

Effectiveness of ERP-Based Accounting Information System Implementation in Improving Operational Efficiency of Manufacturing Companies

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Abstract

This study aims to analyze the effectiveness of Enterprise Resource Planning (ERP)-based accounting information system implementation in improving operational efficiency in manufacturing companies. The background of this research is based on the company's need to integrate business processes digitally, as well as the lack of empirical studies that directly measure the impact of ERP implementation on work efficiency. The method used is a quantitative approach through a survey of 46 respondents from four manufacturing companies. Data was collected using a questionnaire measuring five dimensions of ERP implementation: module integration, user training, ease of access, system reliability, and management support. The results showed that ERP implementation was in the high category (mean score 4.12) and had a positive impact on operational efficiency (mean score 4.08). Pearson correlation test showed a significant positive relationship between the level of ERP implementation and operational efficiency ($r = 0.648$, $p < 0.001$), while simple linear regression test showed that ERP contributed to 42% of the variation in operational efficiency ($R^2 = 0.420$). Nonetheless, non-technical barriers such as resistance to change, digital literacy gaps, and lack of advanced training were also found. The findings confirm that successful ERP implementation does not only depend on technological readiness, but also requires managerial support and overall organizational readiness.

Keywords: Accounting Information System, ERP, Operational Efficiency

JEL Classification: M15, M41, L60

1. Introduction

In the era of rapid digital transformation, the development of information technology has brought fundamental changes in various aspects of business operations, including in the management of the Company's financial and operational data (Zhang et al., 2023). Technology not only acts as a tool, but also becomes the main foundation in creating an integrated and efficient system (Qin et al., 2025). In the manufacturing sector, the complexity of business processes demands accounting data management that is not only accurate, but also fast and relevant to support strategic decision making (Emmanuel Osamuyimen Eboigbe et al., 2023; Mallikarjuna Paramesha et al., 2024; Ren, 2022). However, the reality is that many companies still face challenges in maintaining the efficiency and accuracy of accounting data processing, especially when the systems used are fragmented and manual (Vukman et al., 2024). In this context, the Accounting Information System (AIS) plays a strategic role as the main instrument for integrating financial and operational information, and providing reliable data for management (Qatawneh, 2022; Rasyid et al., 2024; Yoshikuni et al., 2023). A well-designed AIS can improve the quality of information available to decision makers, allowing companies to respond to market dynamics in a more adaptive and timely manner.

Along with the increasing need for integrated and adaptive systems, many manufacturing companies have begun to adopt Enterprise Resource Planning (ERP) systems as a strategic solution in dealing with operational complexity in the era of digitalization (Feng & Ali, 2024; Mandava,



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2024; Mhaskey, 2024). ERP is an information technology-based management system that integrates various key functions in an organization, such as accounting, production, distribution, and human resource management, into a unified platform (Khang, 2024; Wahdana & Soetjipto, 2025). ERP implementation is believed to be able to reduce data fragmentation, avoid duplication of information, and accelerate the flow of information between departments (Maruf, 2025). Theoretically, ERP offers significant benefits in terms of business process efficiency, improved cross-functional coordination, and simplification of previously siloed workflows (Mgbame et al., 2022). In the context of manufacturing companies that have complex production processes and high transaction volumes, ERP is an important tool to create operational efficiency while increasing the company's competitiveness through real-time and accurate data-based decision making.

Although ERP implementation offers a wide range of potential benefits, the realization of its effectiveness in improving operational efficiency does not always go as expected. Many companies face various challenges in the ERP implementation process, both from a technical and non-technical perspective (Hong & Bin Shibghatullah, 2024). Technically, ERP systems require adequate infrastructure and complex integration between modules, which if not managed properly can lead to data mismatches and operational disruptions (Rîndaşu et al., 2024). On the other hand, human resource factors such as lack of training, resistance to change, and low user readiness in operating new systems are often the main obstacles in ERP optimization (Al-Amin et al., 2023; Azouri et al., 2022). In addition, organizational adaptation to ERP systems requires changes in work culture and process flow that are not always easy to do (Akrong et al., 2022; Martins & Santos, 2021; Szelągowski et al., 2022). In the midst of these challenges, evaluative studies that specifically measure the effectiveness of ERP within the framework of Accounting Information Systems (AIS), especially in manufacturing companies, are still relatively limited (Vo Van et al., 2024). In fact, the evaluation is very important to determine the extent to which ERP really contributes to operational efficiency through improving the quality of accounting information produced.

Although ERP implementation is increasingly widespread in various industrial sectors, studies that specifically examine the effectiveness of ERP-based Accounting Information Systems (AIS) in improving the operational efficiency of manufacturing companies are still relatively limited. Most studies emphasize more on the technical aspects or general benefits of ERP without linking it directly with the accounting information system at the heart of managing the company's financial and operational data. As a result, there is still a knowledge gap regarding how much ERP contributes to real business process efficiency in a manufacturing context that has complex and dynamic operational characteristics. Therefore, an empirical data-based evaluative approach is needed that is able to concretely measure the impact of ERP implementation on operational efficiency, especially through performance indicators relevant to the accounting function. This kind of research will not only strengthen academic understanding of ERP and AIS integration, but also provide practical input for companies in optimizing the use of ERP more effectively and contextually.

Based on the background and research gaps that have been identified, this study aims to analyze the effectiveness of ERP-based accounting information system implementation in improving the operational efficiency of manufacturing companies. This research will assess the extent to which ERP integration in the AIS framework is able to optimize business processes, reduce inefficiencies, and improve the accuracy and speed of financial information needed in decision making. In addition, this study also aims to formulate strategic recommendations based on empirical findings, to assist companies in designing, implementing, and managing ERP systems more optimally. Thus, the results of this study are expected to not only provide academic contributions, but also offer practical solutions for the manufacturing industry that is adopting or evaluating ERP implementation.

This research has important significance, both from a practical and academic perspective. Practically, the results of this study are expected to make a real contribution to the management of manufacturing companies in managing the digital transformation process, especially in terms of selecting, implementing, and evaluating ERP-based accounting information systems. The resulting findings can be the basis for making more informed decisions in designing ERP implementation strategies that are aligned with the operational needs and characteristics of the company. Meanwhile, from the academic side, this research aims to enrich the limited literature on the relationship between ERP integration and accounting system efficiency in the manufacturing sector. By promoting a data-driven approach and specific industry context, this study is also expected to open new discussion spaces and become a reference for further research in the field of accounting information systems and operational management.

2. Method, Data, and Analysis

This study uses a quantitative approach with an associative research type to analyze the effectiveness of ERP-based accounting information system implementation in improving

operational efficiency in manufacturing companies. This approach was chosen because it is considered the most relevant to measure the relationship between the level of ERP implementation and the level of operational efficiency objectively and measurably. Data were collected through distributing questionnaires to respondents from the accounting, information technology, and operational divisions in several manufacturing companies that have implemented ERP systems. The questionnaire instrument was designed using a five-point Likert scale to measure respondents' perceptions of the variables studied. Furthermore, the data obtained will be analyzed using descriptive and inferential statistical analysis techniques, including validity, reliability, and linear regression analysis to determine the effect of ERP implementation on operational efficiency. This approach is expected to provide a strong empirical picture of the effectiveness of ERP integration in supporting the accounting information system of manufacturing companies.

Table 1. Description of Research Respondents

No	Categories	Sub-categories	Frequency (n)	Percentage (%)
1	Gender	Male	28	60,9%
		Female	18	39,1%
2	Age	< 25 years	10	21,7%
		25 – 34 years	21	45,7%
		35 – 44 years	12	26,1%
		≥ 45 years	3	6,5%
3	Last Education	SMA/SMK	4	8,7%
		Diploma (D3)	6	13,0%
		Sarjana (S1)	30	65,2%
		Pascasarjana (S2/S3)	6	13,0%
4	Length of Service	< 1 year	5	10,9%
		1–3 years	14	30,4%
		4–6 years	17	37,0%
		> 6 years	10	21,7%
5	Divisi	Akuntansi	20	43,5%
		Information Technology (IT)	10	21,7%
		Operations/Production	16	34,8%

3. Results

Tingkat Implementasi ERP Berbasis SIA

The results of the analysis of questionnaire data obtained from 46 respondents spread across four manufacturing companies show that the level of implementation of the Enterprise Resource Planning (ERP) system based on the Accounting Information System (AIS) is in the high category, with an overall average score of 4.12 from a Likert scale of 1 to 5. The assessment is carried out based on five main dimensions, namely module integration, user training, ease of access, system reliability, and management support. The module integration dimension scored the highest with an average score of 4.32, reflecting that the ERP system has successfully integrated various core company functions such as accounting, production, inventory, and sales effectively. This facilitates inter-divisional data exchange and reduces duplication of records. Management support occupies the second position with a score of 4.15, indicating that management provides strong commitment and attention in supporting ERP implementation, both in terms of policies and provision of resources.

Furthermore, user training obtained an average score of 4.10, indicating that most users felt they had been given adequate training to operate the system. However, there were still some respondents who stated that the training had not fully addressed their practical needs in the field. On the system reliability dimension, the average score obtained was 4.08, indicating that the system generally runs stably and reliably, although there are still some technical problems such as delays in data processing during peak hours. Finally, the ease of access dimension obtained the lowest score of 3.95, although it is still classified as high. This shows that some users face obstacles in accessing the system, such as device limitations, network disruptions, or a system interface that is considered not user-friendly enough. Overall, these results illustrate that ERP implementation in the context of accounting information systems has gone well and has a positive impact on the company's business processes, especially in improving data integration and financial reporting efficiency.

Table 2. Average Score of ERP Implementation Level Based on Five Dimensions

No	Assessment Dimension	Average Score	Categories
1	Module Integration	4,32	Very High
2	Management Support	4,15	High
3	User Training	4,10	High
4	System Reliability	4,08	High

5	Ease of Access	3,95	High
Average Total		4,12	High

The level of implementation of AIS-based ERP has shown positive performance and has an impact on the smooth running of the financial information system. The dimension of system integration is the main strength, while the accessibility aspect still requires further improvement so that the ERP system can be optimized thoroughly by all levels of users.

Description of Operational Efficiency

The results of data analysis show that the operational efficiency of manufacturing companies has increased positively after the implementation of ERP systems based on Accounting Information Systems (AIS). The average operational efficiency score perceived by respondents was in the high category, which amounted to 4.08 on a Likert scale of 1-5. Efficiency measurement is based on four main indicators, namely report processing speed, reduction of input errors, work time efficiency, and operational cost savings. The report process speed dimension obtained the highest average score of 4.20, indicating that ERP is able to speed up the process of creating and distributing financial reports automatically and in real-time, compared to the manual process that previously took longer.

The reduction of input errors also showed good results with an average score of 4.10, reflecting that the ERP system is able to minimize transaction recording errors through automatic validation and data integration. The work time efficiency indicator scored 4.05, indicating that the use of ERP has reduced the time needed to complete routine tasks, such as data entry and periodic reporting. Meanwhile, operational cost savings scored 3.98, which although high, reflects the perception that the financial benefits of ERP have not been felt directly by all respondents, especially in the short term. In addition to the current assessment, respondents were also asked to provide historical perceptions related to operational efficiency conditions before ERP implementation. The average operational efficiency score before ERP implementation was recorded at 3.25, which is classified as moderate. This comparison indicates a significant improvement post-implementation, with a difference in average score of 0.83 points, indicating that ERP contributes significantly to improving business process efficiency in manufacturing companies.

Table 3. Average Operational Efficiency Score Post ERP Implementation

No	Operational Efficiency Indicators	Average Before ERP	Average After ERP	Score Difference	Category After ERP
1	Report Processing Speed	3,20	4,20	+1,00	Very High
2	Input Error Reduction	3,35	4,10	+0,75	High
3	Work Time Efficiency	3,30	4,05	+0,75	High
4	Operational Cost Savings	3,15	3,98	+0,83	High
Average Total Efficiency		3,25	4,08	+0,83	High

The implementation of SIA-based ERP has proven to have a positive impact on operational efficiency, especially in terms of accelerating the reporting process and reducing data errors. Although the cost savings have not been fully felt significantly in the short term, increased time efficiency and data accuracy are the main achievements of this system.

Statistics Test

Before analyzing the relationship between variables, first the validity and reliability tests were carried out on the research instruments to ensure that the statement items in the questionnaire could measure the variables accurately and consistently. The validity test was carried out using the Pearson Product Moment correlation technique between the score of each item and the total variable score. The test results show that all items on the ERP Implementation and Operational Efficiency variables have a correlation coefficient (r) value above 0.30 and significance $p < 0.05$, so they are declared valid. Furthermore, the reliability test was carried out using the Cronbach's Alpha method. The test results show an α value of 0.887 for the ERP implementation variable and 0.872 for the operational efficiency variable. The value is above the 0.70 threshold, so both instruments are declared to have high reliability and are suitable for use in further research.

Table 4. Instrument Validity and Reliability Test Results

Variable	Number of Statement Items	Item-Total Correlation Range (r)	Validitas Status	Cronbach's Alpha	Reliability Status
ERP implementation	10	0,532 – 0,802	Valid	0,887	Reliable
Operational Efficiency	8	0,498 – 0,778	Valid	0,872	Reliable

After the instrument was declared valid and reliable, a Pearson correlation test was conducted to test the relationship between the variable level of AIS-based ERP implementation and operational efficiency. The correlation test results show a correlation coefficient (r) of 0.648 with a significance level (p-value) of 0.000 ($p < 0.05$). This indicates that there is a strong, positive, and significant relationship between the two variables. This means that the higher the level of ERP implementation, the higher the operational efficiency felt by the company. This relationship shows that the ERP system has an important contribution in improving the effectiveness of work processes, reducing errors, and accelerating financial reports.

Table 5. Pearson Correlation Test Results

Variable X (ERP)	Variable Y (Efficiency)	Correlation Coefficient (r)	Significance (p)	Interpreting
ERP Implementation Level	Operational Efficiency	0,648	0,000	Strong, Positive, Significant

To determine the direct effect of ERP implementation level on operational efficiency, a simple linear regression test was conducted. The analysis results show that the ERP implementation variable has a significant effect on operational efficiency, with a regression coefficient (β) of 0.617 and a significance value (p-value) of 0.000, which means it is significant at the 95% confidence level. The coefficient of determination (R^2) value is 0.420, which indicates that 42% of the variation in operational efficiency can be explained by the ERP implementation variable, while the rest is influenced by other factors outside the model. This result confirms that success in implementing ERP systems has a major contribution to improving business process efficiency in manufacturing companies.

Table 6. Simple Linear Regression Test Results

Model	Regression Coefficient (β)	Significance (p)	R ²	Interpreting
ERP → Operational Efficiency	0,617	0,000	0,420	ERP implementation explains 42% of the variation in operational efficiency (significant)

4. Discussion

Although the results show that the implementation of ERP systems based on Accounting Information Systems (AIS) has a positive and significant effect on increasing operational efficiency, a number of non-technical barriers that affect the optimization of system utilization in manufacturing companies were also found. These findings were obtained through analysis of respondents' open-ended comments, as well as field observations of the dynamics of ERP usage in various divisions. One of the main barriers identified was resistance to change. A number of respondents, especially from among senior staff in the operations and finance divisions, stated that they are still more accustomed and comfortable using conventional manual or spreadsheet systems, which are considered more flexible although less efficient. This discomfort has resulted in a slow adaptation process, low participation in training, and a lack of initiative to fully explore ERP features.

The next barrier is the digital literacy gap between users. Differences in the level of technological understanding, especially between users from older generations and digital natives, created challenges in the system adoption process. Some staff had difficulty understanding the ERP user interface, as well as experiencing confusion in navigating the integrated modules, leading to dependency on the IT team in performing basic functions. In addition, there are problems in the aspects of communication and coordination across divisions, where not all work units understand their respective roles in an integrated ERP system. This lack of understanding causes the information generated by the system to not always be maximally used for cross-departmental decision-making. For example, inventory data generated by the system has not been fully utilized by the production department in material planning because a strong data sharing culture has not been formed between divisions.

Another factor is the lack of follow-up training and periodic evaluation sessions. Although most respondents stated that they had participated in initial training when the system was implemented, many felt that they lacked ongoing assistance in overcoming daily operational obstacles. One-way and decontextualized training is also considered ineffective for users who have specific technical needs based on their respective roles in the organization. These findings reinforce the view that successful ERP implementation does not only depend on technological readiness and system sophistication, but also requires a holistic managerial and cultural approach. It requires transformational leadership that is able to build collective awareness of the importance of digital

transformation, accompanied by internal policies that encourage increased competence, active participation, and collaboration between sections. Without structured managerial interventions on these non-technical dimensions, the potential of ERP systems in supporting operational efficiency and corporate competitive advantage will not be maximized.

Based on the results of quantitative analysis and field findings, it can be concluded that the implementation of ERP based on Accounting Information System (AIS) is proven effective in improving the operational efficiency of manufacturing companies. This is reflected in the increase in operational efficiency scores after ERP implementation, with an average difference of 0.83 points on the Likert scale, as well as a positive and significant correlation ($r = 0.648$; $p < 0.001$) between the level of ERP implementation and operational efficiency. The ERP system is proven to be able to speed up the reporting process, minimize recording errors, save work time, and support operational cost control through data integration and more structured processes.

The factors that contributed most to the efficiency improvement included integration between modules, managerial support, and user training. Module integration is a key foundation as it enables real-time data flow between accounting, production, and logistics functions, thus accelerating accurate data-based decision-making. Management support also plays an important role, not only in the form of budget allocations and policies, but also in encouraging a system-based work culture. In addition, effective training helps users understand and operate the system with more confidence, although in practice there is still a need for more contextualized advanced training. However, this study also found a gap between system planning and realization in the field, especially in non-technical aspects. Although technically the ERP system has been implemented well, obstacles such as resistance to change, differences in digital capabilities between employees, and suboptimal coordination between divisions hinder the maximum utilization of the system. This gap shows that the success of ERP implementation cannot depend on technological sophistication alone, but also requires organizational readiness in managerial aspects, work culture, and continuous human resource capacity building.

5. Conclusion, Limitations, and Suggestions

Conclusion

This study shows that the implementation of accounting information systems based on Enterprise Resource Planning (ERP) is proven to have a significant and positive influence on increasing operational efficiency in manufacturing companies. Based on the results of quantitative analysis, there is a strong relationship between the level of ERP implementation and operational efficiency, with a contribution of 42% to the variation in efficiency measured through accelerated reporting, reduced input errors, work time efficiency, and cost savings. Key factors supporting the effectiveness of the system include good module integration, active support from management, and the availability of initial training for users. However, this study also revealed a gap between the implementation design and the reality on the ground, mainly stemming from non-technical barriers such as resistance to change, limited digital literacy, and lack of cross-functional synergy in optimally utilizing the system. Thus, the success of ERP is not only determined by technological readiness, but also highly dependent on organizational readiness in the aspects of human resources, internal communication, and adaptive culture towards digital transformation.

Limitations and suggestions

This study has several limitations that need to be observed in interpreting the results and their implications. First, this research was only conducted in a number of manufacturing companies with a quantitative approach based on respondents' perceptions, so the results may not necessarily be generalizable to other industrial sectors or to companies with different scale and complexity of ERP systems. Second, although the variables of ERP implementation and operational efficiency have been statistically tested, this approach has not fully captured qualitative dynamics such as the adoption process, interdivisional communication challenges, and organizational culture factors that also affect the success of system implementation. Third, the data obtained is cross-sectional, so it cannot provide a longitudinal picture of changes in operational efficiency in the long term after the ERP system is implemented.

Based on these limitations, it is recommended that future research use mixed methods by adding in-depth interviews or case studies to explore non-technical aspects that cannot be measured quantitatively. In addition, it is necessary to conduct comparative studies between industrial sectors or between types of ERP used, in order to gain a broader understanding of the success factors and barriers to system implementation. Longitudinal research is also recommended to monitor the impact of ERP implementation on operational performance continuously over time.

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