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The Impact of ERP and IoT Technologies on Improving Operational Sustainability in the Logistics Sector in Surabaya

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ABSTRACT

The logistics sector plays a critical role in supporting economic growth and supply chain efficiency, while simultaneously facing increasing pressure to adopt sustainable operational practices. Digital transformation technologies, particularly Enterprise Resource Planning (ERP) and the Internet of Things (IoT), have emerged as important tools for enhancing operational sustainability through improved resource management, real-time monitoring, and process optimization. This study aims to analyze the impact of ERP and IoT technologies on operational sustainability in the logistics sector in Surabaya. A quantitative research approach was employed using a survey method involving 100 respondents from logistics companies operating in Surabaya. Data were collected through structured questionnaires measured using a five-point Likert scale and analyzed using SPSS Version 25. The analytical techniques included validity and reliability testing, descriptive statistics, classical assumption testing, multiple linear regression analysis, coefficient of determination analysis, and hypothesis testing. The results reveal that ERP technology has a positive and significant effect on operational sustainability. Similarly, IoT technology significantly influences operational sustainability. Simultaneously, ERP and IoT technologies significantly affect operational sustainability, explaining 53.9% of the variance in operational sustainability. These findings indicate that the integration of ERP and IoT technologies enhances operational efficiency, resource utilization, process optimization, and organizational resilience, thereby contributing to sustainable logistics operations. The study highlights the strategic importance of digital transformation in supporting long-term sustainability and competitiveness within the logistics sector.

Keywords: *Enterprise Resource Planning (ERP), Internet of Things (IoT), Operational Sustainability, Logistics Sector, Digital Transformation.*

1. INTRODUCTION

The logistics sector plays a crucial role in supporting economic growth, facilitating supply chain activities, and ensuring the efficient movement of goods and services across various industries. The rapid expansion of globalization, international trade, and e-commerce has significantly increased the complexity of logistics operations, requiring companies to continuously improve their efficiency, responsiveness, and competitiveness [1], [2]. In Indonesia, particularly in Surabaya as one of the country's largest industrial and commercial centers [3], logistics companies face increasing challenges related to operational costs, customer expectations, environmental concerns, and market competition. These challenges have encouraged organizations to adopt advanced digital technologies that can enhance operational performance while simultaneously supporting sustainability objectives. Consequently, digital transformation has become a strategic necessity rather than merely a technological option within the logistics industry.

Operational sustainability has emerged as an essential organizational objective in modern logistics management. Beyond achieving short-term operational efficiency, logistics companies are increasingly expected to balance economic performance with environmental responsibility and long-term operational resilience [4], [5]. Operational sustainability refers to an organization's ability to maintain efficient, reliable, and adaptive operations while minimizing resource consumption, reducing waste generation, and lowering environmental impacts [6], [7]. In logistics activities, sustainability is reflected through optimized transportation systems, effective inventory management, efficient warehouse utilization, reduced fuel consumption, and improved coordination throughout the supply chain [8], [9]. Organizations that successfully achieve operational sustainability are generally better positioned to maintain service quality, reduce operational risks, and strengthen their competitive advantage in a rapidly changing business environment.

The advancement of Industry 4.0 technologies has transformed traditional logistics management practices by introducing digital systems capable of enhancing operational visibility, integration, and decision-making. One of the most widely implemented technologies is Enterprise Resource Planning (ERP), which provides an integrated platform connecting various organizational functions, including procurement, inventory management, transportation planning, finance, and customer service [10]–[12]. ERP systems enable centralized information management, improve data accuracy, facilitate interdepartmental coordination, and streamline business processes. By integrating organizational resources and information flows [13], [14], ERP systems support more effective resource allocation and operational control, which are essential elements in achieving sustainable logistics operations.

Alongside ERP implementation, the Internet of Things (IoT) has become an increasingly important technology in logistics and supply chain management. IoT utilizes interconnected devices, sensors, and communication networks to collect and transmit real-time operational data. Through IoT applications, logistics companies can monitor vehicle performance, track inventory movement, supervise warehouse conditions, and manage transportation activities more effectively [15], [16]. Real-time data generated through IoT supports predictive maintenance, route optimization, inventory visibility, and operational risk management [17], [18]. These capabilities help organizations reduce inefficiencies, improve service reliability, minimize unnecessary resource utilization, and respond more rapidly to operational disruptions. Consequently, IoT technology has significant potential to contribute to both operational excellence and sustainability objectives within logistics organizations.

The integration of ERP and IoT technologies offers a comprehensive approach to enhancing operational sustainability. ERP provides a structured framework for managing organizational processes and resources, while IoT generates real-time operational intelligence that strengthens decision-making capabilities. When combined, these technologies enable organizations to create more responsive, data-driven, and sustainable logistics systems [18], [19]. For example, IoT-generated data can be integrated into ERP platforms to improve inventory planning, optimize transportation scheduling, reduce equipment downtime, and enhance overall resource utilization. Such integration not only improves operational efficiency but also supports sustainability initiatives through reduced waste, lower energy consumption, and improved environmental performance. Despite these potential benefits, many logistics organizations continue to encounter challenges related to implementation complexity, technological integration, high investment costs, employee resistance, and limited digital competencies, which often hinder the successful realization of technology-driven sustainability outcomes.

Although previous studies have demonstrated that ERP implementation improves organizational performance, information quality, and operational coordination, while IoT adoption enhances supply chain visibility, flexibility, and data-driven decision-making, empirical research examining their combined influence on operational sustainability remains limited. Most existing studies focus primarily on financial performance, operational efficiency, or supply chain effectiveness, with relatively little attention given to sustainability outcomes, particularly in developing countries. This research gap is especially relevant within the logistics sector, where sustainability concerns are becoming increasingly important due to environmental regulations and stakeholder expectations. Therefore, this study aims to analyze the influence of ERP and IoT technologies on operational sustainability in logistics companies in Surabaya. The novelty of this study lies in its integrated examination of ERP and IoT as simultaneous determinants of operational sustainability within a single analytical framework, thereby contributing to the literature on digital transformation and sustainable logistics management while providing practical implications for logistics organizations seeking to improve sustainability performance through technology adoption.

2. LITERATURE REVIEW

2.1 Enterprise Resource Planning (ERP)

Enterprise Resource Planning (ERP) is an integrated information system that coordinates and manages organizational resources through a centralized database and interconnected business processes, enabling the integration of functions such as finance, procurement, inventory management, human resources, production, and logistics [10], [11]. ERP systems support real-time information sharing, improve data accuracy, enhance interdepartmental coordination, and streamline business processes, thereby reducing operational inefficiencies and improving resource allocation. In logistics operations, ERP facilitates inventory control, warehouse management, procurement planning, transportation scheduling, and demand forecasting, contributing to greater operational efficiency and service quality [13], [20]. Previous studies have shown that ERP implementation positively influences organizational performance through improved information quality, cost reduction, customer satisfaction, and competitive advantage. From a sustainability perspective, ERP supports operational sustainability by optimizing resource utilization, minimizing waste, enhancing process efficiency, and enabling organizations to monitor and improve operational performance through accurate and timely information. In this study, ERP is measured using eight indicators: information integration, data accuracy, process automation, interdepartmental coordination, real-time information availability, resource planning efficiency, decision-making support, and operational control.

2.2 Internet of Things (IoT)

The Internet of Things (IoT) refers to a network of interconnected devices, sensors, and systems that collect, transmit, and exchange data in real time through internet-based communication technologies. In the logistics sector, IoT supports applications such as fleet tracking, smart warehousing, inventory monitoring, predictive maintenance, and route optimization, enabling organizations to enhance operational visibility, responsiveness, and efficiency [15], [16]. By providing real-time data on location, equipment conditions, inventory levels, and transportation activities, IoT facilitates better decision-making, resource utilization, and operational control. Previous studies have shown that IoT implementation improves supply chain visibility, reduces operational costs, enhances inventory accuracy, and strengthens customer service [16], [18]. Moreover, IoT contributes to operational sustainability by reducing energy consumption, optimizing transportation routes, minimizing waste, and improving overall logistics performance. In this study, IoT is measured using eight indicators: real-time monitoring capability, device connectivity, data collection efficiency, supply chain visibility, predictive maintenance capability, tracking and tracing accuracy, operational responsiveness, and data accessibility.

2.3 *Operational Sustainability*

Operational sustainability refers to an organization's ability to maintain efficient, reliable, and environmentally responsible operations while ensuring long-term business viability. In the logistics sector, operational sustainability involves optimizing resources, reducing energy consumption and waste, improving process efficiency, maintaining service reliability, and minimizing environmental impacts [6], [7]. Grounded in the Triple Bottom Line (TBL) framework, operational sustainability integrates economic, environmental, and operational objectives to achieve balanced and sustainable performance. Previous studies suggest that the adoption of digital technologies enhances operational sustainability by improving visibility, supporting process optimization, and enabling data-driven decision-making. Therefore, operational sustainability has become a key performance indicator for modern logistics organizations [8], [9]. In this study, operational sustainability is measured using eight indicators: resource utilization efficiency, energy consumption reduction, waste reduction, operational reliability, process efficiency, environmental performance, continuous improvement, and long-term operational resilience.

2.4 *Relationship Between ERP and Operational Sustainability*

ERP systems support integrated resource management and process coordination by providing accurate, real-time information that enhances planning, monitoring, and decision-making. These capabilities improve operational efficiency, optimize resource allocation, reduce waste, and strengthen inventory and procurement management, thereby supporting sustainable operations [11], [21]. Previous studies have consistently demonstrated that ERP adoption contributes positively to sustainable organizational performance [22], [23], indicating that ERP is expected to have a positive effect on operational sustainability in the logistics sector.

H1: ERP technology has a positive and significant effect on operational sustainability in the logistics sector in Surabaya.

2.5 *Relationship Between IoT and Operational Sustainability*

IoT technologies provide real-time visibility into logistics operations through interconnected sensors and smart devices, enabling organizations to optimize transportation activities, improve asset utilization, reduce fuel consumption, and minimize operational disruptions [24], [25]. Through continuous data collection, monitoring, and predictive analytics, IoT supports proactive resource and process management, leading to greater operational efficiency. These capabilities contribute to sustainability objectives by reducing waste, enhancing resource productivity, and lowering environmental impacts. Previous studies have reported positive effects of IoT adoption on logistics efficiency and sustainable supply chain performance, indicating that IoT is expected to significantly enhance operational sustainability [26], [27].

H2: IoT technology has a positive and significant effect on operational sustainability in the logistics sector in Surabaya.

2.6 Relationship Between ERP, IoT, and Operational Sustainability

ERP and IoT technologies are complementary components of digital transformation, where ERP systems provide integrated platforms for managing organizational processes while IoT technologies generate real-time operational data that enhances decision-making effectiveness [11], [28]. The integration of these technologies creates a data-driven operational environment that improves efficiency, responsiveness, and sustainability through synchronized information flows and enhanced operational visibility. By enabling organizations to optimize logistics activities, reduce inefficiencies, improve resource allocation, and strengthen sustainability performance, the combined implementation of ERP and IoT is expected to generate greater benefits for operational sustainability than the adoption of either technology individually.

H3: ERP and IoT technologies simultaneously have a positive and significant effect on operational sustainability in the logistics sector in Surabaya.

3. METHODS

3.1 Research Design

This study employed a quantitative research approach with a cross-sectional survey design to examine the impact of Enterprise Resource Planning (ERP) and Internet of Things (IoT) technologies on operational sustainability in the logistics sector in Surabaya. Data were collected through structured questionnaires administered to respondents at a single point in time, enabling the measurement of relationships among variables using statistical analysis. The conceptual model comprises two independent variables, ERP Technology (X_1) and IoT Technology (X_2), and one dependent variable, Operational Sustainability (Y). The relationships among these variables were analyzed using multiple linear regression to assess both their individual and simultaneous effects on operational sustainability.

3.2 Research Location and Population

The research was conducted in Surabaya, East Java, Indonesia, one of the country's largest logistics and distribution hubs, selected due to its strategic role in supporting transportation, warehousing, supply chain activities, and industrial distribution networks across Eastern Indonesia. The city's growing logistics industry and increasing adoption of digital technologies provide an appropriate setting for examining the influence of ERP and IoT technologies on operational sustainability. The study population consisted of employees working in logistics companies in Surabaya, including managers, supervisors, operational staff, warehouse personnel, transportation coordinators, supply chain specialists, and information technology personnel with relevant knowledge and experience regarding ERP systems, IoT applications, and logistics operations.

3.3 Sampling Technique and Sample Size

This study employed purposive sampling as a non-probability sampling technique to ensure that respondents met criteria relevant to the research objectives. The selected respondents were employees working in logistics companies in Surabaya, had at least one year of work experience in their organizations, were familiar with or directly involved in the implementation of ERP and/or IoT within logistics operations, and participated voluntarily in the study. A total of 100 respondents were included in the sample, which was considered adequate for multiple regression analysis involving two independent variables in accordance with established statistical research guidelines.

3.4 Data Sources

This study utilized both primary and secondary data sources. Primary data were collected directly from respondents through structured questionnaires distributed electronically and in printed form to gather perceptions regarding ERP implementation, IoT adoption, and operational sustainability within their organizations. Secondary data were obtained from academic journals, books, industry reports, conference proceedings, and other relevant publications to support the theoretical foundation and contextual understanding of ERP systems, IoT technologies, logistics management, and sustainability.

3.5 Data Collection Technique

Data were collected using a survey questionnaire consisting of two sections. The first section gathered respondents' demographic information, including gender, age, educational background, job position, and work experience, while the second section contained statements measuring the research variables. All items were assessed using a five-point Likert scale ranging from 1 (Strongly Disagree) to 5 (Strongly Agree), and respondents were asked to indicate their level of agreement based on their experiences and perceptions of logistics operations within their organizations.

3.6 Operational Definition of Variables

In this study, ERP Technology (X_1) is defined as the extent to which an organization utilizes integrated information systems to manage business processes, coordinate operational activities, and support decision-making, measured through information integration (ERP1), data accuracy (ERP2), process automation (ERP3), interdepartmental coordination (ERP4), real-time information availability (ERP5), resource planning efficiency (ERP6), decision-making support (ERP7), and operational control (ERP8). IoT Technology (X_2) refers to the utilization of connected devices and sensors that enable real-time data collection, monitoring, communication, and operational management within logistics activities, measured through real-time monitoring capability (IoT1), device connectivity (IoT2), data collection efficiency (IoT3), supply chain visibility (IoT4), predictive maintenance capability (IoT5), tracking and tracing accuracy (IoT6), operational responsiveness (IoT7), and data accessibility (IoT8). Meanwhile, Operational Sustainability (Y) is defined as an organization's ability to maintain efficient, reliable, and environmentally responsible logistics operations over the long term, measured through resource utilization efficiency (OS1), energy consumption reduction (OS2), waste reduction (OS3), operational reliability (OS4), process efficiency (OS5), environmental performance (OS6), continuous improvement (OS7), and long-term operational resilience (OS8).

3.7 Data Analysis Technique

Data analysis was conducted using SPSS Version 25 through several statistical procedures. Descriptive statistics, including frequencies, percentages, means, and standard deviations, were used to summarize respondent characteristics and variable responses. Instrument validity was assessed using the Pearson Product-Moment Correlation, where items were considered valid if the calculated correlation coefficient exceeded the r-table value of 0.1966 ($n = 100$, $\alpha = 0.05$). Reliability was evaluated using Cronbach's Alpha, with values above 0.70 indicating acceptable internal consistency. Prior to regression analysis, classical assumption tests were performed, including the Kolmogorov–Smirnov test for normality (Sig. > 0.05), Tolerance and Variance Inflation Factor (VIF) tests for multicollinearity (Tolerance > 0.10 and VIF < 10), and the Glejser test for heteroscedasticity (Sig. > 0.05). To examine the effects of ERP Technology (X_1) and IoT Technology (X_2) on Operational Sustainability (Y), multiple linear regression analysis was applied using the model $Y=\alpha+\beta 1X1+\beta 2X2 +e$. Hypothesis testing was conducted through the t-test to evaluate the partial effects of each independent variable and the F-test to assess their simultaneous effects, with a significance threshold of 0.05. Additionally, the coefficient of determination (R^2) was used to measure the proportion of variance in operational sustainability explained by ERP and IoT technologies, where higher R^2 values indicate stronger explanatory power of the regression model.

4. RESULT AND DISCUSSION

4.1 Respondent Characteristics

A total of 100 valid questionnaires were collected from employees working in logistics companies in Surabaya, including managers, supervisors, logistics coordinators, warehouse personnel, transportation staff, and information technology personnel involved in logistics operations. Based on gender, the respondents consisted of 62 males (62.0%) and 38 females (38.0%), indicating the predominance of male employees commonly found in the logistics industry. Regarding age, the largest proportion of respondents was in the 30–39-year age group (41.0%), followed by 40–49 years (25.0%), 20–29 years (24.0%), and 50 years or older (10.0%), suggesting that most participants were within productive working ages and possessed substantial professional experience. In terms of work experience, 34.0% of respondents had worked for 4–6 years, 29.0% for 7–10 years, 19.0% for 1–3 years, and 18.0% for more than 10 years, indicating that the majority had adequate experience to evaluate ERP implementation, IoT adoption, and operational sustainability practices within their organizations.

4.2 Descriptive Statistics

Table 1. Descriptive Statistics of Research Variables

Variable	Minimum	Maximum	Mean	Std. Deviation
ERP Technology	3.05	4.88	4.162	0.512
IoT Technology	2.94	4.91	4.084	0.547
Operational Sustainability	3.12	4.93	4.236	0.495

The descriptive statistics indicate that respondents reported relatively high perceptions of all research variables. ERP Technology recorded a mean score of 4.162 (SD = 0.512) with values ranging from 3.05 to 4.88, while IoT Technology achieved a mean score of 4.084 (SD = 0.547) with a minimum value of 2.94 and a maximum value of 4.91. Operational Sustainability exhibited the highest mean score of 4.236 (SD = 0.495), with responses ranging from 3.12 to 4.93. These findings suggest that the respondents generally perceived the implementation of ERP and IoT technologies, as well as the level of operational sustainability within their organizations, to be relatively high.

4.3 Validity Test

The validity test was conducted using Pearson Product Moment Correlation.

Table 2. Validity Test Results

Variable	Number of Items	Correlation Range	r-table	Result
ERP Technology	8	0.642 – 0.851	0.1966	Valid
IoT Technology	8	0.618 – 0.839	0.1966	Valid
Operational Sustainability	8	0.655 – 0.873	0.1966	Valid

The validity test results indicate that all measurement items used in this study are valid. For ERP Technology, the item correlation coefficients ranged from 0.642 to 0.851; for IoT Technology, from 0.618 to 0.839; and for Operational Sustainability, from 0.655 to 0.873. Since all correlation values exceeded the r-table value of 0.1966, every questionnaire item met the validity requirement and was considered appropriate for measuring its respective construct, allowing all items to be included in the subsequent analysis.

4.4 Reliability Test

Table 3. Reliability Test Results

Variable	Cronbach's Alpha	Standard	Result
ERP Technology	0.911	0.70	Reliable
IoT Technology	0.897	0.70	Reliable
Operational Sustainability	0.924	0.70	Reliable

The reliability test results demonstrate that all research variables possess a high level of internal consistency and reliability. ERP Technology achieved a Cronbach's Alpha value of 0.911, IoT Technology recorded 0.897, and Operational Sustainability obtained 0.924. Since all Cronbach's Alpha values exceeded the recommended threshold of 0.70, the measurement instruments for each variable are considered reliable and suitable for further statistical analysis.

4.5 Classical Assumption Tests

4.5.1 Normality Test

The results of the Kolmogorov–Smirnov normality test show a K-S statistic value of 0.073 with a significance value of 0.200 for 100 observations. Since the significance value is greater than the threshold of 0.05, the residual data are considered normally distributed, indicating that the normality assumption required for multiple linear regression analysis has been satisfied.

4.5.2 Multicollinearity Test

Table 4. Multicollinearity Test Results

Variable	Tolerance	VIF
ERP Technology	0.642	1.558
IoT Technology	0.642	1.558

The multicollinearity test results indicate that ERP Technology and IoT Technology each have a tolerance value of 0.642 and a Variance Inflation Factor (VIF) value of 1.558. Since the tolerance values are greater than 0.10 and the VIF values are well below 10, there is no evidence of multicollinearity between the independent variables, indicating that both variables can be included simultaneously in the regression model without causing estimation bias.

4.5.3 Heteroscedasticity Test

Table 5. Glejser Test Results

Variable	Significance
ERP Technology	0.416
IoT Technology	0.521

The Glejser test results show significance values of 0.416 for ERP Technology and 0.521 for IoT Technology. Since both values exceed the threshold of 0.05, the regression model does not exhibit heteroscedasticity, indicating that the variance of the residuals is constant across observations and that the heteroscedasticity assumption has been satisfied.

4.6 Multiple Linear Regression Analysis

Table 6. Multiple Regression Results

Variable	B	Std. Error	Beta	t-value	Sig.
Constant	1.027	0.342	-	3.003	0.003
ERP Technology	0.412	0.084	0.445	4.905	0.000
IoT Technology	0.358	0.079	0.409	4.532	0.000

The multiple linear regression analysis produced the equation OS = 1.027 + 0.412(ERP) + 0.358(IoT), indicating that both ERP Technology and IoT Technology have positive effects on Operational Sustainability. The partial hypothesis testing (t-test) further confirms these relationships, where ERP Technology has a significant positive effect on Operational Sustainability with a t-value of 4.905, exceeding the t-table value of 1.984, and a significance level of 0.000 ($\beta = 0.445$; $p < 0.001$). Similarly, IoT Technology demonstrates a significant positive influence on Operational Sustainability with a t-value of 4.532, which is also greater than 1.984, and a significance level of 0.000 ($\beta = 0.409$; $p < 0.001$). These findings indicate that improvements in ERP implementation and IoT adoption contribute significantly to enhancing operational sustainability, leading to the acceptance of both H1 and H2.

Table 7. ANOVA Results

Source	Sum of Squares	df	Mean Square	F	Sig.
Regression	28.561	2	14.281	58.734	0.000
Residual	23.590	97	0.243		
Total	52.151	99			

The significance value of 0.000 is less than 0.05, indicating that ERP Technology and IoT Technology simultaneously affect Operational Sustainability. Thus, H3 is accepted.

4.6.1 Coefficient of Determination (R^2)

The coefficient of determination results show an R value of 0.740, indicating a strong relationship between the independent variables and Operational Sustainability. The R^2 value of 0.548 and Adjusted R^2 value of 0.539 indicate that 53.9% of the variation in Operational Sustainability can be explained by ERP Technology and IoT Technology, while the remaining 46.1% is attributable to other factors not included in the research model. Additionally, the standard error of estimate of 0.493 suggests that the regression model provides a reasonably accurate prediction of operational sustainability within the logistics sector.

Discussion

The results of this study demonstrate that ERP Technology has a positive and significant effect on Operational Sustainability in logistics companies in Surabaya. This finding indicates that organizations with stronger ERP implementation are better able to manage integrated information, coordinate resources, control inventory, optimize procurement, and support transportation planning. Through centralized data and standardized business processes, ERP systems help logistics companies reduce operational inefficiencies, minimize resource waste, and improve decision-making accuracy. Therefore, ERP implementation does not only function as an administrative system, but also as a strategic tool for strengthening sustainable logistics operations [28].

The significant influence of ERP on Operational Sustainability also confirms that information integration is essential for achieving efficient and reliable logistics performance. In logistics activities, fragmented information can lead to inventory errors, delayed shipments, inefficient warehouse utilization, and poor coordination among departments. ERP systems reduce these problems by providing real-time and accurate information that supports better operational control. As a result, companies can improve resource utilization, reduce unnecessary costs, and maintain service quality. This finding is consistent with previous studies showing that ERP implementation contributes to operational efficiency, organizational performance, and long-term business sustainability [14], [29], [30].

The findings further reveal that IoT Technology has a positive and significant effect on Operational Sustainability. This result suggests that the adoption of IoT technologies, such as fleet tracking, warehouse sensors, predictive maintenance systems, and real-time inventory monitoring, enables logistics companies to increase operational visibility and responsiveness. Real-time data generated by IoT devices allows managers to monitor vehicle movement, warehouse conditions, equipment performance, and inventory levels more accurately. These capabilities support route optimization, fuel consumption reduction, asset utilization improvement, and faster responses to operational disruptions, which directly contribute to sustainability performance [14], [30].

The role of IoT in improving Operational Sustainability is particularly important because logistics operations are highly dependent on speed, accuracy, and continuous monitoring. Through IoT-based systems, companies can identify inefficiencies earlier, prevent equipment failures, reduce delays, and minimize environmental impacts caused by inefficient transportation and resource use. IoT also supports proactive decision-making by providing operational data that can be used to anticipate risks before they become serious disruptions. Thus, the findings support previous research emphasizing that IoT contributes to intelligent, efficient, and sustainable logistics systems.

The simultaneous test results indicate that ERP Technology and IoT Technology jointly have a significant influence on Operational Sustainability, with an Adjusted R^2 value of 53.9%. This means that more than half of the variation in operational sustainability can be explained by the combined role of ERP and IoT technologies. The integration of ERP and IoT creates synergistic benefits, where ERP provides centralized planning and process management, while IoT supplies real-time operational data to strengthen decision-making. Therefore, logistics companies should not treat ERP and IoT as separate technological investments, but as complementary components of a broader digital transformation strategy. Companies that successfully integrate both technologies are more likely to improve inventory accuracy, optimize transportation activities, reduce resource waste, enhance operational resilience, and maintain competitive advantage in a dynamic logistics environment.

CONCLUSION

This study examined the impact of Enterprise Resource Planning (ERP) and Internet of Things (IoT) technologies on operational sustainability in the logistics sector in Surabaya and found that both technologies have positive and significant effects on operational sustainability. ERP technology enhances information integration, resource planning, operational control, and decision-making, thereby improving sustainability performance, while IoT technology supports real-time monitoring, connectivity, predictive maintenance, and supply chain visibility, enabling more efficient operations and reduced resource consumption. The findings further reveal that ERP and IoT simultaneously exert a significant influence on operational sustainability, with a coefficient of determination of 53.9%, indicating that these technologies explain a substantial proportion of sustainability performance within logistics organizations. The integration of ERP and IoT creates synergistic benefits by combining centralized process management with real-time operational data, leading to improved efficiency, resource optimization, and organizational responsiveness. Therefore, logistics companies should prioritize the adoption and integration of ERP and IoT as part of their digital transformation strategies to strengthen operational sustainability, enhance long-term performance, and maintain competitiveness in a dynamic business environment. Future research is recommended to incorporate additional factors such as organizational innovation, digital capabilities, environmental management practices, and supply chain integration to provide a more comprehensive understanding of operational sustainability.

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