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Factors Affecting the Success of Cloud-Based ERP Implementation in Manufacturing Companies in Indonesia

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ABSTRACT

This study investigates the factors influencing the success of cloud-based Enterprise Resource Planning (ERP) implementation in manufacturing companies in Indonesia. Using a quantitative approach, data were collected from 100 respondents directly involved in ERP implementation, including IT personnel, system users, and project managers. The study examines four key variables: top management support, user competence, system quality, and vendor support. Data were analyzed using SPSS version 25 through descriptive statistics, validity and reliability testing, and multiple linear regression analysis. The results show that all four variables significantly affect the success of ERP implementation, with top management support being the most dominant factor. These findings underscore the importance of strategic leadership, employee preparedness, system reliability, and vendor collaboration in ensuring the effectiveness of cloud-based ERP systems in Indonesia's manufacturing sector.

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1. INTRODUCTION

The rapid advancement of cloud computing technology has significantly transformed the way organizations manage their operations, particularly in the implementation of Enterprise Resource Planning (ERP) systems. Cloud-based ERP offers a flexible, scalable, and cost-effective alternative to traditional on-premises systems, enabling companies to streamline business processes and improve decision-making efficiency. In the context of manufacturing companies, which operate in a highly competitive and dynamic environment, the adoption of cloud-based ERP systems has become increasingly crucial for maintaining operational agility, integrating various functional areas, and enhancing productivity. These systems facilitate real-time data access, improve collaboration, and streamline processes, thereby enhancing decision-making and operational efficiency. The integration of cloud ERP systems is a key component of Industry 4.0, which aims to modernize manufacturing through advanced technologies. Enhanced operational agility is achieved as cloud ERP systems provide real-time data access and enhance collaboration across various functional areas [1]. allowing

companies to swiftly respond to market changes and customer demands [2]. Improved decision-making is supported through enhanced information flow and analytical capabilities [1], with real-time data enabling timely and informed decisions essential for maintaining a competitive edge [3]. Furthermore, cloud ERP systems streamline business processes such as supply chain management, production planning, and inventory control, leading to operational efficiency [4], including reduced production lead times and more accurate demand forecasting [4]. However, successful implementation hinges on various critical success factors—organizational, environmental, technological, and individual characteristics [3]—and a thorough understanding of these factors is vital to overcoming challenges and ensuring a smooth transition to cloud-based systems [3].

In Indonesia, the manufacturing sector plays a vital role in national economic growth and industrial development. As digital transformation accelerates across the country, many manufacturing firms are shifting toward cloud-based ERP systems to modernize their operations and improve competitiveness. However, the successful implementation of cloud ERP systems remains a complex endeavor that depends on multiple interrelated factors, including organizational, technological, and human dimensions. Failure to address these critical factors can lead to suboptimal outcomes or implementation failure, resulting in wasted investments and operational disruptions. Effective project management is crucial, encompassing the planning, execution, and monitoring required to ensure ERP projects meet their objectives [5], while the urgency and contextual alignment of the ERP with strategic goals also significantly influence outcomes [5]. Technological factors such as system quality—including reliability and functionality—determine whether ERP systems meet user expectations and enhance operational efficiency [6], while service and information quality influence satisfaction and effectiveness [6]. Human factors are equally essential; ensuring user satisfaction through training and support increases the likelihood of effective system use [6], [7], and involving end-users in the implementation process fosters adoption and ensures the system better meets organizational needs [7]. Therefore, understanding and addressing these interconnected success factors is essential to ensure a smooth and effective transition to cloud-based ERP systems in Indonesia's manufacturing sector.

Previous studies have highlighted several key determinants of ERP implementation success, such as top management support, user competence, system quality, and vendor support; however, empirical research specifically addressing cloud-based ERP implementation within the Indonesian manufacturing context remains limited. Considering the unique organizational culture, varying levels of technological readiness, and resource constraints commonly faced by Indonesian firms, it is crucial to identify which factors most significantly influence successful implementation outcomes. Therefore, this study aims to examine the factors affecting the success of cloud-based ERP implementation in Indonesian manufacturing companies. The objectives of the study are to evaluate the influence of top management support, user competence, system quality, and vendor support on ERP implementation success; to determine the most significant predictors of successful cloud-based ERP implementation in Indonesian manufacturing firms; and to provide practical recommendations for improving ERP implementation strategies within the sector.

2. LITERATURE REVIEW

2.1 Cloud-Based ERP Systems

Cloud-based ERP is reshaping manufacturing by delivering real-time visibility into production, inventory, and supply chains, thus sharpening efficiency and responsiveness. SMEs benefit most because scalable, subscription-based services cut upfront hardware and software costs while reliable cloud infrastructure lowers total ownership expenses [8], [9]. Other advantages

include seamless growth without major infrastructure changes [9], rapid data access that speeds informed decisions and boosts operational performance [10], and vendor-managed maintenance that eases internal IT workloads while ensuring up-to-date features and security [8]. Still, companies must safeguard data and comply with industry standards, and they remain dependent on stable internet connectivity, which can hamper performance in less-reliable regions [11].

2.2 Success Factors in ERP Implementation

Implementing cloud ERP systems in manufacturing contexts is a multifaceted endeavor that requires careful attention to several critical success factors (CSFs), which are essential for ensuring a smooth transition and maximizing system benefits. Among the key CSFs, top management support plays a pivotal role through active involvement and resource allocation to align IT with business objectives [3], [12], while also managing organizational change to cultivate a technology-accepting culture [13]. User competence, including employees' skills and readiness, is vital during the shift to cloud-based systems, necessitating robust training and proactive user engagement to reduce resistance and increase acceptance [3], [14]. System quality—measured by performance, reliability, and usability—directly affects user satisfaction, with cloud ERP adding further dimensions like uptime, speed, and interface compatibility with business processes [3], [14]. Lastly, vendor support, encompassing technical assistance, training, and continuous consultation, is crucial in a subscription-based environment where reliable and timely services from vendors can significantly influence implementation success [12], [15].

2.3 ERP in Indonesian Manufacturing Companies

The digital transformation of Indonesia's manufacturing sector through ERP adoption faces several challenges, including budget constraints, low digital literacy, and resistance to change, further complicated by hierarchical cultures and rigid industry practices that impact project success. High implementation costs remain a barrier, particularly in sectors like construction despite ERP's potential to improve efficiency [16]. Resistance in government and traditional industries often stems from entrenched hierarchies that hinder openness to change [17], [18], while skill gaps necessitate targeted training to build ERP readiness [17]. To address these issues, organizations can assess their maturity to reduce ERP failure risks, as seen in the textile industry [19], and strengthen management commitment and change management practices to foster innovation [18]. Additionally, ERP systems enhance operational efficiency by integrating functions and enabling real-time information access—particularly valuable for MSMEs [20].

2.4 Research Gap

While many international studies have examined the success factors of ERP systems, limited empirical research specifically investigates the implementation of cloud-based ERP in Indonesian manufacturing firms using a quantitative method. Moreover, most studies focus on general ERP systems without distinguishing between traditional and cloud-based solutions, which differ significantly in architecture, cost structure, and user experience.

2.5 Conceptual Framework

Based on the literature reviewed, this study adopts a conceptual framework that includes top management support, user competence, system quality, and vendor support as independent variables, with ERP implementation success as the dependent variable. This model provides a basis for empirical testing using statistical methods to determine the strength and significance of each factor's influence.

3. METHODS

This research employs a descriptive and explanatory survey design, appropriate for identifying and explaining causal relationships among variables related to cloud ERP implementation. Data were collected through a structured questionnaire developed from established literature and tailored to the Indonesian manufacturing

context. The study targets employees involved in the planning, execution, or use of cloud ERP systems—such as IT staff, ERP users, project managers, and supervisors. Using purposive sampling, 100 respondents with relevant ERP experience were selected, a sample size considered adequate for statistical analysis using SPSS. The questionnaire consisted of two sections: Section A covering demographic and organizational profiles (e.g., company size, ERP implementation stage, respondent's role), and Section B containing measurement items for the study variables rated on a Likert scale from 1 (Strongly Disagree) to 5 (Strongly Agree). All items were adapted from validated instruments used in prior ERP studies and modified for cloud ERP contexts.

The study analyzed five key variables: four independent variables—Top Management Support (commitment, resource allocation, communication), User Competence (training, skill level, user adaptability), System Quality (reliability, usability, integration), and Vendor Support (training, technical assistance, responsiveness)—and one dependent variable, ERP Implementation Success (project success, system use, perceived benefits). Data analysis was conducted using SPSS version 25. Descriptive statistics were used to summarize demographic information and general perceptions. Validity was tested via Pearson's correlation, while reliability was measured using Cronbach's Alpha, with a threshold of 0.70. Multiple linear regression analysis was then applied to determine the influence of the independent variables on ERP implementation success using the regression model:

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \epsilon,$$

where Y represents ERP implementation success and X_1–X_4 represent the four independent variables. Hypothesis testing was conducted using t-statistics and p-values at a 95% confidence level ($\alpha = 0.05$), with p-values below 0.05 indicating significant effects.

Table 1. Descriptive Statistics

Variable	Mean	Std. Deviation
Top Management Support	4.23	0.54
User Competence	4.11	0.60
System Quality	4.08	0.58
Vendor Support	4.15	0.52
ERP Implementation Success	4.20	0.49

The means indicate that most respondents agreed or strongly agreed with positive statements regarding the ERP implementation process, reflecting generally favorable perceptions across all variables. Top Management Support received the highest mean score of 4.23 (SD = 0.54), suggesting strong leadership involvement and strategic alignment during implementation. ERP Implementation Success followed with a mean of 4.20 (SD = 0.49), indicating a shared view that the ERP systems delivered expected outcomes such as usability, project completion, and operational benefits. Vendor Support (mean = 4.15, SD = 0.52) was also rated positively, showing satisfaction with vendor responsiveness, training, and technical assistance. User Competence had a slightly lower mean of 4.11 (SD = 0.60), suggesting good overall readiness among employees but with more variation in experiences, possibly due to differing levels of training or adaptability. System Quality, while still rated positively, had the lowest mean at 4.08 (SD = 0.58), indicating that some respondents may have encountered technical

4. RESULTS AND DISCUSSION

4.1 Descriptive Statistics

The demographic data of the 100 respondents reveal that 64% were male and 36% female, with 62% aged between 31 and 45 years. A majority of 55% held managerial or supervisory positions, and 80% reported that their companies had been using cloud-based ERP systems for more than one year. The most commonly used ERP vendors included SAP, Oracle NetSuite, Odoo, and Microsoft Dynamics. The descriptive statistics for each variable, including mean and standard deviation, are presented as follows.

limitations despite general reliability and usability. Overall, the results affirm strong support for the identified critical success factors in cloud-based ERP implementation.

4.2 Validity and Reliability Testing

The validity test results show that all questionnaire items are statistically valid. Each item demonstrated a significant Pearson correlation coefficient with its corresponding variable at $p < 0.01$, confirming that the items effectively measure the intended constructs. This indicates that the questionnaire was well-constructed and suitable for examining the factors influencing the success of cloud-based ERP implementation in the manufacturing sector.

In terms of reliability, all variables showed strong internal consistency, with Cronbach's Alpha values exceeding the recommended threshold of 0.70. Specifically, Top Management Support had an alpha of 0.812, User Competence 0.795, System Quality 0.803, Vendor Support 0.818, and ERP Implementation Success 0.827. These results suggest that the measurement instruments used for each variable are reliable and consistent, further supporting the robustness of the survey data for subsequent analysis.

4.3 Regression Analysis

A multiple linear regression analysis was conducted to examine the influence of top management support, user competence, system quality, and vendor support on ERP implementation success. The regression model yielded an R value of 0.782, with an R^2 of 0.611 and adjusted R^2 of 0.598, indicating that approximately 61.1% of the variance in ERP implementation success can be explained by the four independent variables. The F-statistic of 47.268 with a significance level of 0.000 confirms that the overall model is statistically significant and possesses strong explanatory power.

Table 2. Hypothesis Testing

Variable	Unstandardized B	Std. Error	t-value	Sig. (p-value)
(Constant)	0.827	0.249	3.322	0.001
Top Management Support	0.321	0.078	4.115	0.000
User Competence	0.274	0.071	3.859	0.000
System Quality	0.193	0.068	2.838	0.005
Vendor Support	0.201	0.074	2.716	0.008

The hypothesis testing results indicate that all proposed relationships are statistically significant and supported. Top Management Support has a significant positive effect on ERP implementation success ($t = 4.115$, $p = 0.000$), as does User Competence ($t = 3.859$, $p = 0.000$). System Quality also significantly influences ERP success ($t = 2.838$, $p = 0.005$), along with Vendor Support ($t = 2.716$, $p = 0.008$). These findings confirm that all four independent variables—top management support, user competence, system quality, and vendor support—have a meaningful and positive impact on the success of cloud-based ERP implementation.

4.4 Discussion

The findings confirm that top management support is the most influential factor in successful ERP implementation, consistent with prior studies emphasizing leadership's role in providing strategic direction, allocating resources, and preparing the organization for change. Top executives' active involvement ensures that ERP implementation is treated not merely as an IT initiative but as a strategic business transformation [21], [22], [23], further reinforces that top management support is the most critical success factor across diverse organizational settings, enhancing project success by promoting alignment between business goals and technological adoption.

User competence also plays a significant role in determining ERP success. Employees' ability to adapt, understand system functionalities, and participate in structured training programs directly influences the effectiveness of ERP utilization [21], [24]. Comprehensive training fosters a better organizational fit and helps reduce

resistance to change. However,[22]) notes that the impact of user involvement may vary depending on context. Beyond these two factors, successful ERP implementation also hinges on effective project management, clear scope definition, and robust change management processes [25]. Communication emerges as a cross-cutting element that links strategic and operational aspects, highlighting the importance of an integrated approach to implementation [21].

System quality, encompassing reliability, usability, and integration, plays a vital role in the success of ERP implementation. A high-quality ERP system that is reliable and user-friendly enhances user satisfaction and promotes consistent system usage—two critical factors for measuring implementation success [26], [27]. Moreover, the quality of information and services provided by the system serves as a mediator in achieving successful outcomes by fostering better user experiences [26]. Integration and usability are particularly essential in streamlining business processes and supporting managerial functions, ultimately contributing to operational efficiency and strategic decision-making [27], [28].

Vendor support also significantly influences ERP outcomes, particularly in cloud-based systems where maintenance and updates are managed externally. In this context, the role of dependable vendors becomes crucial; those who provide responsive technical assistance, ongoing training, and professional consultancy services greatly enhance the likelihood of a successful ERP implementation [29]. The presence of experienced vendors and consultants ensures that technical challenges are addressed promptly and that users are adequately supported throughout the system's lifecycle. Ultimately, external support from knowledgeable vendors complements internal efforts by reducing implementation barriers and reinforcing system sustainability [28].

5. CONCLUSION

The implementation of cloud-based ERP systems in manufacturing companies in Indonesia is influenced by multiple interconnected factors, with this study confirming that top management support, user competence, system quality, and vendor support all significantly contribute to implementation success. Among these, top management support emerged as the most critical determinant, emphasizing the importance of leadership in aligning ERP objectives with organizational goals, allocating resources, and managing change. User competence is also essential, as successful ERP adoption relies heavily on users' ability to effectively operate the system, underscoring the need for continuous training and active user involvement. Additionally, system quality influences usability and reliability, which in turn impact user satisfaction and acceptance, while strong vendor support ensures organizations can address technical challenges and optimize system performance over time. The regression model used in this study explains over 60% of the variance in ERP implementation success, reinforcing the significance of both internal and external support mechanisms. These findings offer practical insights for manufacturing firms preparing to implement cloud ERP, guiding them in developing strategies that enhance readiness and execution. Future research is recommended to examine additional factors such as organizational culture, change management approaches, and post-implementation evaluation to achieve a more holistic understanding of ERP success in the Indonesian context.

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