

The Application of Enterprise Resource Planning (ERP) to the Performance of Manufacturing Companies Case Study at PT XYZ

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ABSTRAK

This study aims to analyze the effect of Enterprise Resource Planning (ERP) implementation on the financial performance of PT XYZ. The background of this research is based on the importance of integrated information systems in improving operational effectiveness in manufacturing companies. The research method used is a quantitative descriptive method using the company's Return on Assets (ROA) data for the 2016–2024 period. The data were analyzed using descriptive statistics, average analysis, annual growth analysis, and trend analysis before and after ERP implementation. The results showed that ERP implementation had a positive effect on the company's financial performance. The average ROA after ERP implementation increased by 1.04% compared to the period before implementation. In addition, ERP improved asset management effectiveness, interdepartmental data integration, and operational efficiency within the company.



1. Introduction

Manufacturing companies in the digital age face the demands to improve operational efficiency and competitiveness through the use of integrated information technology [1]. One of the most widely adopted solutions is the Enterprise Resource Planning (ERP) system, which integrates various business functions such as production, logistics, finance, and human resources in one unified platform [2]. ERP implementation is believed to be able to improve information quality and accelerate data-driven decision-making, so it has the potential to encourage improvement in overall company performance [3].

A number of studies have examined the influence of ERP on company performance with mixed results [4]. One study found that the implementation of ERP has a positive effect on the efficiency of resource management and supports the improvement of organizational performance [5]. Other research has also shown that ERP contributes to improved financial performance and company value through better information integration [6]. However, a different result is shown by one study, which states that although ERP is able to improve operational efficiency, its impact on profitability is not significant in the short term [7]. The limitations of this study generally lie in the lack of longitudinal data-based analysis and have not taken into account the dynamics of changes in financial performance before and after the implementation of ERP, especially in the automotive manufacturing sector [8].

Based on these different findings, there is a research gap that shows that the effectiveness of ERP on financial performance still needs to be further tested with a more contextual and historical data-based approach [9]. This study proposes a descriptive quantitative approach with trend analysis and comparison of Return on Assets (ROA) before and after ERP implementation as an indicator of the company's financial performance [10]. This approach was chosen because it was able to provide an empirical picture of performance

changes in a sustainable manner and overcome the limitations of previous research that tended to use a cross-sectional approach [11].

Research was conducted on PT XYZ as one of the largest automotive manufacturing companies in Indonesia that has implemented ERP in its operations. The focus of this study is to analyze the influence of ERP implementation on the company's financial performance and identify the factors that affect its contribution. Thus, this study is expected to provide more comprehensive empirical evidence on the effectiveness of ERP in improving the performance of manufacturing companies, as well as a reference for future research in the development of historical data-based analysis methods.

2. Research Methods

This study uses a quantitative approach with an analytical descriptive design to examine the effect of the implementation of Enterprise Resource Planning (ERP) on the financial performance of manufacturing companies [12]. Conceptually, ERP is positioned as an independent variable that represents an integrated information system in the company, while financial performance as a dependent variable is measured using the Return on Assets (ROA) indicator. The selection of ROA is based on its ability to reflect the company's efficiency in utilizing assets to generate profits, making it relevant to assess the impact of ERP system implementation on the company's financial performance [13].

$$ROA = \frac{\text{Net Profit}}{\text{Total Assets}} \quad (1)$$

The analysis model used in this study is a simple linear regression to measure the relationship and influence between ERP variables on ROA, which is expressed in the following equation :

$$Y = \alpha + \beta X + \epsilon \quad (2)$$

Where Y is financial performance (ROA), X is the ERP variable expressed in dummy form (0 = before ERP implementation, 1 = after ERP

implementation), α is constant, β is the regression coefficient, and ϵ is the error term. This approach was chosen to quantitatively examine the statistical association between ERP implementation and financial performance and to complement the descriptive analysis of ROA before and after ERP implementation [14].

The research was carried out at the automotive manufacturing company PT XYZ during the period from February to May 2025 using historical data from the annual financial statements for the period 2016–2024 as an object of observation. The subject of the study is in the form of secondary data that includes the company's net profit and total assets, as well as ERP implementation information. The sampling technique was carried out by purposive sampling with the criteria of complete, relevant, and consistently available financial data during the research period.

Data collection is carried out through documentation studies of the company's financial statements, direct observation during field work practices to obtain information on ERP implementation, and literature studies from relevant journals and scientific literature. The data obtained were analyzed using descriptive statistics to describe ROA trends before and after ERP implementation, followed by inferential analysis using simple linear regression to examine the statistical association between ERP implementation and the company's financial performance.

The analysis procedure begins with grouping data into periods before and after ERP implementation, followed by the calculation of the ROA value each year, trend analysis using graphs, and testing of relationships and influences between variables using regression models. The results of the analysis are then interpreted systematically by referring to previous theories and research, while considering the statistical significance and limitations of the regression model.

3. Results and Discussions

a. Presentation of Research Data

This study aims to analyze the influence of the implementation of Enterprise Resource Planning (ERP) on the company's financial

performance in PT XYZ. Financial performance measurement is carried out using the Return on Assets (ROA) indicator because this ratio is able to describe the company's ability to utilize its assets to generate profits. The higher the ROA value, the better the company's level of efficiency in managing its assets.

Research data was obtained from the company's financial statements for the period 2016–2024. In addition, field observations during field work practice activities are used to identify the ERP implementation time in the company. Based on the results of observations, the ERP system began to be actively implemented in 2018. Therefore, the research period is divided into two groups, namely the period before the implementation of ERP (2016–2017) and the period after the implementation of ERP (2018–2024).

The data presentation was carried out to provide an initial overview of the development of the company's ROA value before and after ERP implementation. The data is presented in Table 1 below.

Table 1. PT XYZ ROA Data Year 2016–2024

Year	ERP Implementation	ROA
2016	0	0,0660
2017	0	0,0665
2018	1	0,0670
2019	1	0,0675
2020	1	0,0655
2021	1	0,0668
2022	1	0,0673
2023	1	0,0667
2024	1	0,0678

A value of "0" indicates that an Enterprise Resource Planning (ERP) system has not been implemented, while a value of "1" indicates that an ERP system has been implemented in the company. Based on Table 1, it can be seen that ERP implementation began in 2018. Before the implementation of ERP, the company's Return on Assets (ROA) value was in the range of 0.0660 to 0.0665 which indicates that the company's financial performance is relatively stable. After the ERP implementation is carried out, the company's ROA value shows a

tendency to increase even though it still fluctuates in certain periods. This condition indicates that ERP implementation is starting to contribute to increasing the effectiveness of the company's asset management. To provide a clearer picture of the company's ROA development during the research period, the data is then presented again in the form of a trend graph.

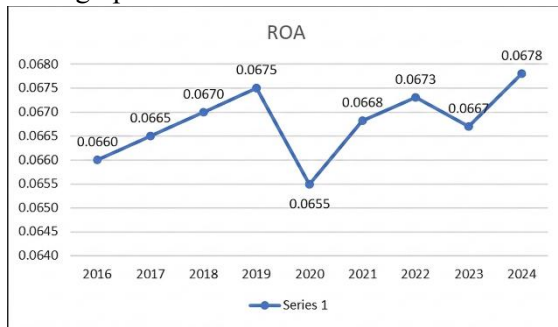


Figure 1. Trend Chart of Return on Assets (ROA) PT XYZ Year 2016–2024

Based on Figure 1, it can be seen that the company's ROA value has a tendency to increase after the implementation of ERP in 2018. Prior to the implementation of ERP, the ROA value was relatively stable in the range of 0.0660 to 0.0665. After ERP was implemented, the ROA value gradually increased until it reached 0.0675 in 2019.

In 2020, there was a decrease in ROA to 0.0655 due to the impact of the COVID-19 pandemic on the automotive manufacturing sector. However, the company was able to increase the ROA value again in the following period until it reached the highest value of 0.0678 in 2024.

The trend of increasing ROA shows that ERP implementation helps companies improve the effectiveness of asset management through the integration of business processes, inventory control, and the provision of faster and more accurate information to support management decision-making.

b. Descriptive Statistical Analysis

Descriptive statistical analysis was carried out to provide an overview of the characteristics of the research data. Descriptive statistics are used to determine the mean, minimum, maximum value, and standard deviation of the company's ROA before and after ERP

implementation. The results of descriptive statistical data processing are presented in Table 2 below.

Table 2. Descriptive Statistics of ROA

Variable	N	Minimum	Maximum	Mean	Std. Deviation
ROA Before ERP	2	0,0660	0,0665	0,06625	0,00035
ROA After ERP	7	0,0655	0,0678	0,06694	0,00075

Based on Table 2, it can be seen that the average ROA after ERP implementation is higher than before ERP implementation. The average ROA value before ERP was 0.06625, while after ERP implementation increased to 0.06694.

The maximum ROA value after ERP implementation reached 0.0678, higher than before ERP implementation which was only 0.0665. This shows that the company has increased its ability to generate profits through the use of company assets.

In addition, the standard deviation value after ERP implementation is still at a relatively small level, indicating that the fluctuations in the company's ROA tend to be stable. This condition indicates that ERP implementation not only helps improve the company's performance, but also helps maintain the stability of the company's financial performance in the medium and long term.

c. Average ROA Analysis Before and After ERP Implementation

The average analysis was carried out to determine changes in the level of the company's financial performance before and after the implementation of ERP. The calculation of the average ROA before ERP was carried out using data from 2016–2017, while the average after ERP used data from 2018–2024.

The calculation of the average ROA before ERP implementation is as follows:

$$\bar{X} = \frac{0.0660 + 0.0665}{2} = 0.06625$$

Meanwhile, the average ROA after ERP implementation is calculated as follows:

$$\bar{X} = \frac{0.0670 + 0.0675 + 0.0655 + 0.0668 + 0.0673 + 0.0667 + 0.0678}{7}$$

$$\bar{X} = 0.06625$$

Based on the results of these calculations, an average increase in ROA was obtained as follows:

$$\bar{X} = 0.06694 - 0.06625 = 0.00069$$

If converted into percentages, then the increase is:

$$\frac{0.00069}{0.06625} \times 100\% = 1.04\%$$

The increase of 1.04% shows that ERP implementation has a positive impact on the effectiveness of the company's asset management. Although the increase is relatively small, it descriptively shows a tendency to improve financial performance after ERP implementation is implemented.

This improvement can be explained through the ability of ERP to integrate various business activities of the company, such as production planning, inventory management, purchasing, warehouse, and finance into one integrated system. The integration allows companies to reduce information delays, improve data accuracy, and speed up the managerial decision-making process.

d. Simple Linear Regression Analysis

Simple linear regression analysis was conducted to examine the statistical association between Enterprise Resource Planning (ERP) implementation and the financial performance of PT XYZ, as measured by Return on Assets (ROA). The ERP implementation variable was represented by a dummy variable, with a value of 0 for the period before ERP implementation (2016–2017) and 1 for the period after ERP implementation (2018–2024). The results of the simple linear regression analysis are presented in Table 4.

Variable	Coefficient	t-Statistic	Prob.
C	0.06625	133.222.448	0
ERP Implementation	0.000693	1.228.748	0.2589

- 1) R-squared: 0.177421
- 2) Adjusted R-squared: 0.059910
- 3) F-statistic: 1.509823
- 4) Prob(F-statistic): 0.258868

Based on Table 4, the constant value of 0.066250 indicates that the estimated ROA before ERP implementation, represented by the dummy value of 0, was 0.066250. The ERP implementation coefficient of 0.000693 indicates that the estimated ROA after ERP implementation was higher by approximately 0.000693 compared with the period before ERP implementation. However, the coefficient is not statistically significant, as indicated by the t-statistic of 1.228748 and probability value of 0.258868, which is greater than the 5% significance level.

The coefficient of determination (R-squared) of 0.177421 indicates that the ERP implementation variable explains approximately 17.74% of the variation in ROA within the observed data, while the remaining 82.26% is associated with other factors that are not included in the model. The adjusted R-squared value of 0.059910 indicates that the explanatory power of the model decreases after considering the number of predictors and the limited number of observations.

The F-statistic of 1.509823 with a probability value of 0.258868 also indicates that the regression model is not statistically significant at the 5% significance level. Therefore, the regression results provide descriptive evidence of a positive difference in the estimated ROA after ERP implementation, but they do not provide sufficient statistical evidence to conclude that ERP implementation significantly explains changes in ROA in the observed period.

e. ROA Annual Growth Analysis

To strengthen the results of the research, an analysis of the annual growth of ROA was carried out to determine the pattern of changes in the company's performance from year to year.

Table 3. Annual Growth of ROA

Year	ROA	Growth
2017	0,0665	0,76%
2018	0,0670	0,75%
2019	0,0675	0,74%
2020	0,0655	-2,96%
2021	0,0668	1,98%
2022	0,0673	0,75%
2023	0,0667	-0,89%
2024	0,0678	1,65%

Based on Table 3, it can be seen that the company experienced positive ROA growth in most of the period after ERP implementation. The largest decline occurred in 2020 due to the COVID-19 pandemic which had an impact on the automotive industry globally.

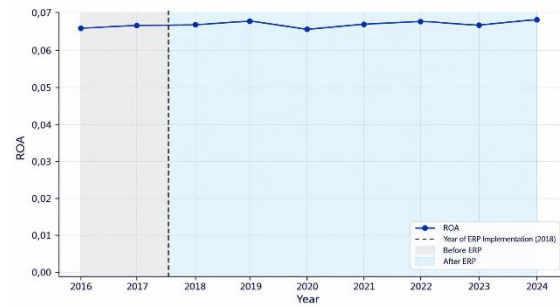
Nevertheless, the company was able to increase its ROA again in the following period. This shows that ERP systems help companies maintain operational effectiveness and accelerate the process of recovering company performance after external disruptions.

The increase in ROA in the 2021–2024 period shows that companies are able to adapt to post-pandemic business conditions. ERP helps companies improve operational flexibility through real-time data integration so that decision-making processes can be done faster and more accurately.

f. Visualization of ROA Trends Before and After ERP Implementation

To clarify changes in the company's financial performance before and after ERP implementation, a visualization of ROA trends based on the research period was conducted. This visualization is used to see the pattern of changes in ROA values more clearly and identify trends in the improvement or decrease of the company's performance after ERP implementation.

Based on Figure 2, it can be seen that the company's ROA value shows a tendency to increase after the implementation of ERP in 2018. Before ERP was implemented, the company's ROA value was relatively stable with limited improvements. After ERP implementation, companies began to show more consistent improvement in financial performance.

**Figure 2.** ROA Trend Chart After ERP Implementation

The increase in ROA in the post-ERP implementation period shows that ERP systems help companies improve operational efficiency and the effectiveness of enterprise asset management. Data integration across departments allows companies to speed up business processes, improve information accuracy, and support decision-making more effectively.

In 2020, there was a decrease in the value of ROA due to the impact of the COVID-19 pandemic on the global automotive industry. However, the company was able to increase the value of ROA again in the following period. These conditions show that ERP systems help companies increase operational flexibility and business resilience in the face of changing external conditions.

Overall, the trend of ROA after ERP implementation shows a more stable pattern and tends to increase. This indicates that ERP implementation makes a positive contribution to the company's financial performance in the medium and long term.

g. Interpretation of Research Results

The results of the analysis show that the average ROA of PT XYZ increased from 0.06625 before ERP implementation to 0.06694 after ERP implementation. This represents an increase of approximately 1.04% in relative terms. Descriptively, this difference indicates an improvement in the company's ROA after the implementation of ERP.

However, the results of the simple linear regression provide a more cautious interpretation. The ERP implementation coefficient is 0.000693, indicating a positive estimated difference in ROA between the

period before and after ERP implementation. Nevertheless, the coefficient is not statistically significant, with a t-statistic of 1.228748 and a probability value of 0.258868. Since the probability value is greater than the 5% significance level, the regression results do not provide sufficient statistical evidence that ERP implementation significantly explains changes in the company's ROA during the observation period.

The R-squared value of 0.177421 indicates that ERP implementation accounts for approximately 17.74% of the variation in ROA in the observed data. This relatively limited explanatory power suggests that changes in the company's financial performance may also be associated with other factors that are not included in the model. Therefore, the increase in ROA observed after ERP implementation should not be interpreted solely as the result of ERP implementation.

From an operational perspective, ERP may support the integration of business activities such as production planning, inventory management, purchasing, warehouse management, and finance. The integration of these activities can facilitate information sharing, improve data availability, and support managerial decision-making. However, the present study does not statistically establish that these operational benefits directly caused the observed increase in ROA.

The decline in ROA in 2020 also indicates that the company's financial performance was affected by external conditions. The COVID-19 pandemic had a substantial impact on economic and industrial activities during this period. Although ROA increased again in subsequent years, the recovery cannot be attributed solely to ERP implementation because other internal and external factors may also have contributed to the changes in financial performance.

The findings of this study are partially consistent with previous research showing that ERP implementation can support operational efficiency and organizational performance [15]. However, the current regression results indicate that the statistical association between ERP implementation and ROA is not significant in the observed data [16]. This difference may be related to the research design, the limited

number of observations, the use of a single financial performance indicator, and the presence of other factors affecting company performance.

Overall, the results indicate that PT XYZ experienced a descriptive increase in ROA following ERP implementation, but the regression analysis does not provide sufficient statistical evidence to establish a significant association between ERP implementation and ROA. Therefore, the findings should be interpreted as empirical evidence of changes in financial performance before and after ERP implementation rather than as definitive evidence of a causal effect of ERP on financial performance.

4. Conclusions and Recommendations

Based on the results of the study, the implementation of Enterprise Resource Planning (ERP) at PT XYZ has a positive influence on the company's financial performance as measured using Return on Assets (ROA). This is shown by the increase in the average ROA after ERP implementation from 0.06625 to 0.06694 or an increase of 1.04%. ERP implementation helps companies improve the effectiveness of asset management through data integration between departments, better inventory control, increased information accuracy, and accelerated decision-making processes. In addition, ERP also helps companies maintain operational stability and business resilience despite external conditions such as the COVID-19 pandemic. Thus, the purpose of the study to analyze the influence of ERP implementation on the company's financial performance has been achieved.

Based on the results of the study, companies are advised to continue to optimize ERP implementation through increasing system integration, technology updates, and developing human resource competencies so that the company's operational effectiveness can continue to increase. In addition, further research is recommended to use more diverse financial variables and more in-depth statistical analysis methods so that the research results are more comprehensive and have a stronger level of validity. The next research can also develop

studies related to the influence of ERP on non-financial aspects of the company, such as work productivity, supply chain effectiveness, and production process efficiency.

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