followed Rendy Audio as a result of their Odoo implementation. These broad enhancements demonstrate the ERP system as an affordable and scalable technology, making it that one system which serves the best for the small and medium enterprises operating in the retail car audio industry, where responsive timings and maximized transactional efficiency serve as the two majoring altering parameters (Goumas et al., 2018; Ranjan et al., 2016). Furthermore, recent works by Wahedi et al. (2023) highlight that SMEs' integrated use of ERP and machine learning techniques can give them a competitive advantage with respect to their demand forecasting and inventory planning.

This research has shown that open-source ERP systems such as Odoo can serve as a flexible solution for small businesses like Rendy Audio. Faizan & Mehmood (2022) stated and Zakharchenkov (2024) stated that SMEs will be in a position to implement technical solutions of state-of-the-art on affordable basis just like improving the efficiency of existing operations. In addition, Zakaria et al. (2023) discuss that ERP could mitigate some errors, e.g., in materials tracking, and can provide better visibility of current inventory. According to Spathis and Constantinides (2003), ERP systems should be able to help businesses by simplifying their processes and increasing customer satisfaction. Here ERP plays a very important role, which can drive long-term business growth and increase competitiveness for small retail companies in the dynamic automotive audio market.

METHODS

This study follows a structured, four-phase methodology adapted and modified from Ibrahim et al. (2022), designed to implement an ERP system effectively in a small business context like Rendy Audio. In consideration of the limited resources and the small team of only four employees at Rendy

Audio, the methodology is streamlined to lower its complexity and to support easy adoption by all staff members. This will ensure that the strategy will align with the dynamic, organization-centric paradigm, which allows for customized ERP deployments in specific business situations (Dunaway, 2012). Ibrahim et al.'s four-phase framework (2022) served as the model for the study's four revised stages, which are Preparation and Planning, Data Collection and Analysis, System Design and Prototyping, and Deployment with User Training. The approach is tailored because it aims to ensure smooth implementation of the ERP system at all levels, focusing on simplicity, usability, and efficiency so that all staff will be able to join the change process without need for a specialized IT or inventory team.

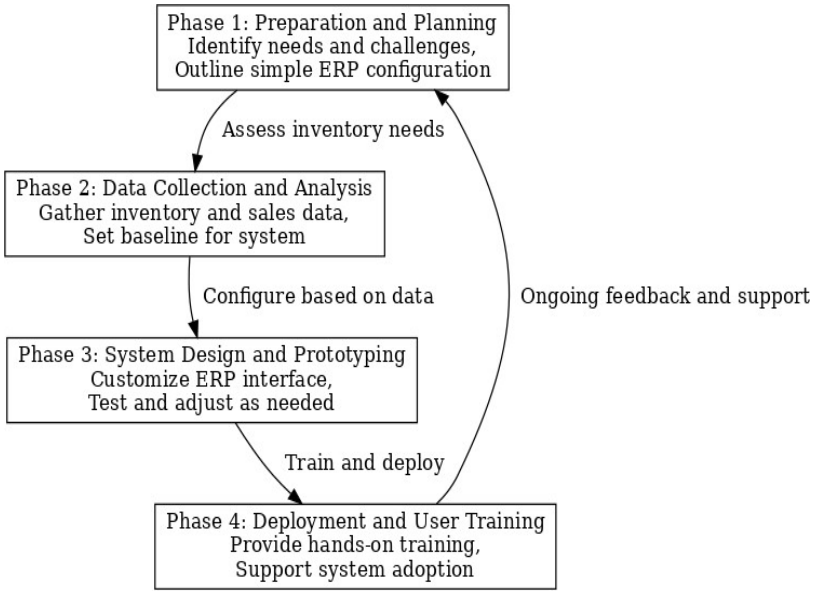

Figure 1. Flowchart for Research Method
Source: Documentation by Author

A. Preparation and Planning

During the initial stage, known as Preparation and Planning, emphasis is given to comprehending the specific business needs of Rendy Audio and determining the major issues the ERP system has to address. Since Rendy Audio is a small establishment with limited personnel, the basic needs are that there should be optimized inventory management, improved order fulfillment, and proper visibility of stock ensured. *Needs Analysis.* This activity involves determining which items require regular checking, specifically those that have a high demand or fast turnover rate. It also includes deciding which specific procedures need to be improved, for example, reorder levels and update inventory. By analyzing the trends of the store's operations, the ERP system can be configured to accurately reflect these critical needs.

Challenge Identification. Due to its workforce constraint, Rendy Audio cannot have manpower dedicated to complex IT-related tasks. This phase has therefore involved a review of functions in the ERP that can be automated or simplified, with the objective of configuring it user-friendly so as to make inventory management easier and not a task that takes up a lot of manually entering data. *System Configuration Outline. An* initial configuration strategy has been developed to correspond with the daily operational activities of Rendy Audio. It includes detailing the sequence of the implementation of the modules, with priority in the inventory and sales modules, while also detailing essential functionalities like automated inventory notifications and efficient order monitoring. The configuration strategy will ensure that the

architecture of the ERP system is clear, intuitive, and fitting for a small team setting. With all these limitations in view, the phase also proposes a simple and effective setup of a system to facilitate inventory management in the easiest way possible.

B. Data Collection and Analysis

The second stage, Data Collection and Analysis, would involve collecting data on Rendy Audio's current inventory levels, sales patterns, and reordering cycles. This phase is critical in setting up the ERP system correctly and establishing automated procedures that reflect both actual demand and the turnover rate of inventory. Since Rendy Audio does not have an inventory team, data collection has been made simple by focusing on capturing only important information such as current stock counts, high-turnover items, and typical demand cycles. *Inventory and Sales Data Collection*: This involves gathering information on current inventory counts, historical sales data, and purchase records. The data collecting process is reduced to focus on important parameters like current stock counts, turnover rates for popular items, and seasonally high-demand products because Rendy Audio lacks a professional inventory personnel. When designing the ERP automation, the operational snapshot provided by the collected data will be useful.

Cycle and Demand Analysis. Through the analysis of reordering cycles, demand fluctuations can be determined, and the ERP system can be programmed to reflect the store's inventory rhythm. For example, fast-moving items can be set up with automatic reorder triggers to minimize stockout situations. Further, the demand analysis indicates the timing and quantity needs for the reorders, which will become part of the automated functionalities of the ERP. *Baseline Establishment.* The data collected will serve as a baseline for the setup of the ERP system, ensuring that the automated reordering and tracking features reflect the actual operational needs. This baseline supports easier integration of the system and reduces the need for adjustments later, as the system is already calibrated to the store's inventory patterns. This information will give a baseline to the ERP system so that functions for automatic reordering and tracking will work right with less intervention by the limited staff.

C. System Design and Prototyping

Rendy Audio has a unique workflow and operational requirements, so in the development and prototyping of the ERP system, considerations were made to suit Rendy Audio. Due to the small number of people, the system architecture prioritizes accessibility and usability, making it easier for employees to maintain and update inventory data. To make the ERP system's interface easy to use and understand, the first step is to set up an intuitive user interface. Staff members can easily process orders, manage inventory levels, and update stock counts thanks to the design. Essentially, this backdrop is about making the ERP accessible and available to even the least tech-savvy staff. This is attenuated with customizing the core feature of the ERP to Rendy Audio. That means automating stock tracking, transparency into your real-time inventory, and alerts when items are low in stock. An efficient workflow includes fundamental processes that minimize human errors (e.g., updating stock and processing orders).

To fulfill practical needs, Rendy Audio staff collaborated to develop and test a prototype. Staff feedback was also gathered in user engagement sessions and system demonstrations, where staff members could view the features and identify any challenges while interacting with them. Comment-based changes were made in order to enhance productivity and adjust the ERP together with Rendy Audio's specifications. Flexible Prototype: The team tested the prototype before finalizing the system interface and carrying out the necessary modifications to ensure

that the functional requirements meant to be provided by the Rendy Audio system were sufficiently met.

D. Deployment and User Training

The final stage, called Deployment and User Training, focuses on introducing the ERP system to the employees of Rendy Audio, making sure they have the skills needed to adequately perform inventory-related activities. *System Deployment*. System deployment of the ERP begins with the base modules defined in the configuration plan: Inventory, Sales, and Procurement. This incremental approach allows the team to adapt in stages, thus business disruptions are minimized. *Practical User Training.* Given that Rendy Audio does not have a specialized IT department, the availability of training is very important. The training sessions cover basic yet essential operations, such as stock monitoring, updating of inventory records, and retrieving real-time order information. Each of these training sessions is participatory and hands-on, so employees are not forced and will feel more comfortable using the system and combine ongoing support with feedback.

After the implementation phase, support sessions will be held to address any questions or concerns that arise as staff members adapt to the new system. Making these small changes easier to make allows the system to fit into staff operations while information is continually collected. This helps increase user confidence, making adoption of the ERP system smoother and easier.

RESULTS

A. Preparation and Planning

Needs Assessment

At the needs assessment phase, Rendy Audio's assets were assessed in order to find out which units would require regular tracking; especially parts or components that are frequently sold or fast-moving. It found that some items, such as audio cables, connectors and specialized mounting kits, had higher turnover rates and required more diligent tracking. Moreover, in observing the operational patterns of the store it was evident that reorder schedule and stock updates needed to be optimized to prevent low stock situations, thereby leading to reduced downtime of service for customers. The needs assessment laid the groundwork for setting up a way for the ERP to accurately track key inventory items and trigger reorders in a timely manner at the Table 1: More Information on High-Demand Components.

Table 1. High-Demand Inventory Items and Tracking Requirements

No	ERP Functionality	Automation Type	Description	Benefit to Rendy Audio
1	Inventory Count Updates	Automated stock level sync	Real-time updates on inventory levels	Reduces manual counting effort
2	Order Status Tracking	Real-time tracking alerts	Tracks and alerts on order status changes	Improves order processing efficiency
3	Stock Level Alerts	Low-stock notifications	Sends alerts when stock falls below preset levels	Ensures timely reordering to prevent stockouts
4	Simplified User Interface	User-friendly interface customization	Provides easy access to core ERP functions	Enhances employee usability with minimal training
5	Sales Module Integration	Streamlined order processing	Automates sales entry and tracking	Supports efficient order management

Source: Data Processed by Author (2024)

This needs assessment study found out that Rendy Audio's team effort could reduce by adding feature of automatic notifications and real-time tracking. The ERP system set up thus includes highlighting cases of stock shortage, predicting points of order placement, and generating automated stock out alerts all of which has to be tailored to suit the high-demand and critical stock items in the industry. This demonstrated the need for a system that actively helps with efficient stock management, especially in a small-scale retail scenario where employees cannot commit the whole day to implementing inventory checks. Regarding features, please refer to Table 2.

Table 2. Key ERP System Functionalities and Automated Processes

No	Item Category	Specific Items	Turnover Rate	Tracking Requirement	Reordering Schedule
1	Head Units	Android Head Unit	Moderate to High	Stock updates, alert on low stock	Two Weeks or as needed
2	Audio Cables	RCA, AUX, AWG Cable	Moderate	Real-time tracking, alert on low stock	Monthly or as needed
3	Speakers	Coaxial, Tweeter, Mid Range & Subwoofer	Moderate to High	Stock updates, alert on low stock	Two Weeks or as needed
4	Amplifiers	DSP, Mono, multi-channel amplifiers	Moderate to High	Stock updates, alert on low stock	Monthly or as needed
5	Specialty Items	Spare Part, Bluetooth receivers, sound dampeners	Variable	Real-time tracking, alert on low stock	Monthly or as needed
6	Car Accessories	Wiper Blades, Car Seat Cover, Car Floor Mat, Car Cover, Lamps, etc	Moderate	Stock updates, alert on low stock	Three Weeks or as needed

Source: Data Processed by Author (2024)

Challenge Identification

The challenge identification process included assessing the features of the ERP that need to be simplified or automated to work as some small team would. Designing for minimal manual input across all team members with basic workflows was key to a successful ERP configuration, particularly given the limited availability of Rendy Audio team members and the absence of an IT department. Then analyzed where data could be leveraged through automation in repeat cases, it was found that processes like updating inventory counts, tracking order status, and adjustment of stock levels could be removed from humans and automated.

This led to the curation of the user interface and the individual workflows in the ERP. With programming that was easily-configurable and intuitive in a user-friendly manner, the ERP system empowered Rendy Audio’s staff to perform management roles without excessive need for technical training. This proved to be a diplomatic finding, as it showcased the system's ability to drive productivity forward and mistake aversion, especially in the areas which had previously been based much upon manual entry. The setup was intended to facilitate fast access to basic information and reduce interruptions to daily operations so employees could focus on customer service and sales.

System Configuration Outline

A temporary system modelling plan will be created based on the analysis of previously existing challenge identification processes and demands. This strategy observes the important modules that exist to be prioritized in the implementation of this ERP, which will be carried out with an emphasis on these modules, namely inventory and sales. The below modules were selected to effectively manage the basic needs of Rendy Audio: inventory management and filled orders process.

According to the configuration plan, important features included automated stock alerts, a low-stock warning system, and a user-friendly order tracking process. This setup ensured that Rendy Audio could maintain visibility over stock levels, monitor inventory turnover rates, and receive timely alerts when critical items were running low. This idea also encourages the selection of a simpler and easier-to-understand user interface so that not only a few employees but all employees can access information without having to learn complicated features. This approach is taken so that the development of this ERP system is easy to use and in accordance with the small workforce so that Rendy Audio can smoothly make the transition to digital from manual operations.

B. Data Collection and Analysis

Phase two: Data Collection and Analysis The data collection and analysis phase, the second phase, involves gathering crucial information about Rendy Audio's inventory levels, sales trends, and reordering cycles to ensure the ERP system is properly configured. Phase allowed a simple data base that can help with automation, demand forecasting, and reordering.

Inventory and Sales Data Collection

The objective of this step was to obtain data about past sales statistics, purchasing records, and current inventory counts that would help to determine the current stock position of Rendy Audio. The data collection method was intentionally simplified streamlining the capturing of key information i.e., stock counts of popular goods, turnover rates for popular products, seasonally high-demand goods etc, as Rendy Audio did not have a dedicated inventory team. Therefore, they kept the data input streamline and ERP setup to be relevant to actionable inventory KPI. Refer to Table 3 for more details on Inventory and Sales data (2024).

Table 3. Inventory and Sales Data Collection

No	Item Category	Stock Count	Turnover Rate	Demand Frequency	Seasonal Demand
1	Head Units	30	Moderate to High	Two Weeks or as needed	Medium
2	Audio Cables	200	Moderate	Monthly or as needed	Low
3	Speakers	50	Moderate to High	Two Weeks or as needed	Medium
4	Amplifiers	50	Moderate to High	Monthly or as needed	High
5	Specialty Items	300	Variable	Monthly or as needed	Medium
6	Car Accessories	100	Moderate	Three Weeks or as needed	High

Source: Data Processed by Author (2024)

The utility oversaw the entire process and obtained data that could be used to automatically track stock (limits) and automatically notify regarding restocking, which could provide an overview of stock activities and possibilities of the ERP system. This achievement shows how important it is to carry out an effective data collection preparation even with limited

resources and time owned by a small company like Rendy Audio. Using the data that they had collected to create an in-house ERP system requiring minimal human tweaking, the tiny team could devote more of its energies to customer service.

Cycle and Demand Analysis

During this phase, I analyzed reordering cycles of Rendy Audio and identified any demand fluctuations. This prepared against stockouts of high volume consumable items, like necessary audio cables and connectors, how soon to reorder in the ERP system. Furthermore, demand analysis improved timing and quantity needs for reorders, allowing the ERP's automatic features to better match the store's actual requirements. Table 4 contains more information on Cycle and Demand Analysis.

Table 4. Cycle and Demand Analysis

No	Item Category	Demand Pattern	Reorder Cycle	Typical Quantity per Reorder
1	Head Units	Consistent weekly demand	Two Weeks or as needed	15 Units
2	Audio Cables	Bi-monthly, moderate demand	Monthly or as needed	50 Units
3	Speakers	Moderate, fluctuates with season	Two Weeks or as needed	10 Units
4	Amplifiers	Moderate, fluctuates with season	Monthly or as needed	10 Units
5	Specialty Items	Variable	Monthly or as needed	20 Units
6	Car Accessories	Bi-weekly, moderate demand	Three Weeks or as needed	35 Units

Source: Data Processed by Author (2024)

Thus, the results from this analysis propped up the arrangement of a more reactant ERP that made it feasible for it to suit Rendy Audio's designated stock upsurge. Using it to learn trends in demand versus normal stock levels, so many key items would automatically re-order, relieving the manual demand on the small team of staff and ensuring more consistent product availability.

Baseline Establishment

Data collected at this stage was utilized to establish a baseline for ERP system configuration. This baseline was necessary to establish automated reordering and tracking solutions that will suffice Rendy Audio's operational objectives. The ERP was already configured with baseline inventory patterns, so integration was made easier and further tweaks to the system were reduced. Removing a need for Rendy Audio staff to continuously enter data by hand improved overall the effectiveness and reliability of inventory management as a whole, refer Table 5.

Table 5. Baseline Data for ERP Configuration

No	Item Category	Baseline Stock Level	Reorder Threshold	Low-Stock Alert Level	Stock Monitoring Frequency
1	Head Units	30 Units	15 Units	5 Units	Two Weeks or as needed
2	Audio Cables	200 Units	125 Units	50 Units	Monthly or as needed

3	Speakers	50 Units	30 Units	20 Units	Two Weeks or as needed
4	Amplifiers	50 Units	30 Units	20 Units	Monthly or as needed
5	Specialty Items	300 Units	150 Units	50 Units	Monthly or as needed
6	Car Accessories	100 Units	65 Units	40 Units	Three Weeks or as needed

Source: Data Processed by Author (2024)

C. System Design and Prototyping

In the System Design and Prototyping phase we customized the interface and functionalities of the ERP according to Rendy Audio's needs. With such a small company, the system design focused on usability and independence so employees were able to simply manage inventory updates.

User-Friendly Interface Configuration

Such an interface for this user-friendly ERP system was developed taking into consideration many prerequisites such as usability and accessibility, making this system user-friendly for all Rendy Audio's employees. The architecture simplifies the core processes such as inventory monitoring, order processing, and supply adjustments. So this approach not only prevents mistakes in inventory but also improves data accuracy.

Core Functionality Customization

We decided to implement a custom ERP (Enterprise Resource Planning) system, where the core functions were tailored to Rendy Audio's needs, not only regarding inventory management (stock automatically updated) but also real-time visibility of products in order and instant low stock notifications. These functionalities were built-in to help Rendy Audio minimize manual intervention, allowing their internal team to run smoothly with little to no extensive technical training. By implementing such an ERP system, we simplified and integrated them into a single business process (order processing and stock modifications), significantly reducing the likelihood of human error in the management of inventory.

Prototyping and Feedback Gathering

Once these were set up the design into a prototype of the ERP system was made and tested by Rendy Audio's personnel. During testing, these employees tested the core functions and any usability issues found were reported during feedback sessions and user demonstrations. Several revisions were done accordingly, which provided a fine-tuned ERP configuration that fitted to Rendy Audio daily operations and increased the efficiency as a whole. The prototyping process ensured that the final ERP setup was practical and well-suited to the team's needs, which helped in smoother adoption in the subsequent deployment phase.

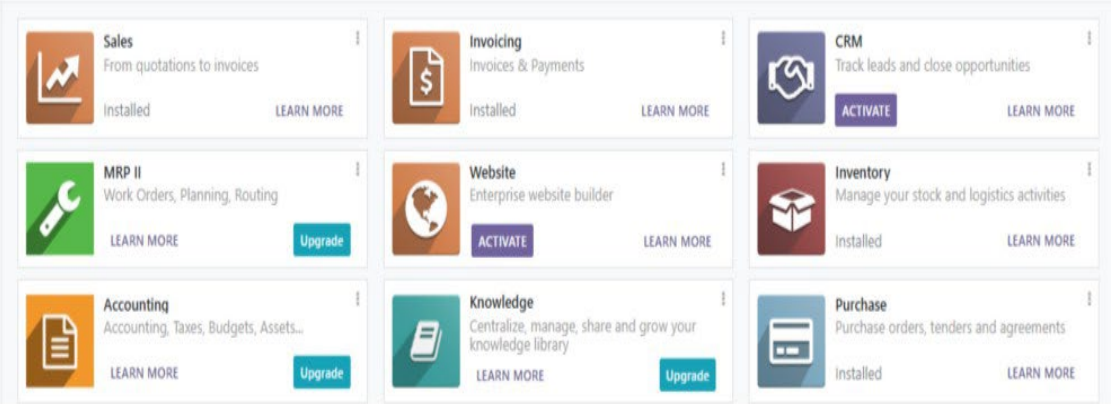

Figure 2. Installed Modules
Source: Documentation by Author

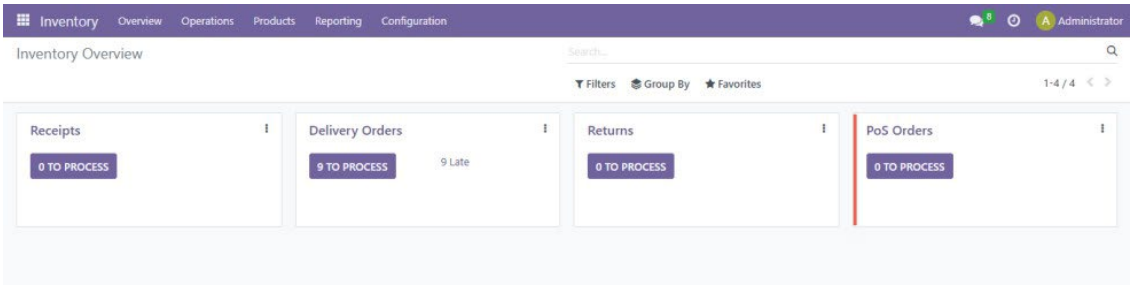

Figure 3. Inventory Module Dashboard
Source: Documentation by Author

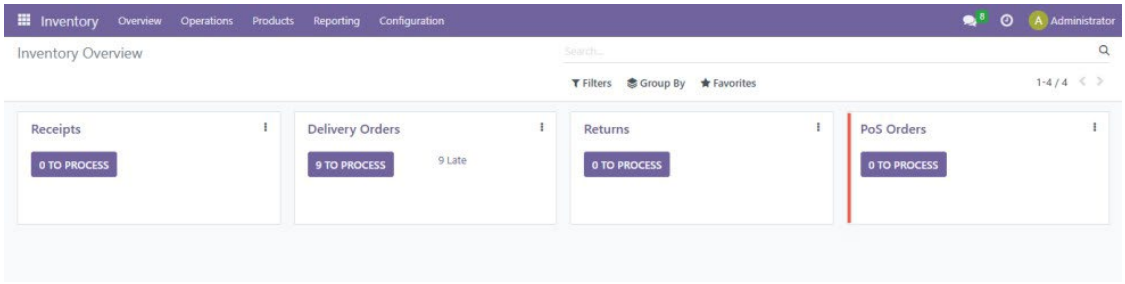

Figure 4. Inventory Module for Product Receiving
Source: Documentation by Author

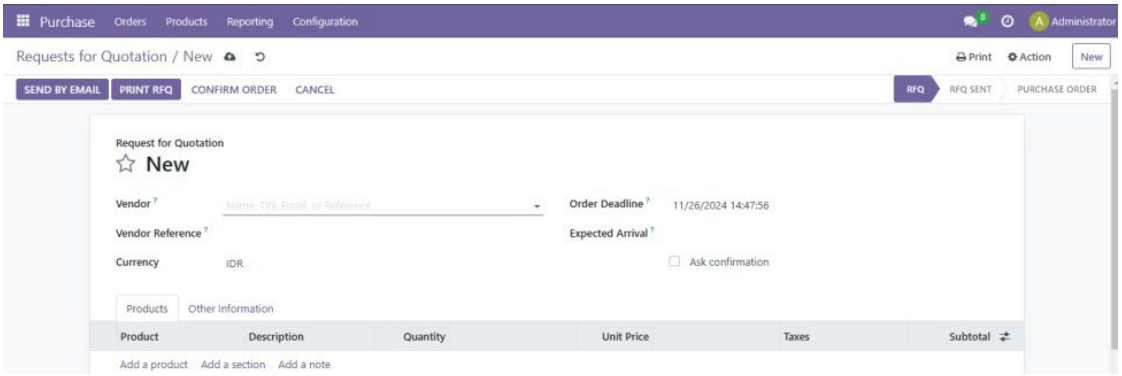

Figure 5. Purchase Module for Product Receiving
Source: Documentation by Author

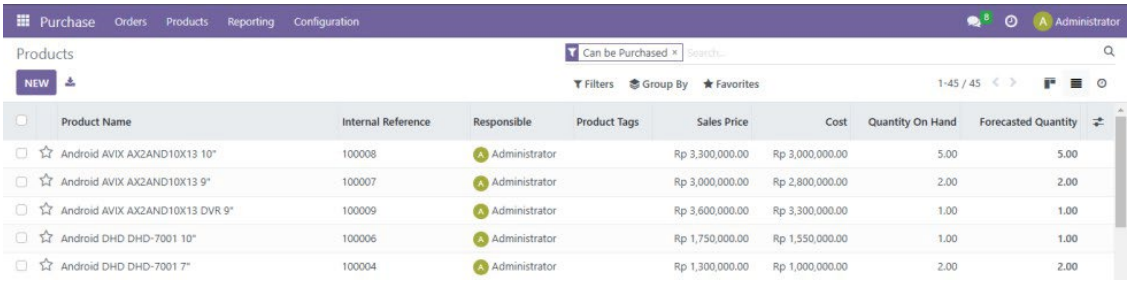

Figure 6. Master Data Product
Source: Documentation by Author

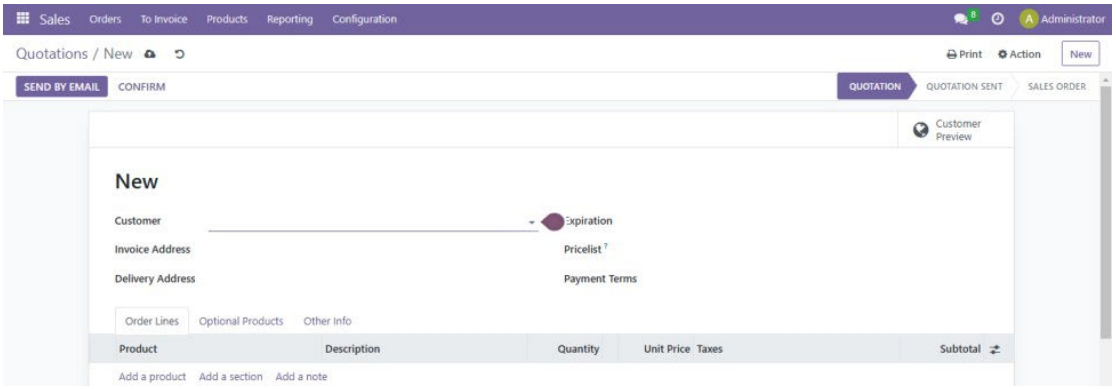

Figure 7. Sales Module
Source: Documentation by Author

D. Deployment and User Training

The last phase is the implementation and user training which are crucial to ensure a smooth transition to the ERP system without any hiccups and to give Rendy Audio employees the tools they need to carry out inventory tasks.

System Deployment

Deployment followed a step-by-step approach, with the crucial modules determined in the configuration plan being the first, such as Inventory, Sales & Procurement. This gradual rollout enabled Rendy Audio's team to ease into the new system in stages, ensuring daily operations remained uninterrupted. By prioritising core functionalities at a manageable pace, Rendy Audio was able to build familiarity with the enhancements to the ERP system without overwhelming the team, leaving the small team feeling empowered and confident in the new processes.

Hands-On User Training

Since there was no IT staff per se the training beyond practical training was required so that each and every employee could comfortably use the system on their own. Simple training sessions were held to cover essential parts such as retrieving live order data, updating item records, and monitoring stock. Staff members were able to practice their jobs under supervision since all the sessions were interactive. Including real data during training, preparation and the "sandbox" setup, where people could experiment with processes or functions without causing real harm, "made it much easier for us... we gave them confidence and skills to succeed with the ERP implementation."

Ongoing Support and Feedback Integration

A support phase of activities was initiated post launch to answer questions and resolve issues as employees engaged with the system. We kept getting feedback that allowed for some tweaks to ensure the ERP system was in line with Rendy Audio's workflow. This additional support period resulted in a higher level of user confidence, with employees being able to work through any issues/teething problems and to tailor the system to their specific needs.

DISCUSSION

The implementation of Odoo ERP at Rendy Audio demonstrates that open-source ERP systems can significantly improve inventory management performance in small retail businesses with limited financial and human resources. The findings indicate that the integration of inventory, sales, and procurement processes into a centralized platform reduced reliance on manual record keeping and enabled real-time stock visibility. This outcome is consistent with the argument of Spathis and Constantinides (2003), who found that ERP systems improve operational control by streamlining business processes and enhancing the availability of managerial information. For SMEs, the ability to access accurate inventory data in real time is particularly important because inventory errors can directly affect customer satisfaction and cash flow.

The study also confirms that ERP adoption can increase inventory tracking accuracy and reduce order-processing delays. Automated low-stock alerts, reorder thresholds, and real-time transaction updates helped Rendy Audio maintain adequate inventory levels for fast-moving items such as audio cables, speakers, and amplifiers. Similar benefits were reported by Bayu et al. (2019), who demonstrated that Odoo-based inventory management supports better safety-stock control and minimizes stockout risks in retail environments. The present findings therefore reinforce the view that ERP-supported automation is an effective mechanism for improving inventory reliability in small-scale retail operations.

Another important contribution of this study is the emphasis on implementation methodology. The four-phase approach consisting of preparation and planning, data collection and analysis, system design and prototyping, and deployment with user training proved suitable for a business employing only four people. This staged implementation reduced complexity and encouraged employee participation throughout the process. The result aligns with Bingi et al. (1999), who identified organizational readiness and user involvement as critical factors in successful ERP implementation. Likewise, Dunaway (2012) argued that ERP projects in smaller organizations require simplified methodologies that prioritize usability and gradual adoption. The experience at Rendy Audio demonstrates that ERP success depends not only on technology selection but also on the alignment between system design and organizational capability. Previous work by Meilanitasari and Ibrahim (2023) showed that integrated warehouse applications built on open-source ERP platforms can improve inventory coordination and operational responsiveness in retail businesses. The current study extends this perspective by demonstrating that similar benefits can be achieved in a specialized automotive-audio retail context through the use of Odoo's Inventory module. Both studies support the argument that affordable digital inventory solutions enable SMEs to strengthen operational resilience by improving visibility, reducing manual errors, and accelerating decision making.

The supply-chain perspective, the integration of inventory data with sales and procurement activities created a more responsive replenishment process. Teittinen et al. (2013) noted that ERP systems in SMEs enhance cross-functional coordination and support management control by providing a shared information base across departments. In Rendy Audio, this integration allowed

reorder decisions to be based on actual demand patterns rather than intuition, thereby improving inventory planning and reducing the risk of excess stock. The findings therefore support the proposition that ERP systems contribute not only to operational efficiency but also to better tactical decision making in small businesses. The study additionally highlights the strategic value of open-source ERP solutions. Olson et al. (2018) argued that open-source ERP offers flexibility, customization capability, and lower acquisition costs compared with proprietary alternatives. These characteristics were evident in Rendy Audio's implementation, where the system was tailored to the company's workflow without requiring substantial investment in specialized IT infrastructure. This affordability is particularly relevant for Indonesian SMEs, which often face budget constraints when pursuing digital transformation initiatives.

Overall, the results suggest that Odoo ERP can function as a scalable and cost-effective platform for inventory optimization in small retail enterprises. By combining automation, real-time visibility, and user-centered implementation practices, the system improved operational efficiency while supporting business continuity and customer service quality. These outcomes strengthen the growing body of evidence that digital inventory management is a practical pathway for enhancing SME competitiveness and resilience in increasingly dynamic retail markets (Faizan & Mehmood, 2022; AlMuhayfith & Shaiti, 2020).

CONCLUSION

Rendy Audio managed to enhance operational efficiency, customer service, and release workload on fewer people by reducing dependency on manual systems which are often prone to error leading to inventory management and moving towards automatic and real-time tracking. Its systematic four-phase approach which encompasses needs assessment, data extraction, systems design, and deployment led to a successful implementation transition by adjusting the ERP system according to the specific requirements of the enterprise. Such systems, the study supports, are a highly viable and inexpensive option for small businesses that must upgrade their systems in the face of opposition from their finance or IT departments.

Now, this research does have important consequences for small businesses, working in closely-related industries. Open-source ERP systems, like Odoo, offer scalability and flexibility, which enables businesses to modify the system to meet specific needs and make plans for future expansion. Instead of wasting a lot of time on manual tasks that could be automated, these few employees can focus on improving customer service and Rendy Audio's business development by automating critical operations that better the system than manual ones such as inventory, reordering, and workflow sale. Furthermore, through hands-on training and user-friendly interfaces, employees can build confidence and expertise, facilitating technology integration. Additionally, by providing real-time information about inventory and order issues in a timely manner, a business can win the trust and loyalty of its clients.

An implementation approach focused on human capital is therefore strongly recommended engaged in the process, the new ERP system is assured to be tailor-made around practical, day-to-day needs through identification of problems, designing workflows, and giving feedback. Heavy investment in proper training and continued support is also important to equip employees with competencies that ensure effective use of the system, reducing resistance and increasing benefits. What's more, the flexibility in open-source ERP systems has to be exploited to fulfill unique business needs without blowing up the costs. Another advantage companies will get is that of creating SME networks with the same ERP solutions in place, sharing knowledge, and problem-solving in collaboration, thereby fastening digital transformation in industries.

A system needs monitoring and continuous optimization to sustain the benefits of ERP adoption. Companies can monitor system performance regularly, utilize the feedback from employees, and analyze operational data to improve areas that might need enhancement in order to keep the ERP system attuned to the changing business needs. By doing so, small businesses can now update their operations, expand their customer base, and strengthen their path toward a leading and sustained organization. This in itself is a form of the achievement of Rendy Audio's metamorphosis, how a relatively resource-constrained enterprise has reached great heights by applying prudent thought and custom-fit ER

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Implementasi Metode Analytical Hierarchy Process (AHP) dalam Pemilihan Mahasiswa Terbaik Program Studi E-Commerce Logistics di Multimedia Nusantara Polytechnic

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ABSTRAK

Pemilihan mahasiswa terbaik di perguruan tinggi memerlukan sistem penilaian yang objektif dan terukur untuk menghasilkan nilai terbaik dan objektif dengan melibatkan banyak kriteria yang sepadan dan sesuai. Sistem penilaian yang baik akan memberikan rasa kepercayaan dan kepuasan yang tinggi bagi para mahasiswa dan sivitas akademika yang ada di perguruan tinggi. Hal ini, seperti yang diharapkan, dapat dilaksanakan oleh Politeknik Multimedia Nusantara. Berlandaskan dari latar belakang tersebut, penelitian ini dilakukan bertujuan untuk merancang Sistem Pendukung Keputusan (SPK) menggunakan metode *Analytical Hierarchy Process* (AHP) untuk pemilihan mahasiswa terbaik pada Program Studi E-Commerce Logistics, Politeknik Multimedia Nusantara. Data diperoleh melalui wawancara, kuesioner perbandingan berpasangan, serta dokumen institusi yang di peroleh dari Program Studi yang merupakan hasil pembelajaran mahasiswa. Metode AHP, diterapkan melalui penyusunan hierarki, perbandingan berpasangan, normalisasi, dan uji konsistensi. Hasil penelitian menunjukkan bahwa kriteria *Inspirer* memiliki bobot tertinggi sebesar 57,96%, diikuti oleh *Improver* 30,99%, dan *Pioneer* 11,05%. Seluruh matriks memiliki nilai *Consistency Ratio* (CR) di bawah 0,1 sehingga dinyatakan konsisten. Berdasarkan hasil perhitungan akhir, Mahasiswa V memperoleh skor tertinggi sebesar 1,06 dan direkomendasikan sebagai mahasiswa terbaik. Sistem yang dikembangkan ini mampu menghasilkan rekomendasi yang objektif dan transparan dalam proses seleksi mahasiswa terbaik sehingga memiliki pertanggungjawaban mutlak karena dihitung berdasarkan nilai yang jelas dan transparan.

Kata kunci: *Analytical Hierarchy Process*; mahasiswa terbaik, *E-Commerce Logistics*; pembobotan kriteria, sistem pendukung keputusan

ABSTRACT

Selecting the best students in higher education requires an objective, measurable assessment system that yields the most accurate grades by incorporating multiple, commensurate, and appropriate criteria. A good assessment system will foster a high level of trust and satisfaction among students and academicians in higher education. This is what is expected to be implemented by Multimedia Nusantara Polytechnic. Based on this background, this study was conducted to design a Decision Support System (DSS) using the Analytical Hierarchy Process (AHP) to select the best students in the E-Commerce Logistics Study Program at Multimedia Nusantara Polytechnic. Data were obtained through interviews, paired-comparison questionnaires, and institutional documents from the Study Program, which are the results of student learning. The AHP method was applied through hierarchical arrangement, paired comparisons, normalization, and consistency tests. The results showed that the Inspirer criterion had the highest weight

of 57.96%, followed by the Improver criterion at 30.99% and the Pioneer criterion at 11.05%. All matrices had a Consistency Ratio (CR) value below 0.1, so they were declared consistent. Based on the final calculation, Student V achieved the highest score of 1.06 and was recommended as the best student. The developed system is capable of producing objective, transparent recommendations in the top student selection process, ensuring absolute accountability because it is calculated using clear, transparent scores.

Keywords: *Analytical Hierarchy Process, best student, criteria weighting, E-Commerce Logistic, decision support system*

PENDAHULUAN

Pendidikan tinggi merupakan salah satu pilar utama dalam upaya peningkatan kualitas sumber daya manusia yang siap menghadapi perkembangan dunia industri dan teknologi. Di era revolusi industri 4.0 dan transformasi digital seperti saat ini, perguruan tinggi dituntut untuk tidak hanya menghasilkan lulusan yang unggul secara akademik, tetapi juga memiliki karakter, sikap profesional, kemampuan berpikir kritis, serta kompetensi nonakademik yang seimbang. Untuk mendorong peningkatan kualitas tersebut, banyak perguruan tinggi menyelenggarakan program pemilihan mahasiswa terbaik sebagai bentuk apresiasi atas pencapaian mahasiswa, sekaligus motivasi bagi mahasiswa lainnya untuk terus berprestasi dan berkontribusi positif (Akbar dkk., 2023). Program semacam ini tidak hanya berfungsi sebagai ajang penghargaan, tetapi juga sebagai sarana evaluasi institusi dalam mengukur sejauh mana proses pembelajaran dan pembinaan mahasiswa telah berjalan efektif. Oleh karena itu, dibutuhkan mekanisme penilaian yang adil, objektif, dan dapat dipertanggungjawabkan, agar mahasiswa yang terpilih benar-benar mencerminkan kualitas terbaik dari berbagai aspek penilaian yang ada.

Di Indonesia, pemilihan mahasiswa berprestasi merupakan salah satu bentuk apresiasi perguruan tinggi terhadap capaian akademik, nonakademik, karakter, dan kontribusi mahasiswa (Akbar dkk., 2023). Penelitian serupa juga telah diterapkan pada jenjang sekolah menengah. Puspita dkk. (2022) membuktikan bahwa metode *Analytical Hierarchy Process (AHP)* mampu menghasilkan proses pemilihan siswa berprestasi secara lebih objektif melalui pembobotan berbagai kriteria akademik maupun nonakademik, sehingga mendukung pengambilan keputusan yang lebih sistematis. Penerapan sistem seleksi yang terstruktur menjadi kebutuhan mendasar bagi setiap institusi penyelenggara Pilmapres (Akbar dkk., 2023), menunjukkan bahwa penerapan metode AHP pada program pemilihan mahasiswa berprestasi di Universitas Dharmawangsa berhasil menghasilkan proses seleksi yang lebih objektif dan sistematis dibandingkan dengan pendekatan konvensional. Hal ini menegaskan bahwa kebutuhan akan sistem pendukung keputusan dalam proses pemilihan mahasiswa terbaik bukan hanya kebutuhan satu institusi, melainkan kebutuhan umum yang dihadapi banyak perguruan tinggi di Indonesia.

Multimedia Nusantara Polytechnic (MNP), sebagai institusi pendidikan vokasi yang berfokus pada pengembangan kompetensi dan inovasi mahasiswa, memiliki banyak mahasiswa dengan kemampuan dan prestasi yang beragam. Khususnya pada Program Studi E-Commerce Logistics, proses pemilihan mahasiswa terbaik menggunakan tiga kriteria utama, yaitu Mahasiswa *Improver*, Mahasiswa *Inspirer*, dan Mahasiswa *Pioneer*. Setiap kriteria memiliki subkriteria yang menjadi dasar penilaian, seperti peningkatan akademik, perkembangan nonakademik, integritas, kepedulian sosial, kreativitas, inovasi, hingga dampak kontribusi mahasiswa. Banyaknya kriteria dan subkriteria tersebut membuat proses penilaian menjadi kompleks. Apabila dilakukan secara manual dan bergantung pada penilaian subjektif, hasil keputusan berisiko kurang objektif, kurang akurat, dan sulit dipertanggungjawabkan.

Permasalahan serupa juga ditemukan dalam berbagai konteks seleksi sumber daya manusia. Narti dkk. (2017) dalam penelitiannya tentang pemilihan karyawan terbaik menyatakan bahwa proses

seleksi yang melibatkan banyak kriteria penilaian sangat rentan terhadap inkonsistensi dan subjektivitas apabila tidak didukung oleh metode yang terstruktur. Hal ini diperkuat pula oleh temuan Fathimahhayati dkk. (2021), yang menunjukkan bahwa pengambilan keputusan dengan banyak variabel kriteria sebagaimana yang terjadi dalam pemilihan supplier memerlukan pendekatan sistematis yang mampu mengolah berbagai pertimbangan kualitatif dan kuantitatif secara bersamaan. Kondisi ini sepenuhnya relevan dengan permasalahan yang dihadapi dalam proses pemilihan mahasiswa terbaik di MNP, sehingga diperlukan suatu sistem yang mampu membantu proses penilaian secara objektif, sistematis, dan terukur.

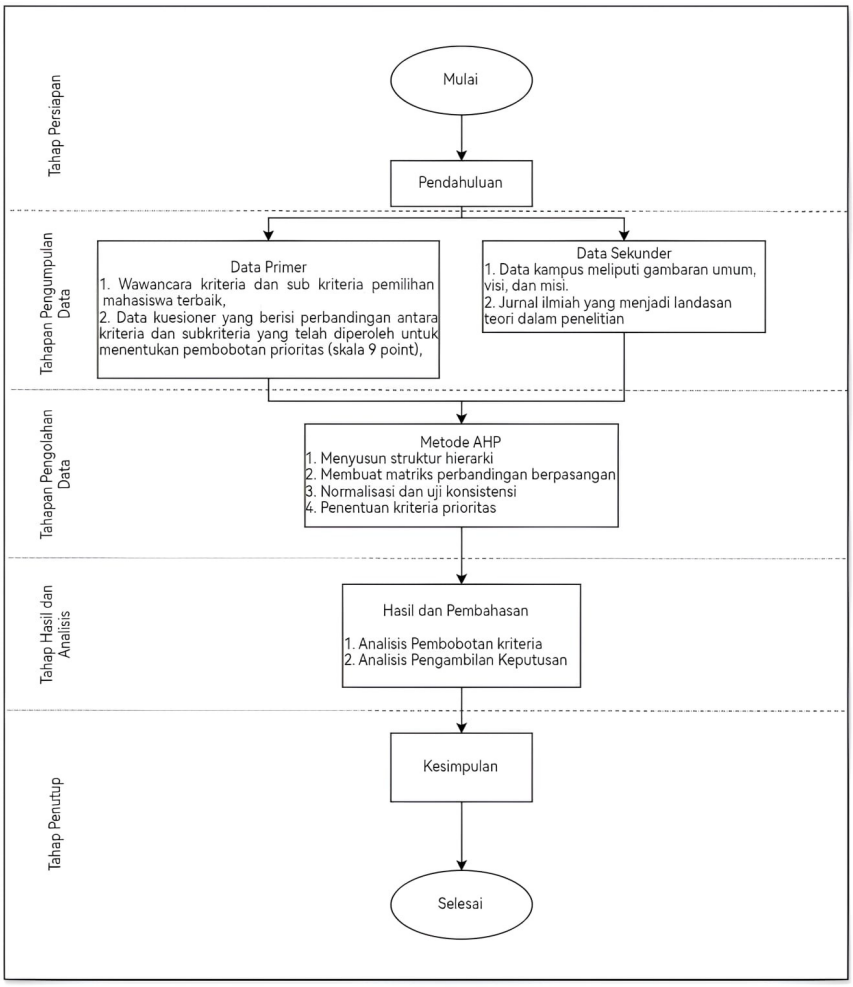
Untuk menjawab kebutuhan tersebut, dapat diterapkan suatu *Decision Support System (DSS),* yaitu sistem berbasis komputer yang dirancang untuk membantu pengambil keputusan mengolah data dan kriteria yang kompleks menjadi rekomendasi yang objektif dan konsisten. Metode *Analytical Hierarchy Process (AHP)* dinilai paling sesuai dengan karakteristik permasalahan pemilihan mahasiswa terbaik di MNP. AHP merupakan metode pengambilan keputusan multikriteria yang dikembangkan oleh Thomas L. Saaty, yang menguraikan masalah kompleks ke dalam struktur hierarki mulai dari tujuan, kriteria, subkriteria, hingga alternatif, kemudian melakukan perbandingan berpasangan (*Pairwise Comparison*) untuk menghasilkan bobot prioritas tiap elemen secara konsisten (Saaty, 2008). Penerapan metode AHP dalam bidang pendidikan juga telah terbukti mampu membantu proses pengambilan keputusan yang melibatkan banyak kriteria melalui pembobotan dan perangkingan alternatif secara sistematis, sehingga menghasilkan keputusan yang lebih objektif, transparan, dan akurat (Azzahra dkk., 2025). Akbar dkk. (2023), membuktikan bahwa metode AHP mampu menghasilkan pemeringkatan mahasiswa yang objektif dan dapat dipertanggungjawabkan dalam konteks pemilihan mahasiswa berprestasi di perguruan tinggi.

Metode AHP dipilih dalam penelitian ini karena mampu mengubah nilai-nilai kualitatif yang bersifat subjektif menjadi nilai kuantitatif yang terukur, sehingga aspek-aspek seperti kepedulian sosial, integritas, dan inovasi dapat dinilai secara lebih sistematis. AHP juga menyediakan uji konsistensi melalui perhitungan *Consistency Ratio* (CR) yang berfungsi memastikan bahwa penilaian bersifat logis dan tidak kontradiktif; matriks dinyatakan konsisten apabila CR ≤ 0,1 (Saaty, 2008). Narti dkk. (2017) membuktikan bahwa AHP efektif dalam proses seleksi multikriteria dan menghasilkan keputusan yang lebih akurat dibandingkan dengan penilaian manual. Fathimah Hayati dkk. (2021) juga mengonfirmasi bahwa AHP unggul dalam tahap pembobotan kriteria pada sistem pengambilan keputusan yang melibatkan banyak variabel penilaian. Dengan keunggulan-keunggulan tersebut, metode AHP diharapkan mampu menjawab permasalahan yang selama ini muncul dalam proses pemilihan mahasiswa terbaik di Program Studi E-Commerce Logistics, Multimedia Nusantara Polytechnic.

Berdasarkan permasalahan dan justifikasi metode yang telah dipaparkan, penelitian ini bertujuan untuk merancang dan mengimplementasikan sebuah Sistem Pendukung Keputusan (SPK) berbasis metode *Analytical Hierarchy Process* (AHP) dalam proses pemilihan mahasiswa terbaik di Program Studi E-Commerce Logistics, Multimedia Nusantara Polytechnic. Melalui penerapan sistem ini, diharapkan proses pemilihan dapat dilakukan secara lebih objektif, efisien, konsisten, dan terukur berdasarkan kriteria yang telah ditetapkan. Hasil penelitian ini juga diharapkan memberikan kontribusi praktis bagi pihak program studi sebagai alat bantu pengambilan keputusan, serta kontribusi akademis sebagai referensi penerapan metode AHP pada konteks pemilihan mahasiswa terbaik di institusi pendidikan vokasi.

METODE

Berikut adalah flowchart diagram alur penelitian yang kami gunakan dan dapat dilihat pada Gambar 1.



Gambar 1. Diagram Alur Penelitian

Metode Pengumpulan Data

Tahapan pengumpulan data dilakukan dengan mengumpulkan data primer dan sekunder. Data primer didapatkan melalui wawancara untuk menentukan kriteria dan subkriteria pemilihan mahasiswa terbaik, serta penyebaran kuesioner dilakukan untuk mendapatkan nilai perbandingan antarkriteria dan subkriteria untuk mendapatkan bobot dengan skala 1-9. Sementara itu, data sekunder diperoleh dari dokumen kampus yang meliputi gambaran umum institusi, visi, dan misi, dan beberapa jurnal ilmiah terkait yang menjadi landasan teori penelitian serta sebagai data pendukung penelitian.

Metode Pengolahan Data

Setelah data primer dan sekunder dikumpulkan, tahap selanjutnya adalah pengolahan data. Pengolahan data dilakukan dengan tujuan menentukan mahasiswa terbaik sebagai alternatif utama. Metode yang digunakan dalam tahap ini adalah *Analytical Hierarchy Process* (AHP) yaitu dengan melakukan perbandingan berpasangan antarkriteria dan subkriteria untuk mendapatkan bobot prioritas, kemudian dilakukan uji konsistensi data agar hasil penelitian valid dan menghasilkan alternatif dengan nilai paling dominan di setiap kriteria, sehingga dari alternatif tertinggi setiap

kriteria dapat dihitung rata-rata untuk menghasilkan mahasiswa terbaik.

Analytic Hierarchy Process (AHP)

Analytic Hierarchy Process (AHP) merupakan suatu metode pengambilan keputusan multi kriteria yang dikembangkan oleh Thomas L. Saaty pada tahun 1970an. Metode ini bekerja dengan cara menguraikan masalah kompleks menjadi elemen-elemen yang lebih sederhana, kemudian disusun dalam bentuk hierarki dan diberikan bobot berdasarkan penilaian para ahli (Saaty,1980). Penerapan metode AHP dalam sistem pendukung keputusan juga telah banyak digunakan untuk proses seleksi berdasarkan berbagai kriteria. Makmum dan Taryo (2025), menjelaskan bahwa AHP digunakan untuk melakukan pembobotan kriteria untuk menentukan prioritas alternatif melalui perbandingan berpasangan (pairwise comparison), serta menguji konsistensi sehingga menghasilkan keputusan yang lebih objektif. AHP menggabungkan Pertimbangan kualitatif dan kuantitatif secara sistematis sehingga mampu menghasilkan keputusan yang lebih terstruktur dan objektif. Selain bersifat multi-kriteria, metode AHP juga didasarkan pada proses yang logis dan terstruktur, karena penyusunan prioritas dilakukan melalui prosedur yang sistematis sehingga preferensi subjektif pengambil keputusan dapat diintegrasikan secara terukur (Febryanto dkk., 2022). Dalam penerapannya, AHP banyak digunakan sebagai digunakan inti dari sistem pendukung (SPK) karena kemampuanya dalam menangani permasalahan dengan banyak kriteria sekaligus mengukur tingkat konsistensi penilaian yang diberikan (Widiantoro, et al.,2023). Meskipun AHP banyak digunakan dalam proses pengambilan keputusan, metode ini tetap memiliki beberapa kelemahan yang perlu diperhatikan

1. Model AHP sangat bergantung pada masukan dari seorang pakar ahli sebagai input utamanya. Kondisi ini mengakibatkan adanya unsur subjektivitas dalam proses penilaian, dan apabila penilaian yang diberikan oleh ahli tersebut tidak tepat, maka hasil yang diperoleh pun menjadi tidak valid.
2. Metode AHP hanya mengandalkan pendekatan matematis dalam proses perhitungannya tanpa disertai pengujian secara statistik, sehingga tidak terdapat batas kepercayaan yang dapat dijadikan tolok ukur kebenaran dari model yang dihasilkan.

Dalam menyelesaikan suatu permasalahan menggunakan metode AHP, terdapat beberapa prinsip dasar yang perlu dipahami terlebih dahulu

1. Penyusunan hierarki permasalahan yang rumit dan kompleks dapat disederhanakan dengan cara menguraikannya menjadi elemen-elemen yang lebih kecil, kemudian elemen-elemen tersebut disusun secara bertingkat membentuk sebuah hierarki dan selanjutnya diintegrasikan kembali menjadi satu kesatuan solusi.
2. Penilaian kriteria dan alternatif dilakukan melalui mekanisme perbandingan berpasangan antara satu elemen dengan elemen lainnya. Dalam proses ini, skala penilaian yang digunakan berkisar antara 1 hingga 9, di mana skala tersebut dianggap paling tepat untuk mempresentasikan pendapat secara kualitatif.

Tabel 1. Kriteria Pemilihan Mahasiswa

Intesitas Kepentingan	Keterangan
1	Kedua elemen sama pentingnya
3	Elemen i sedikit lebih penting dibandingkan elemen j
5	Elemen i lebih penting dibandingkan elemen j
7	Elemen i sangat lebih penting dibandingkan elemen j
9	Elemen i mutlak lebih penting dibandingkan elemen j
2	Elemen i antara sama dan sedikit lebih penting dibandingkan elemen j
4	Elemen i antara lebih sedikit lebih dan lebih penting dibandingkan elemen j
6	Elemen i antara lebih sedikit lebih dan sangat lebih penting dibandingkan elemen j
8	Elemen i antara sangat lebih dan mutlak lebih penting dibandingkan elemen j

Sumber: Hasil Olah Data Penulis (2026)

3. Nilai hasil perbandingan berpasangan kemudian dinormalisasikan untuk memperoleh bobot prioritas dari setiap kriteria, subkriteria, dan alternatif. Setelah itu dilakukan uji konsistensi untuk mengetahui apakah penilaian yang diberikan telah konsisten dan dapat digunakan dalam proses pengambilan keputusan. Tingkat konsistensi diukur menggunakan *Consistency Index* (CI) dan *Consistency Ratio* (CR). Matriks perbandingan dianggap konsisten apabila nilai CR ≤ 0,1.
4. Bobot prioritas yang diperoleh dari proses normalisasi kemudian digunakan untuk menentukan tingkat kepentingan kriteria, subkriteria, dan alternatif. Elemen dengan bobot terbesar menunjukkan tingkat prioritas paling tinggi sehingga dapat dijadikan dasar dalam penentuan alternatif terbaik.

Prosedur Metode AHP

Setelah seluruh data primer dan data sekunder berhasil dikumpulkan, tahap berikutnya adalah tahap pengolahan data menggunakan metode *Analytical Hierarchy Process* (AHP). Metode AHP yang dikembangkan oleh Thomas L. Saaty menguraikan permasalahan pengambilan keputusan yang kompleks ke dalam struktur hierarki yang terdiri atas tujuan, kriteria, sub kriteria, dan alternatif, untuk kemudian dilakukan perbandingan berpasangan agar menghasilkan bobot prioritas yang konsisten (Saaty, 2008). Pada penelitian ini, prosedur AHP dilakukan melalui empat tahapan utama sebagai berikut.

1. Menyusun Struktur Hierarki

   Struktur hierarki disusun berdasarkan hasil wawancara dengan pihak Kemahasiswaan MNP mengenai kriteria dan sub-kriteria yang digunakan dalam pemilihan mahasiswa terbaik. Pemilihan mahasiswa terbaik berada pada level 1 (*goal*), kemudian pada level 2 (*criteria*) terdapat tiga kriteria utama yaitu Mahasiswa *Improver*, Mahasiswa *Inspirer*, dan Mahasiswa *Pioneer*. Pada level 3 dijabarkan sub-kriteria seperti peningkatan akademik, perkembangan non-akademik, integritas, kepedulian sosial, kreativitas, inovasi, dan dampak kontribusi mahasiswa. Pada level 4 terdapat sejumlah mahasiswa kandidat (alternatif) yang akan dibandingkan dan di ranking.

2. Membuat Matriks Perbandingan Berpasangan

   Tahap kedua adalah membuat matriks perbandingan berpasangan (*pairwise comparison matrix*) berdasarkan data kuesioner yang telah diisi oleh *expert*, dalam hal ini enam dosen Program Studi E-Commerce Logistics yang berperan dalam proses pemilihan mahasiswa terbaik. Setiap kriteria dibandingkan satu sama lain menggunakan skala perbandingan (skala 1–9), di mana nilai 1 menyatakan tingkat kepentingan yang sama, dan nilai 9 menyatakan tingkat kepentingan yang mutlak lebih penting. Pengisian matriks dilakukan pada bagian atas garis diagonal (kiri ke kanan), sedangkan sisi di bawah diagonal merupakan nilai kebalikan (*reciprocal*) dari sisi atasnya. Hubungan nilai resiprokal tersebut dapat dirumuskan sebagai berikut:

$$aa_{iiii} = \frac{1}{aa_{iiii}} \qquad (1)$$

   Dengan aa_{iiii} menyatakan nilai perbandingan kriteria ke-i terhadap kriteria ke-j dan aa_{iiii} merupakan kebalikan dari nilai tersebut.

3. Normalisasi dan Uji Konsistensi

   Tahap ketiga adalah melakukan normalisasi matriks dan uji konsistensi. Normalisasi

dilakukan dengan membagi setiap elemen pada matriks perbandingan berpasangan dengan total nilai pada kolom yang bersangkutan, sehingga didapatkan matriks ternormalisasi. Selanjutnya, bobot prioritas (*weight*) tiap kriteria diperoleh dari rata-rata nilai pada tiap baris matriks ternormalisasi. Rumus yang digunakan adalah:

$$w_t = \sum_{t=1}^{n} \frac{a_{ij}}{n} \quad (2)$$

Dengan ww_{tt} menyatakan bobot prioritas elemen ke-t dan n merupakan jumlah kriteria yang dibandingkan. Setelah didapatkan bobot prioritas, dilakukan perhitungan nilai *eigen value* maksimum (λmaks) sebagai dasar uji konsistensi. Perhitungannya dapat dilakukan dengan rumus berikut:

$$a_{ij} = (A)\left(w^T\right) = (\lambda)\left(w^T\right) \quad (3)$$

$$W_i = \frac{1}{n}\sum_j a_{ij} \quad (4)$$

$$\lambda_{maks} = \frac{1}{n}\sum_{i=1}^{n} \frac{Elemen\ ke{-}i\ pada\ (A)\left(w^T\right)}{Elemen\ ke{-}i\ pada\ w^T} \quad (5)$$

Setelah nilai λmaks diperoleh, dilakukan perhitungan *Consistency Index* (CI) dan *Consistency Ratio* (CR) menggunakan Persamaan 6 dan 7.

$$CI = \frac{\lambda_{maks} - n}{n-1} \quad (6)$$

$$CR = \frac{CI}{RI} \quad (7)$$

Nilai RI (*Random Index*) merupakan nilai indeks konsistensi acak yang bergantung pada ordo matriks (n) seperti ditampilkan pada Tabel 2. Apabila CR ≤ 0,1, maka penilaian dianggap konsisten dan hasil perhitungan dapat digunakan sebagai dasar pengambilan keputusan. Jika CR > 0,1, maka kuesioner perlu direvisi dan diisi ulang.

Tabel 2. Nilai Indeks Random Konsistensi (Saaty, 2008)

Matriks	1,2	3	4	5	6	7	8	9	10	11	12	13	14
Nilai R	0	0,58	0,9	1,12	1,24	1,32	1,41	1,45	1,49	1,51	1,48	1,56	1,57

Sumber: Hasil Olah Data Penulis (2026)

4. Penentuan Kriteria Prioritas

Tahap terakhir adalah penentuan kriteria prioritas berdasarkan bobot global hasil perhitungan AHP. Bobot global setiap sub-kriteria diperoleh dengan mengalikan bobot prioritas sub-kriteria dengan bobot prioritas kriteria induknya. Selanjutnya, setiap alternatif (mahasiswa kandidat) dinilai berdasarkan bobot global tersebut, lalu dijumlahkan untuk mendapatkan skor akhir tiap kandidat. Mahasiswa dengan skor akhir tertinggi akan menjadi prioritas utama sebagai mahasiswa terbaik pada kategorinya masing-masing (Mahasiswa *Improver*, *Inspirer*, atau *Pioneer*). Hasil pembobotan dan perangkingan ini selanjutnya akan dianalisis lebih lanjut pada tahap hasil dan pembahasan, mencakup analisis pembobotan kriteria dan analisis pengambilan keputusan, untuk memastikan bahwa rekomendasi yang dihasilkan oleh sistem benar-benar objektif, konsisten, dan dapat dipertanggung jawabkan.

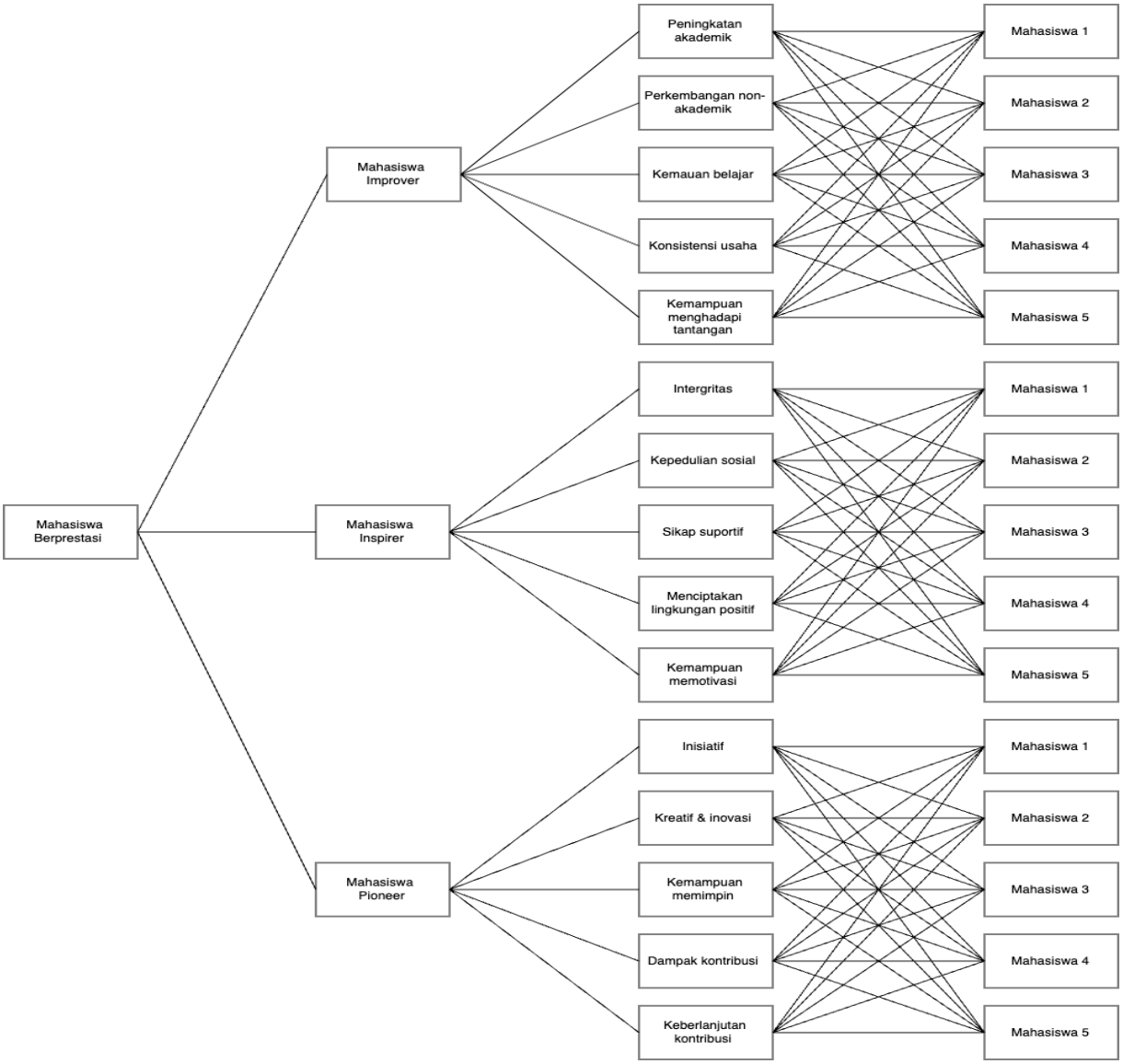
HASIL

Untuk menentukan mahasiswa terbaik terdapat beberapa kriteria yang harus diterapkan antara lain *Pioneer*, *Improver* dan *Inspirer* yang harus di penuhi mahasiswa. Detail Kriteria Sub kriteria yang ditetapkan oleh enam dosen program studi digital commerce and logistik. Adapun Struktur hierarki keputusan pemilihan mahasiswa terbaik di prodi digital commerce and supply chain pada table 4.

Tabel 3. Kriteria dan Sub Kriteria

Kriteria	Sub Kriteria
Improver	Peningkatan Akademik
	Perkembangan Non-Akademik
	Kemauan Belajar
	Konsistensi Usaha
	Kemampuan Menghadapi Tantangan
Inspirer	Integritas
	Kepedulian Sosial
	Sikap Suportif
	Menciptakan Lingkungan Positif
	Kemampuan Memotivasi
Pioneer	Inisiatif
	Kreativitas & Inovasi
	Kemampuan Memimpin
	Dampak Kontribusi
	Keberlanjutan Kontribusi

Sumber: Hasil Olah Data Penulis (2026)



Gambar. 2 Struktur Hierarki

Matriks Perbandingan Kriteria Utama

Perbandingan berpasangan antar tiga kriteria utama dilakukan berdasarkan hasil kuesioner yang diisi oleh enam dosen Program Studi. Hasil matriks perbandingan dan jumlah kolom ditampilkan pada Tabel 4.

Tabel 4. Matriks Perbandingan Berpasangan kriteria Utama

Kriteria	*Improver*	*Inspirer*	*Pioneer*
Improver	*1*	*0.20*	*7*
Inspirer	*5*	*1*	*3*
Pioneer	*0.14*	*0.33*	*1*
Summary	*6.14*	*1.53*	*11*

Sumber: Hasil Olah Data Penulis (2026)

Dari hasil normalisasi matriks perbandingan berpasangan, diperoleh bobot prioritas untuk masing-masing kriteria utama. Kriteria *Inspirer* memperoleh bobot tertinggi sebesar 57,96%, diikuti *Improver* (30,99%), dan *Pioneer* (11,05%). Tingginya bobot *Inspirer* mencerminkan bahwa Program

Studi E-Commerce Logistics lebih mengutamakan mahasiswa yang mampu memberikan dampak positif pada lingkungan sosial, memiliki integritas, dan mampu memotivasi sesama.

Bobot Sub Kriteria per Kategori

Pada kategori *Improver*, sub kriteria Konsistensi Usaha memiliki bobot tertinggi (40,71%). Pada kategori *Inspirer*, Kemampuan Memotivasi memiliki bobot tertinggi (34,49%), sementara pada *Pioneer*, Dampak Kontribusi memiliki bobot paling dominan (36,94%). Distribusi bobot ini sesuai dengan karakteristik masing-masing kategori yang telah disepakati oleh pengelola program studi.

Tabel 5. Bobot Kriteria Utama

Kriteria	Bobot
Improver	*30,99%*
Inspirer	*57,96%*
Pioneer	*11,05%*

Sumber: Hasil Olah Data Penulis (2026)

Uji Konsistensi

Uji konsistensi dilakukan untuk memastikan bahwa penilaian yang diberikan oleh pengambil keputusan bersifat logis dan tidak kontradiktif. Hasil uji konsistensi untuk seluruh matriks perbandingan ditampilkan pada Tabel 6.

Tabel 6. Hasil Uji Konsistensi

Matriks	λmaks	CI	CR	Status
Improver	*5,1816*	*0,0405*	0.041	*Konsisten*
Inspirer	*5,0731*	*0,0163*	0.016	*Konsisten*
Pioneer	*5,0571*	*0,0127*	0.013	*Konsisten*

Sumber: Hasil Olah Data Penulis (2026)

Seluruh matriks perbandingan menghasilkan nilai CR ≤ 0.1 sehingga dinyatakan konsisten dan valid untuk dijadikan dasar pengambilan keputusan. Nilai CR terendah terdapat pada matriks *Pioneer* (CR = 0,013), sedangkan nilai CR tertinggi pada matriks *Improver* (CR = 0,041) namun tetap di bawah ambang batas 0,1.

Rangking Mahasiswa Terbaik

Setelah seluruh matriks perbandingan dinyatakan konsisten, tahap selanjutnya adalah menghitung skor akhir tiap mahasiswa berdasarkan bobot global yang telah diperoleh dari masing-masing kriteria. Hasil perhitungan skor akhir dan peringkat mahasiswa ditampilkan pada Tabel 7.

Tabel 7. Rangking Akhir Mahasiswa Terbaik

Matriks	Skor *Improver*	Skor *Inspirer*	Skor *Pioneer*	Total Skor
Mahasiswa V	*0,33*	*0,61*	*0,61*	*1,06*
Mahasiswa I	*0,34*	*0,60*	*0,60*	*1,04*
Mahasiswa IV	*0,31*	*0,59*	*0,59*	*1,01*
Mahasiswa III	*0,35*	*0,50*	*0,50*	*0,96*
Mahasiswa II	*0,24*	*0,57*	*0,57*	*0,92*

Sumber: Hasil Olah Data Penulis (2026)

Berdasarkan Tabel 7, **Mahasiswa V** meraih skor tertinggi sebesar 1,06 dan ditetapkan sebagai Mahasiswa Terbaik Program Studi E-Commerce Logistics. Keunggulan Mahasiswa V terutama terlihat pada dimensi *Inspirer* (skor 0,61) yang memiliki bobot dominan, mengindikasikan bahwa mahasiswa ini memiliki integritas tinggi, kepedulian sosial yang kuat, dan kemampuan memotivasi

lingkungan sekitarnya. Mahasiswa I berada di posisi kedua (skor 1,04), diikuti Mahasiswa IV (1,01), Mahasiswa III (0,96), dan Mahasiswa II (0,92).

HASIL

Penelitian ini mengimplementasikan metode *Analytical Hierarchy Process* (AHP) yang dikembangkan oleh Saaty (2008) untuk membangun Sistem Pendukung Keputusan (SPK) pemilihan mahasiswa terbaik di Program Studi E-Commerce Logistics, Multimedia Nusantara Polytechnic. AHP bekerja dengan menguraikan permasalahan keputusan yang kompleks ke dalam struktur hierarki, kemudian dilakukan perbandingan berpasangan antar elemen menggunakan skala 1–9 untuk menghasilkan bobot prioritas yang terukur (Saaty, 2008). Pendekatan ini dipilih karena mampu mengakomodasi kriteria kualitatif dan kuantitatif sekaligus, sehingga sesuai dengan karakteristik penilaian mahasiswa yang mencakup aspek akademik, karakter, dan kontribusi sosial.

Berdasarkan hasil pembobotan, kriteria *Inspirer* menjadi prioritas utama dalam pemilihan mahasiswa terbaik di Program Studi E-Commerce Logistics. Hal ini menunjukkan bahwa Program Studi lebih mengutamakan mahasiswa yang memiliki integritas, mampu memberikan dampak positif bagi lingkungan, serta dapat menjadi teladan dan motivator bagi mahasiswa lainnya. Temuan ini sejalan dengan penelitian Narti dkk. (2017) dalam pemilihan karyawan terbaik menggunakan AHP, di mana kriteria yang berkaitan dengan karakter, integritas dan kemampuan memotivasi memperoleh bobot yang lebih tinggi dibandingkan kriteria teknis. Hal ini mengonfirmasi bahwa dalam konteks seleksi sumber daya manusia, aspek kepribadian dan dampak sosial seorang individu cenderung diprioritaskan oleh pengambil keputusan.

Pada level subkriteria, Konsistensi Usaha pada kategori *Improver* memperoleh bobot tertinggi sebesar 40,71%, mencerminkan bahwa ketekunan dan konsistensi dalam upaya peningkatan akademik maupun non-akademik menjadi fondasi utama penilaian. Kemampuan Memotivasi pada kategori *Inspirer* meraih bobot 34,49%, sementara Dampak Kontribusi pada kategori *Pioneer* menjadi sub-kriteria paling dominan dengan bobot 36,94%. Distribusi bobot ini konsisten dengan temuan Narti dkk. (2017) yang menunjukkan bahwa sub-kriteria dengan nuansa interpersonal dan kolaboratif memiliki pengaruh signifikan dalam menentukan peringkat kandidat pada sistem seleksi berbasis AHP.

Validtas hasil pembobotan dikonfirmasi melalui uji konsistensi. Saaty (2008) menetapkan bahwa suatu matriks perbandingan dinyatakan konsistensi apabila nilai Consistency Ratio (CR) tidak melebihi 0,1. Seluruh matriks perbandingan pada penelitian ini memenuhi kriteria tersebut, sehingga penilaian yang diberikan oleh responden dapat dinyatakan konsisten. Dengan demikian, bobot prioritas yang dihasilkan dapat digunakan sebagai dasar dalam proses pengambilan keputusan secara valid dan dapat dipertanggungjawabkan

Hasil perangkingan menunjukkan bahwa Mahasiswa V memperoleh nilai tertinggi dibandingkan kandidat lainnya. Hasil tersebut menunjukkan bahwa mahasiswa tersebut memiliki performa yang lebih baik pada kriteria-kriteria yang diprioritaskan oleh Program Studi, khususnya pada aspek yang berkaitan dengan kemampuan memberikan inspirasi serta kontribusi positif terhadap lingkungan akademik. Perbedaan skor antar kandidat yang relatif kecil juga menunjukkan bahwa seluruh kandidat memiliki kualitas yang baik sehingga penggunaan metode AHP mampu membantu membedakan prioritas secara lebih objektif dan terstruktur.

Hasil penelitian ini menunjukan bahwa penerapan metode *Analytical Hierarchy Process* (AHP) mampu menghasilkan pembobotan kriteria dan perangkingan alternatif secara objektif dalam proses pengambilan keputusan. Hasil tersebut sejalan dengan penelitian terdahulu yang menerapkan metode AHP pada sistem Pendukung Keputusan pemilihan siswa terbaik, Hasil ini juga

sejalan dengan penelitian Loda dkk. (2024) yang mengimplementasikan AHP dalam SPK berbasis web untuk pemilihan siswa terbaik, di mana sistem yang terkomputerisasi terbukti mampu mempercepat proses perhitungan bobot kriteria tanpa mengurangi objektivitas hasil keputusan.

Penelitian Fathimahhayati dkk. (2021) yang menerapkan AHP dan TOPSIS dalam pemilihan supplier menunjukkan bahwa AHP efektif dalam menentukan bobot kriteria secara konsisten, sementara penggabungannya dengan metode lain seperti TOPSIS dapat meningkatkan presisi perangkingan alternatif. Meskipun penelitian ini hanya menggunakan AHP tanpa penggabungan metode tambahan, hasil yang diperoleh sudah memenuhi standar konsistensi dan memberikan perangkingan yang dapat dipertanggungjawabkan. Temuan ini membuka peluang bagi penelitian selanjutnya untuk mengintegrasikan AHP dengan TOPSIS atau metode lain guna mempertegas perbedaan skor antar kandidat yang nilainya berdekatan. Hal ini diperkuat oleh penelitian Arini (2024) yang menerapkan kombinasi AHP dan TOPSIS pada penentuan mahasiswa berprestasi di Universitas Baturaja, yang membuktikan bahwa integrasi kedua metode tersebut mampu mempertajam perbedaan skor antar kandidat yang nilainya berdekatan kondisi yang juga ditemukan pada hasil perangkingan penelitian ini.

KESIMPULAN

Penelitian ini berhasil merancang dan mengimplementasikan Sistem Pendukung Keputusan (SPK) berbasis metode *Analytical Hierarchy Process* (AHP) untuk pemilihan mahasiswa terbaik di Program Studi E-Commerce Logistics, Multimedia Nusantara Polytechnic. Mengacu pada kerangka AHP yang dikembangkan oleh Saaty (2008), seluruh proses perbandingan berpasangan, normalisasi bobot, serta uji konsistensi telah dilaksanakan sesuai prosedur yang ditetapkan. Nilai Consistency Ratio (CR) pada ketiga matriks perbandingan *Improver* (CR = 0,041), *Inspirer* (CR = 0,016), dan *Pioneer* (CR = 0,013), seluruhnya berada di bawah ambang batas 0,1, sehingga hasil pembobotan dinyatakan konsisten dan valid sebagai dasar pengambilan keputusan. Hasil pembobotan kriteria utama menempatkan *Inspirer* sebagai kriteria berprioritas tertinggi (57,96%), diikuti *Improver* (30,99%) dan *Pioneer* (11,05%). Pada level sub kriteria, Konsistensi Usaha (40,71%), Kemampuan Memotivasi (34,49%), dan Dampak Kontribusi (36,94%) menjadi sub-kriteria paling berpengaruh di masing-masing kategori. Pola bobot ini konsisten dengan penelitian Narti dkk. (2017) yang menunjukkan dominannya aspek karakter dan interpersonal dalam sistem seleksi sumber daya manusia berbasis AHP.

Berdasarkan perhitungan skor akhir, Mahasiswa V direkomendasikan sebagai mahasiswa terbaik dengan total skor 1,06, diikuti Mahasiswa I (1,04), Mahasiswa IV (1,01), Mahasiswa III (0,96), dan Mahasiswa II (0,92). Rekomendasi ini bersifat objektif, transparan, dan dapat dipertanggungjawabkan, sehingga memberikan solusi atas keterbatasan penilaian subjektif yang selama ini dihadapi dalam proses pemilihan mahasiswa terbaik secara konvensional.

Penelitian ini memberikan kontribusi praktis berupa SPK yang siap digunakan oleh pihak program studi, serta kontribusi akademis sebagai referensi implementasi AHP dalam konteks seleksi mahasiswa berprestasi di institusi pendidikan vokasi. Sebagaimana disarankan oleh Fathimahhayati dkk. (2021), penelitian selanjutnya dapat mengintegrasikan AHP dengan metode TOPSIS untuk meningkatkan akurasi dan presisi perangkingan, khususnya dalam kondisi di mana nilai skor antar kandidat berdekatan. Selain itu, perluasan jumlah responden kuesioner dan penambahan periode penilaian dapat dilakukan untuk memperkuat validitas dan reliabilitas sistem secara keseluruhan.

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Pemilihan Dosen Terbaik di Multimedia Nusantara Polytechnic dengan Metode Analytical Hierarchy Process (AHP)

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ABSTRAK

Pemilihan dosen terbaik merupakan salah satu bentuk penghargaan institusi atas kontribusi dosen dalam menjalankan Tridharma Perguruan Tinggi. Proses pemilihan dosen terbaik ini juga dilaksanakan di Multimedia Nusantara Polytechnic (MNP), proses ini masih dilakukan secara manual sehingga memiliki kecenderungan yang subjektif dan tidak efisien terhadap penilaian tersebut. Penelitian ini, bertujuan menentukan dosen terbaik menggunakan metode *Analytical Hierarchy Process (AHP)* berdasarkan lima kriteria sebagai berikut, Penelitian (C1), Pengabdian kepada Masyarakat (PKM) (C2), EDOM/Pembelajaran (C3), Publikasi (C4), dan HKI (C5). Data diperoleh melalui wawancara, pengambilan data dan pendokumentasian dari Lembaga Penelitian dan Pengabdian kepada Masyarakat (LPPM) MNP. Hasil perhitungan menunjukkan bahwa kriteria Publikasi memiliki bobot prioritas tertinggi sebesar 0,3953 (39,53%), diikuti oleh EDOM 0,2395 (23,95%), Penelitian 0,1730 (17,30%), PKM 0,1194 (11,94%), dan HKI 0,0728 (7,28%). Dari akumulasi 19 dosen yang dievaluasi, dosen H menempati peringkat pertama dengan nilai akhir 0,174, disusul dosen dengan nilai 0,100 dan dosen L dengan nilai 0,096. Penerapan metode AHP terbukti mampu menghasilkan perangkingan yang lebih sistematis dan objektif dibandingkan dengan penilaian manual. Penelitian menjadi solusi konkrit dalam menjawab sistem penilaian yang telah berjalan.

Kata Kunci: *Analytical Hierarchy Process*, Bobot Prioritas, Dosen Terbaik, *Multi Criteria Decision Making*, Sistem Pendukung Keputusan

ABSTRACT

The selection of the best lecturer is a form of institutional recognition of the lecturer's contribution to the Tridharma of Higher Education. The process of selecting the best lecturer is also carried out at Multimedia Nusantara Polytechnic (MNP), but it is still done manually, which tends to be subjective and inefficient in the assessment. This study aims to determine the best lecturer using the Analytical Hierarchy Process (AHP) method based on the following five criteria: Research (C1), Community Service (PKM) (C2), EDOM/Learning (C3), Publication (C4), and IPR (C5). Data were obtained through interviews, as well as through data collection and documentation from the MNP Research and Community Service Institute (LPPM). The calculation results show that the Publication criteria have the highest priority weight of 0.3953 (39.53%), followed by EDOM 0.2395 (23.95%), Research 0.1730 (17.30%), PKM 0.1194 (11.94%), and IPR 0.0728 (7.28%). From the accumulation of 19 lecturers evaluated, lecturer H is ranked first with a final score of 0.174, followed by lecturer with a score of 0.100 and lecturer L with a score of 0.096. The AHP method has been shown to produce a more systematic and objective ranking than manual assessment. Research is a concrete solution to the existing

assessment system.

Keywords: *Best Lecturer, Decision Support System, Analytical Hierarchy Process, Multi Criteria Decision Making, Priority Weight*

PENDAHULUAN

Dosen memiliki peran yang sangat penting dalam penyelenggaraan pendidikan tinggi karena bertanggung jawab terhadap pelaksanaan Tri Dharma Perguruan Tinggi yang meliputi pendidikan, penelitian, dan pengabdian kepada masyarakat. Berdasarkan Undang-Undang Nomor 14 Tahun 2005 tentang Guru dan Dosen Pasal 51 Ayat (1) huruf b, dosen berhak memperoleh penghargaan atas prestasi kerja dan pengabdiannya. Oleh karena itu, pemilihan dosen terbaik merupakan salah satu bentuk apresiasi institusi terhadap kinerja dosen sekaligus menjadi upaya dalam meningkatkan mutu pendidikan tinggi melalui sistem evaluasi yang objektif dan transparan. Seiring berkembangnya transformasi digital, pemanfaatan teknologi informasi dalam proses pengambilan keputusan telah menjadi kebutuhan di berbagai sektor, termasuk pendidikan tinggi. Salah satu implementasinya adalah **Sistem Pendukung Keputusan (SPK)** yang mampu membantu pengambilan keputusan secara lebih cepat, akurat, konsisten, dan berbasis data. Selain digunakan dalam lingkungan akademik, SPK juga banyak diterapkan pada sektor bisnis kreatif dan organisasi modern untuk meningkatkan efektivitas pengelolaan sumber daya manusia dan mendukung proses evaluasi berbasis kinerja (Astutik & Jatiningrum, 2023; Telaumbanua & Siregar, 2025).

Dalam lingkungan perguruan tinggi, kualitas dosen merupakan salah satu faktor utama yang memengaruhi mutu pembelajaran, produktivitas penelitian, serta reputasi institusi. Oleh karena itu, penilaian dosen tidak hanya mempertimbangkan kemampuan mengajar, tetapi juga aktivitas penelitian, publikasi ilmiah, pengabdian kepada masyarakat, serta luaran akademik lainnya (Yasa et al., 2021; Silitonga et al., 2024). Namun demikian, pada praktiknya proses pemilihan dosen terbaik di berbagai perguruan tinggi masih dilakukan secara manual sehingga berpotensi menimbulkan subjektivitas, membutuhkan waktu yang relatif lama, serta menyulitkan proses pengambilan keputusan ketika melibatkan banyak kriteria (Hasanah & Iddrus, 2025). Permasalahan serupa juga terjadi di Multimedia Nusantara Polytechnic (MNP). Proses pemilihan dosen terbaik masih dilakukan secara manual sehingga pengolahan data penilaian belum optimal dan berpotensi menghasilkan keputusan yang kurang objektif. Selain itu, banyaknya kriteria yang digunakan dalam proses evaluasi menyebabkan proses penilaian menjadi semakin kompleks. Oleh karena itu, diperlukan suatu metode yang mampu mengakomodasi berbagai kriteria penilaian secara sistematis sehingga keputusan yang dihasilkan lebih objektif, transparan, dan dapat dipertanggungjawabkan (Sundari et al., 2024; Maringga et al., 2025).

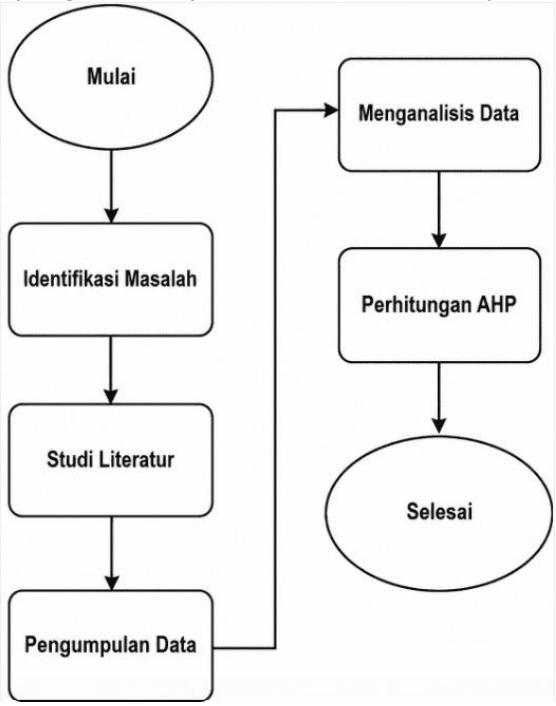
Salah satu pendekatan yang banyak digunakan dalam Sistem Pendukung Keputusan untuk menyelesaikan permasalahan multikriteria adalah ***Multi Criteria Decision Making*** **(MCDM)**. Di antara berbagai metode MCDM, ***Analytical Hierarchy Process*** **(AHP)** merupakan metode yang banyak digunakan karena mampu menguraikan permasalahan kompleks ke dalam struktur hierarki, melakukan perbandingan berpasangan antarkriteria, serta menghasilkan bobot prioritas yang konsisten sebagai dasar pengambilan keputusan (Saaty, 1980; Alencar & Schmid, 2024). Berbagai penelitian terbaru juga menunjukkan bahwa metode AHP mampu meningkatkan objektivitas dan transparansi dalam proses pemilihan dosen terbaik maupun evaluasi kinerja akademik di perguruan tinggi (Silitonga et al., 2024; Nasyuha et al., 2025; Hasanah & Iddrus, 2025).

Berdasarkan kondisi tersebut, penelitian ini bertujuan untuk menentukan dosen terbaik di Multimedia Nusantara Polytechnic menggunakan metode ***Analytical Hierarchy Process (AHP)*** berdasarkan lima kriteria utama, yaitu Penelitian, Pengabdian kepada Masyarakat (PKM), Evaluasi

Dosen oleh Mahasiswa (EDOM), Publikasi, dan Hak Kekayaan Intelektual (HKI). Penelitian ini diharapkan dapat menghasilkan proses penilaian yang lebih objektif, efektif, dan terukur sehingga dapat mendukung pengambilan keputusan institusi secara lebih transparan. Selain itu, penelitian ini juga memberikan kontribusi terhadap penerapan teknologi pendukung keputusan dalam tata kelola pendidikan tinggi yang sejalan dengan perkembangan transformasi digital dan kebutuhan organisasi modern berbasis teknologi.

METODE

Penelitian ini menggunakan metode *Analytical Hierarchy Process (AHP)* sebagai pendekatan dalam sistem pendukung keputusan untuk menentukan dosen terbaik di Multimedia Nusantara Polytechnic (MNP). Metode AHP digunakan karena mampu membantu proses pengambilan keputusan multikriteria melalui proses perbandingan berpasangan antar elemen sehingga menghasilkan bobot prioritas yang lebih objektif dan terukur (Saaty, 1980); (Soares et al., 2023).



Gambar 1. Alur Penelitian

Alur Penelitian

1. **Identifikasi Masalah:** Penelitian diawali dengan mengobservasi dan mengidentifikasi permasalahan utama yang ada di lingkungan **Multimedia Nusantara Polytechnic (MNP)**, khususnya mengenai kebutuhan sistem pengambilan keputusan yang objektif dalam menentukan dosen terbaik.
2. **Studi Literatur:** Tahap selanjutnya adalah melakukan studi literatur guna menggali informasi, teori, serta acuan ilmiah melalui **jurnal-jurnal penelitian terdahulu**. Hal ini dilakukan untuk memperkuat landasan berpikir dan memahami penerapan metode *Analytical Hierarchy Process (AHP)* secara mendalam
3. **Pengumpulan Data:** Setelah landasan teori kuat, dilakukan pengumpulan data primer dan sekunder melalui wawancara dengan Lembaga Penelitian dan Pengabdian kepada Masyarakat (LPPM) serta Program Studi Logistik Niaga – El, guna memperoleh kriteria, bobot awal, dan data kinerja dosen. Proses pembobotan kriteria dalam penelitian ini dilakukan berdasarkan hasil

wawancara dengan satu orang pakar yang berasal dari Bagian Riset dan Kerja Sama Multimedia Nusantara Polytechnic. Pakar tersebut dipilih karena memiliki kewenangan dalam proses evaluasi kinerja dosen serta memahami indikator yang digunakan institusi dalam menentukan dosen terbaik. Meskipun demikian, penggunaan satu orang pakar merupakan salah satu keterbatasan penelitian karena bobot yang dihasilkan masih merepresentasikan sudut pandang dari satu individu.

4. **Analisis Data:** Data yang telah terkumpul kemudian dianalisis untuk menentukan variabel-variabel kunci. Hasil analisis ini digunakan untuk menyusun **struktur hirarki** penilaian yang terdiri dari kriteria utama (Pembelajaran, Penelitian, PKM) dan subkriteria pendukungnya.
5. **Validasi Data:** Validasi data dilakukan untuk memastikan bahwa informasi yang digunakan dalam penelitian sesuai dengan kondisi sebenarnya dan mampu menjawab tujuan penelitian. Data hasil wawancara diverifikasi dengan dokumen penilaian dosen yang dimiliki institusi, seperti data penelitian, publikasi, PKM, HKI, dan EDOM. Selain itu, konsistensi penilaian pakar diuji menggunakan *Consistency Ratio (CR)* pada metode AHP. Nilai CR sebesar 0,0233 (< 0,1) menunjukkan bahwa hasil pembobotan bersifat konsisten sehingga layak digunakan sebagai dasar pengambilan keputusan. Meskipun penelitian hanya melibatkan satu orang pakar, narasumber dipilih karena memiliki kompetensi dan kewenangan dalam proses evaluasi dosen sehingga informasi yang diberikan relevan dengan tujuan penelitian.
6. **Perhitungan AHP:** Tahapan inti dilakukan dengan mengeksekusi perhitungan menggunakan algoritma **AHP**, mulai dari perbandingan berpasangan *(pairwise comparison)* hingga mendapatkan bobot prioritas akhir dan menguji konsistensi data.

Lokasi dan Objek Penelitian

Penelitian dilakukan di Multimedia Nusantara Polytechnic (MNP). Objek penelitian berupa proses pemilihan dosen terbaik yang berasal dari tiga program studi di lingkungan MNP. Alternatif yang digunakan dalam penelitian ini merupakan dosen aktif yang dinilai berdasarkan beberapa kriteria utama yang telah ditentukan oleh pihak institusi.

Tabel 1. Data Alternatif Dosen

No	Kode Dosen	No	Kode Dosen	No	Kode Dosen	No	Kode Dosen
1	A	6	F	11	K	16	P
2	B	7	G	12	L	17	Q
3	C	8	H	13	M	18	R
4	D	9	I	14	N	19	S
5	E	10	J	15	O		

Sumber : Pengolahan Data oleh Peneliti (2026)

Metode Pengumpulan Data

Metode pengumpulan data yang digunakan dalam penelitian ini adalah wawancara dan dokumentasi. Wawancara dilakukan dengan pihak Riset dan Kerjasama Multimedia Nusantara Polytechnic guna memperoleh informasi mengenai proses penilaian dosen, standar penilaian, serta kriteria yang digunakan dalam menentukan dosen terbaik. Selain itu, dokumentasi digunakan untuk memperoleh data penilaian dosen yang akan diolah menggunakan metode AHP.

Jenis Data

Jenis data yang digunakan terdiri dari data primer dan data sekunder. Data primer diperoleh secara langsung melalui hasil wawancara dan dokumen penilaian dosen di MNP. Sedangkan data

sekunder diperoleh melalui studi literatur berupa jurnal ilmiah, buku, dan referensi lain yang berkaitan dengan sistem pendukung keputusan dan metode *Analytical Hierarchy Process (AHP).*

Kriteria Penilaian

Penilaian dosen terbaik dalam penelitian ini dilakukan berdasarkan lima kriteria utama yang digunakan sebagai dasar dalam proses pengambilan keputusan. Kriteria tersebut diperoleh berdasarkan hasil wawancara dan kebutuhan penilaian di Multimedia Nusantara Polytechnic (MNP). Adapun kriteria yang digunakan dalam penelitian ini meliputi penelitian, pengabdian kepada masyarakat (PKM), EDOM, publikasi, dan Hak Kekayaan Intelektual (HKI).

Tabel 2. Kriteria Penilaian

Kode	Criteria
C1	Penelitian
C2	PKM
C3	EDOM
C4	Publikasi
C5	HKI

Sumber : Pengolahan Data oleh Peneliti (2026)

Kelima kriteria tersebut digunakan untuk menilai seluruh alternatif dosen yang berasal dari tiga program studi di Multimedia Nusantara Polytechnic. Setiap kriteria kemudian dibandingkan menggunakan metode Analytical Hierarchy Process (AHP) untuk memperoleh bobot prioritas yang digunakan dalam proses penentuan dosen terbaik. Data kinerja dosen yang digunakan dalam penelitian ini diperoleh dari hasil dokumentasi internal Multimedia Nusantara Polytechnic (MNP). Setiap alternatif dosen dinilai berdasarkan lima kriteria utama, yaitu penelitian, PKM, EDOM, publikasi, dan HKI. Data tersebut kemudian digunakan sebagai input dalam proses perhitungan menggunakan metode Analytical Hierarchy Process (AHP).

Tabel 3. Rekap Data Kinerja Seluruh Dosen MNP

Kode	Penelitian	PKM	Publikasi	HKI	EDOM
A	1	0	0	0	3
B	1	0	4	0	4
C	1	2	2	4	3
D	1	0	3	0	5
E	2	0	0	0	5
F	1	0	2	0	2
G	2	0	2	0	4
H	1	3	10	6	3
I	0	1	6	2	5
J	0	2	4	4	5
K	0	0	0	0	2
L	0	2	6	1	2
M	0	0	4	0	3
N	0	0	0	0	1
O	0	1	0	0	1
P	0	0	0	0	1
Q	0	2	2	8	2
R	0	1	3	0	3
S	0	2	2	1	3

Sumber: Data Riset dan Kerjasama MNP (2025)

Tahapan Metode AHP

Metode *Analytical Hierarchy Process (AHP)* digunakan dalam penelitian ini untuk membantu proses pengambilan keputusan dalam menentukan dosen terbaik berdasarkan beberapa kriteria penilaian. Metode ini dilakukan secara bertahap mulai dari penyusunan hierarki, perbandingan antar kriteria, hingga pengujian konsistensi hasil penilaian. Tahapan-tahapan tersebut bertujuan untuk menghasilkan bobot prioritas yang objektif sehingga keputusan yang diperoleh dapat dilakukan secara lebih sistematis dan terukur (Nisaa et al., 2020).

- **Penyusunan Hierarki**

  Tahapan awal dalam metode AHP adalah menyusun struktur hierarki berdasarkan tujuan, kriteria, subkriteria, dan alternatif. Tujuan utama penelitian ini adalah menentukan dosen terbaik di Multimedia Nusantara Polytechnic.

- **Matriks Perbandingan Berpasangan**

  Perbandingan berpasangan dilakukan menggunakan skala Saaty 1-9 untuk menentukan tingkat kepentingan relatif antarkriteria (Saaty, 1980). Normalisasi matriks dilakukan dengan membagi setiap nilai pada matriks perbandingan berpasangan dengan jumlah total pada masing-masing kolom untuk memperoleh nilai prioritas dari setiap kriteria yang digunakan dalam pengambilan keputusan (Saaty, 1980); (Alencar & Schmid, 2024).

$$rij = \frac{xij}{\sum xij}$$

rij = nilai hasil normalisasi

xij = nilai matriks perbandingan

∑xij = jumlah total nilai pada kolom

- **Normalisasi Matriks**

  Normalisasi matriks dilakukan dengan membagi setiap nilai pada matriks perbandingan dengan jumlah total masing-masing kolom. Hasil normalisasi digunakan untuk memperoleh nilai prioritas atau eigenvektor dari setiap kriteria.

- **Perhitungan Bobot Prioritas**

  Setelah proses normalisasi dilakukan, langkah berikutnya adalah menghitung bobot prioritas setiap kriteria. Nilai bobot diperoleh dari rata-rata setiap baris pada matriks normalisasi. Rumus perhitungan bobot prioritas adalah sebagai berikut:

$$W_i = \frac{\sum r_{ij}}{n}$$

Wi = bobot prioritas

rij = nilai hasil normalisasi

n = jumlah kriteria

- **Pengujian Konsistensi**

  Pengujian konsistensi dilakukan untuk mengetahui tingkat konsistensi penilaian pada matriks perbandingan berpasangan. Tahapan ini dilakukan dengan menghitung nilai *Consistency Index (CI*) dan *Consistency Ratio (CR).*

Consistency Index (CI)

$$CI = \frac{\lambda_{maks} - n}{n - 1}$$

Keterangan:

- CI= *Consistency Index*
- λmaks = nilai eigen maksimum
- n = jumlah kriteria

Consistency Ratio (CR)

$$CR = \frac{CI}{RI}$$

Keterangan:

- CR = *Consistency Ratio*
- CI = *Consistency Index*
- RI = *Random Index*

HASIL

Proses Pembobotan Menggunakan Metode AHP

Tahapan awal dalam metode *Analytical Hierarchy Process (AHP)* adalah menyusun matriks perbandingan berpasangan antar kriteria menggunakan skala Saaty 1-9 (Saaty, 1980). Matriks ini digunakan untuk menentukan tingkat kepentingan masing-masing kriteria dalam proses pengambilan keputusan. Perbandingan dilakukan berdasarkan lima kriteria utama yaitu penelitian, PKM, publikasi, HKI, dan EDOM. Berdasarkan hasil wawancara dengan pihak LPPM MNP, diperoleh penilaian kepentingan antar kriteria sebagai berikut: Publikasi (C4) lebih penting dari Penelitian (C1) dengan nilai 5; Penelitian (C1) lebih penting dari PKM (C2) dengan nilai 5; EDOM (C3) sedikit lebih penting dari Penelitian (C1) dengan nilai 2; Penelitian (C1) sedikit lebih penting dari HKI (C5) dengan nilai 3.

Tabel 4. Matriks Perbandingan Berpasangan

Kriteria	C1 Penelitian	C2 PKM	C3 Edom	C4 Pulikasi	C5 HKI
C1 Penelitian	1.00	2.00	0.50	0.33	3.00
C2 PKM	0.50	1.00	0.50	0.33	2.00
C3 EDOM	2.00	2.00	1.00	0.50	3.00
C4 Publikasi	3.00	3.00	2.00	1.00	4.00
C5 HKI	0.33	0.50	0.33	0.25	1.00

Sumber: Hasil Olah Data Penelitian (2026)

Berdasarkan matriks perbandingan berpasangan pada Tabel 4, setiap kriteria dibandingkan satu sama lain untuk menentukan tingkat kepentingannya dalam proses penilaian dosen terbaik. Penilaian dilakukan menggunakan skala Saaty 1-9, di mana nilai yang lebih besar menunjukkan bahwa suatu kriteria dianggap lebih penting dibandingkan kriteria lainnya. Matriks perbandingan berpasangan ini digunakan sebagai dasar dalam proses perhitungan metode Analytical Hierarchy Process (AHP) untuk memperoleh nilai prioritas dari masing-masing kriteria penilaian. Selanjutnya, dilakukan proses normalisasi matriks untuk memperoleh nilai prioritas dari masing-masing kriteria. Normalisasi dilakukan dengan membagi setiap nilai pada matriks perbandingan dengan jumlah total setiap kolom.

Tabel 5. Hasil Normalisasi Matriks

	Penelitian	PKM	EDOM	PUBLIKASI	HKI
Penelitian	0.15	0.24	0.12	0.14	0.23
PKM	0.07	0.12	0.12	0.14	0.15
EDOM	0.29	0.24	0.23	0.21	0.23
PUBLIKASI	0.44	0.35	0.46	0.41	0.31
HKI	0.05	0.06	0.08	0.10	0.08
Summary	1.00	1.00	1.00	1.00	1.00

Sumber: Hasil olahan data penelitian (2026)

Hasil normalisasi menunjukkan nilai prioritas setiap kriteria yang digunakan dalam proses pembobotan. Nilai tersebut kemudian digunakan untuk menghitung bobot prioritas akhir dari masing-masing kriteria penilaian. Setelah normalisasi matriks dilakukan dengan membagi setiap nilai pada matriks dengan jumlah total kolomnya, diperoleh bobot prioritas (eigenvector) setiap kriteria dengan cara merata-ratakan nilai setiap baris. Hasil normalisasi dan bobot prioritas kriteria disajikan pada Tabel berikut.

Tabel 6. Bobot Prioritas Kriteria

Kriteria	Bobot (W)	Persentase	Peringkat
C4 - Publikasi	0,395	39.53%	1
C3 - EDOM	0,239	23,95%	2
C1 - Penelitian	0,173	17,30%	3
C2- PKM	0,119	11,94%	4
C5 - HKI	0,073	7.28%	5

Sumber: Hasil Perhitungan AHP (2026)

Berdasarkan Tabel 6, diperoleh bobot prioritas untuk setiap kriteria penilaian. Kriteria Publikasi memiliki bobot tertinggi yang menunjukkan faktor paling berpengaruh dalam proses penentuan dosen terbaik di Multimedia Nusantara Polytechnic (Yasa et al., 2021; Nisaa et al., 2020). Untuk memastikan hasil penilaian yang diperoleh bersifat konsisten, dilakukan pengujian konsistensi menggunakan nilai *Consistency Index (CI)* dan *Consistency Ratio (CR)* (Saaty, 1980; Alencar & Schmid, 2024). Pengujian ini bertujuan untuk mengetahui apakah hasil perbandingan berpasangan yang dilakukan telah memenuhi tingkat konsistensi yang dapat diterima.

Tabel 7. Hasil Pengujian Konsistensi

Parameter	Nilai Hasil
λ max	5.1044
n (jumlah kriteria)	5
CI = (λ max - n)/(n-1)	0.0261
RI (n=5)	1.12
CR = CI / RI	0.0233

Sumber: Hasil perhitungan AHP (2026)

Berdasarkan hasil pengujian konsistensi pada Tabel 7, diperoleh nilai *Consistency Ratio* (CR) sebesar 0,0233 atau kurang dari 0,1 sehingga matriks perbandingan berpasangan dinyatakan konsisten (Alencar & Schmid, 2024). Hal ini menunjukkan bahwa hasil penilaian antar kriteria dapat digunakan dalam proses pengambilan keputusan menggunakan metode AHP (Saaty, 1980).

Pembobotan Alternatif

Setelah diperoleh bobot prioritas kriteria dan hasil pengujian konsistensi menunjukkan nilai CR sebesar 0,0233 (< 0,1), dilakukan pembobotan alternatif untuk setiap dosen berdasarkan masing-masing kriteria penilaian. Pembobotan alternatif diperoleh melalui proses normalisasi matriks

perbandingan berpasangan sehingga menghasilkan bobot prioritas alternatif pada kriteria Penelitian (C1), PKM (C2), EDOM (C3), Publikasi (C4), dan HKI (C5). Bobot tersebut menunjukkan tingkat preferensi relatif masing-masing dosen terhadap setiap kriteria yang digunakan dalam penelitian.

Tabel 8. Bobot Alternatif Setiap Kriteria

C1 -Penelitian			C2- PKM		
No	Kode Dosen	Bobot Alternatif	No	Kode Dosen	Bobot Alternatif
1	A	0,07	1	A	0,02
2	B	0,07	2	B	0,02
3	C	0,07	3	C	0,10
4	D	0,07	4	D	0,02
5	E	0,19	5	E	0,02
6	F	0,07	6	F	0,02
7	G	0,19	7	G	0,02
8	H	0,07	8	H	0,18
9	I	0,02	9	I	0,18
10	J	0,02	10	J	0,02
11	K	0,02	11	K	0,02
12	L	0,02	12	L	0,02
13	M	0,02	13	M	0,02
14	N	0,02	14	N	0,02
15	O	0,02	15	O	0,02
16	P	0,02	16	P	0,02
17	Q	0,02	17	Q	0,02
18	R	0,02	18	R	0,02
19	S	0,02	19	S	0,02
Bobot Kriteria Penelitiaan		**0,19**	**Bobot Kriteria PKM**		**0,14**
C3 - EDOM			C4- Publikasi		
No	Kode Dosen	Bobot Alternatif	No	Kode Dosen	Bobot Alternatif
1	A	0,01	1	A	0,01
2	B	0,07	2	B	0,07
3	C	0,03	3	C	0,03
4	D	0,05	4	D	0,05
5	E	0,01	5	E	0,01
6	F	0,03	6	F	0,03
7	G	0,03	7	G	0,03
8	H	0,22	8	H	0,22
9	I	0,13	9	I	0,13
10	J	0,07	10	J	0,07
11	K	0,01	11	K	0,01
12	L	0,13	12	L	0,13
13	M	0,07	13	M	0,07
14	N	0,01	14	N	0,01
15	O	0,01	15	O	0,01
16	P	0,01	16	P	0,01
17	Q	0,03	17	Q	0,03
18	R	0,05	18	R	0,05
19	S	0,03	19	S	0,03
Bobot Kriteria EDOM		**0,18**	**Bobot Kriteria Publikasi**		**0,38**

C5 - HKI		
No	Kode Dosen	Bobot Alternatif
1	A	0,03
2	B	0,07
3	C	0,03
4	D	0,15
5	E	0,15
6	F	0,02
7	G	0,07
8	H	0,03
9	I	0,15
10	J	0,15
11	K	0,02
12	L	0,02
13	M	0,03
14	N	0,01
15	O	0,01
16	P	0,01
17	Q	0,02
18	R	0,03
19	S	0,03
Bobot Kriteria HKI		0,11

Sumber: Hasil Olah Data Penelitian (2026)

Berdasarkan Tabel 8, terlihat bahwa setiap dosen memiliki bobot yang berbeda pada masing-masing kriteria. Sebagai contoh, pada kriteria Penelitian (C1) dosen E dan G memperoleh bobot tertinggi sebesar 0,19, sedangkan pada kriteria Publikasi (C4) dosen H memperoleh bobot tertinggi sebesar 0,22. Hasil pembobotan alternatif ini selanjutnya digunakan dalam proses perhitungan nilai akhir untuk menentukan peringkat dosen terbaik.

Perhitungan Nilai akhir

Nilai akhir setiap alternatif diperoleh dengan mengalikan bobot alternatif pada masing-masing kriteria dengan bobot prioritas kriteria hasil perhitungan AHP (Saaty, 1980 ; Soares et al., 2023). Hasil perkalian tersebut kemudian dijumlahkan sehingga menghasilkan nilai preferensi akhir untuk setiap dosen.

$$Vi = \sum_{i=1}^{n} \quad (Wj \; x \; Ij)$$

Keterangan:

- Vi = nilai akhir alternatif ke-i
- Wj = bobot kriteria ke-j
- Ij = bobot alternatif ke-i pada kriteria ke-j

Hasil perhitungan nilai akhir seluruh dosen ditunjukkan pada Tabel.

Tabel 9. Hasil Perhitungan Nilai Akhir

No	Kode Dosen	Penelitian	PKM	Publikasi	HKI	EDOM	Nilai Akhir	Rangking
1	A	0.07	0.02	0.01	0.01	0.03	0.024	15
2	B	0.07	0.02	0.07	0.07	0.07	0.065	5
3	C	0.07	0.10	0.03	0.03	0.03	0.045	10
4	D	0.07	0.02	0.05	0.05	0.15	0.058	7
5	E	0.19	0.02	0.01	0.01	0.15	0.053	8

No	Kode Dosen	Penelitian	PKM	Publikasi	HKI	EDOM	Nilai Akhir	Rangking
6	F	0.07	0.02	0.03	0.03	0.02	0.035	13
7	G	0.19	0.02	0.03	0.03	0.07	0.059	6
8	H	0.07	0.18	0.22	0.22	0.03	0.174	1
9	I	0.02	0.05	0.13	0.13	0.15	0.100	2
10	J	0.02	0.10	0.07	0.07	0.15	0.070	4
11	K	0.02	0.02	0.01	0.01	0.02	0.013	17
12	L	0.02	0.10	0.13	0.13	0.02	0.096	3
13	M	0.02	0.02	0.07	0.07	0.03	0.052	9
14	N	0.02	0.02	0.01	0.01	0.01	0.013	18
15	O	0.02	0.05	0.01	0.01	0.01	0.016	16
16	P	0.02	0.02	0.01	0.01	0.01	0.013	18
17	Q	0.02	0.10	0.03	0.03	0.02	0.035	14
18	R	0.02	0.05	0.05	0.05	0.03	0.043	11
19	S	0.02	0.10	0.03	0.03	0.03	0.036	12

Sumber : Hasil Perhitungan Nilai Akhir (2026)

Hasil Perankingan Dosen Terbaik

Berdasarkan nilai akhir yang diperoleh pada Tabel 9, dilakukan proses pengurutan nilai dari yang terbesar hingga terkecil untuk menghasilkan peringkat dosen terbaik. Hasil perangkingan ditunjukkan pada Tabel 10.

Tabel 10. Hasil Perangkingan Dosen Terbaik

No	Kode Dosen	Rangking
1	H	1
2	I	2
3	L	3
4	J	4
5	B	5
6	D	6
7	G	7
8	E	8
9	C	9
10	M	10
11	R	11
12	S	12
13	Q	13
14	F	14
15	A	15
16	O	16
17	K	17
18	N	18
19	P	18

Sumber : Hasil Perhitunga Nilai Akhir (2026)

Berdasarkan hasil perankingan yang diperoleh, alternatif dengan nilai tertinggi ditetapkan sebagai dosen terbaik. Hasil tersebut menunjukkan bahwa metode *Analytical Hierarchy Process (AHP)* mampu membantu proses pengambilan keputusan secara lebih objektif, sistematis, dan terukur berdasarkan bobot prioritas yang telah ditentukan sebelumnya.

PEMBAHASAN

Berdasarkan hasil perhitungan menggunakan metode *Analytical Hierarchy Process (AHP),* diperoleh bahwa dosen H menempati peringkat pertama dengan nilai akhir sebesar 0,174. Nilai tersebut merupakan hasil akumulasi dari bobot setiap kriteria yang dikalikan dengan bobot alternatif masing-masing dosen (Saaty, 1980). Tingginya nilai akhir dosen H menunjukkan bahwa dosen tersebut memiliki performa yang unggul pada sebagian besar kriteria penilaian, khususnya pada aspek Publikasi, PKM, dan HKI. Pada kriteria Publikasi, dosen H memperoleh kontribusi nilai terbesar terhadap hasil akhirnya. Hal ini didukung oleh data rekapitulasi yang menunjukkan bahwa dosen H memiliki jumlah publikasi sebanyak 10 publikasi, tertinggi dibandingkan dosen lainnya. Karena dalam model AHP ini kriteria Publikasi memiliki bobot prioritas tertinggi yaitu sebesar 39,53%, maka dosen dengan jumlah publikasi yang tinggi akan memperoleh pengaruh yang sangat besar terhadap hasil akhir perangkingan (Yasa et al., 2021 ; Nisaa et al., 2020).

Dosen I berada pada peringkat kedua dengan nilai akhir sebesar 0,100. Meskipun dosen I tidak memiliki nilai pada kriteria Penelitian, dosen ini tetap memperoleh peringkat tinggi karena unggul pada kriteria EDOM dan Publikasi. Hasil ini menunjukkan bahwa kombinasi antara kualitas pembelajaran dan produktivitas publikasi mampu meningkatkan posisi dosen dalam sistem perangkingan, walaupun terdapat kekurangan pada salah satu kriteria lainnya (Sundari et al., 2024). Sementara itu, dosen L menempati posisi ketiga dengan nilai akhir sebesar 0,096. Secara umum, profil penilaian dosen L memiliki kemiripan dengan dosen I, terutama pada aspek Publikasi dan PKM. Dosen L memiliki jumlah publikasi sebanyak 6 dan PKM sebanyak 2. Akan tetapi, nilai EDOM dosen L lebih rendah dibandingkan dosen I sehingga mempengaruhi hasil akhir perangkingan (Puspitasari & Ilmi, 2016). Hasil penelitian ini menunjukkan bahwa metode AHP mampu memberikan proses pengambilan keputusan yang lebih sistematis dan objektif dalam menentukan dosen terbaik (Saaty, 1980 ; Soares et al., 2023). Dalam penelitian ini, kriteria Publikasi menjadi faktor paling dominan karena memiliki bobot prioritas tertinggi sebesar 39,53%. Hal tersebut menandakan bahwa institusi lebih menekankan produktivitas ilmiah sebagai indikator utama dalam penilaian kinerja dosen.

Temuan penelitian ini juga sejalan dengan beberapa penelitian terdahulu yang menerapkan metode AHP dalam evaluasi kinerja dosen (Yasa et al., 2021; Puspitasari & Ilmi, 2016 ; Nisaa et al., 2020 ; Sundari et al., 2024). Pada umumnya, penelitian sebelumnya menunjukkan bahwa produktivitas akademik seperti publikasi ilmiah, penelitian, dan HKI menjadi faktor utama dalam menentukan dosen terbaik, terutama pada perguruan tinggi yang berorientasi pada riset. Publikasi ilmiah dianggap mampu mencerminkan kontribusi dosen dalam pengembangan ilmu pengetahuan serta reputasi akademik institusi. Terdapat perbedaan dengan beberapa penelitian lain yang menempatkan kualitas pembelajaran atau EDOM sebagai faktor utama dalam penilaian dosen terbaik (Sundari et al., 2024). Perbedaan tersebut dapat terjadi karena penentuan bobot dalam metode AHP sangat dipengaruhi oleh kebijakan, kebutuhan, dan prioritas masing-masing institusi (Saaty, 1980). Berdasarkan hasil pengujian konsistensi, diperoleh nilai *Consistency Ratio (CR)* sebesar 0,0233 yang berada di bawah batas toleransi konsistensi dalam metode AHP yaitu ≤ 0,1 (Alencar & Schmid, 2024). Dengan demikian, hasil pembobotan kriteria yang diperoleh dalam penelitian ini dapat digunakan sebagai dasar pengambilan keputusan secara valid dan dapat diterima. Penelitian selanjutnya disarankan untuk melibatkan lebih banyak pakar dalam proses pembobotan agar hasil lebih representatif. Selain itu, penggunaan metode penggabungan pendapat ahli seperti Geometric Mean dapat diterapkan untuk meningkatkan konsistensi hasil perhitungan (Alencar & Schmid, 2024).

Penelitian ini menggunakan satu orang pakar dalam proses penyusunan matriks perbandingan berpasangan. Pendekatan tersebut dipilih karena pakar merupakan pihak yang bertanggung jawab

dalam proses evaluasi dosen di lingkungan institusi. Namun demikian, penggunaan satu orang pakar berpotensi menimbulkan subjektivitas dalam proses pembobotan. Oleh sebab itu, penelitian selanjutnya disarankan melibatkan beberapa pakar dari unsur pimpinan program studi, unit penjaminan mutu, maupun bidang akademik sehingga bobot kriteria dapat diperoleh melalui agregasi pendapat, misalnya menggunakan *Geometric Mean*. Hasil penelitian menunjukkan bahwa proses pembobotan menghasilkan nilai *Consistency Ratio (CR)* sebesar 0,0233 sehingga penilaian pakar dinyatakan konsisten. Meskipun penelitian ini hanya melibatkan satu orang pakar, proses pembobotan dilakukan berdasarkan kriteria yang telah ditetapkan oleh institusi dan diuji menggunakan metode konsistensi AHP sehingga hasilnya dapat dipertanggungjawabkan. Namun demikian, penelitian selanjutnya disarankan melibatkan lebih banyak pakar untuk memperoleh bobot yang lebih representatif.

KESIMPULAN

Berdasarkan hasil penelitian yang telah dilakukan, dapat disimpulkan bahwa metode *Analytical Hierarchy Process (AHP)* mampu digunakan sebagai metode sistem pendukung keputusan dalam menentukan dosen terbaik di Multimedia Nusantara Polytechnic secara lebih objektif, sistematis, dan terukur (Saaty, 1980); (Puspitasari & Ilmi, 2016). Proses pembobotan dilakukan berdasarkan lima kriteria utama yaitu Penelitian, PKM, EDOM, Publikasi, dan HKI melalui tahapan perbandingan berpasangan, normalisasi matriks, perhitungan bobot prioritas, serta pengujian konsistensi. Hasil penelitian menunjukkan bahwa kriteria Publikasi memiliki bobot prioritas tertinggi sebesar 39,53%, sehingga menjadi faktor paling dominan dalam proses penentuan dosen terbaik. Selanjutnya diikuti EDOM 23,95%, Penelitian 17,30%, PKM 11,94%, dan HKI 7,28%. Hal ini menunjukkan bahwa institusi lebih menekankan produktivitas ilmiah dan kualitas akademik dalam penilaian kinerja dosen (Yasa et al., 2021 ; Nisaa et al., 2020). Berdasarkan hasil perangkingan, dosen H memperoleh peringkat pertama dengan nilai akhir sebesar 0,1511, diikuti dosen I (0,100) dan dosen L (0,096). Hasil tersebut menunjukkan bahwa kombinasi antara produktivitas akademik dan kualitas pembelajaran memberikan pengaruh besar terhadap hasil akhir perangkingan dosen (Sundari et al., 2024 ; Soares et al., 2023).

Pengujian konsistensi menghasilkan nilai CR sebesar 0,0233 atau kurang dari 0,1, sehingga matriks perbandingan berpasangan dinyatakan konsisten dan hasil pembobotan dapat diterima (Alencar & Schmid, 2024). Dengan demikian, penerapan metode AHP pada penelitian ini dinilai mampu membantu proses pengambilan keputusan secara lebih efektif dibandingkan proses penilaian manual yang cenderung subjektif. Penelitian selanjutnya disarankan untuk menambahkan jumlah kriteria maupun alternatif penilaian agar hasil lebih komprehensif. Selain itu, penelitian berikutnya juga dapat mengkombinasikan metode AHP dengan metode SPK lainnya seperti TOPSIS atau SAW (Turban et al., 2005 ; Soares et al., 2023). Penelitian ini memiliki keterbatasan pada proses pembobotan yang hanya melibatkan satu orang pakar sehingga hasil bobot masih merepresentasikan perspektif individu. Penelitian selanjutnya disarankan melibatkan lebih banyak pakar agar menghasilkan bobot yang lebih representatif.

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