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# Analysis of Operational Risk Management in Logistic Companies: A Case Study of PT Sugiarto Jaya Mandiri Transport Bogor

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## ABSTRACT

This study aims to analyze operational risk management at PT Sugiarto Jaya Mandiri Transport, a logistics company that focuses on transporting heavy equipment. Using an approach based on SNI ISO 31000:2018, this study identifies the operational risks faced, analyzes the level of risk based on its probability and impact, and formulates risk mitigation strategies. Data was collected through in-depth interviews, surveys, questionnaires, and document reviews. The *Failure Modes and Effect Analysis* (FMEA) method is used to analyze and prioritize risks. The results of the study showed that there were 19 operational risks identified, including process, HR, system, business, and incidental aspects. Key risks include delivery delays, fleet breakdowns, accidents, and operational system mismatches. Recommended mitigation strategies include improving operational processes, strengthening oversight, and implementing ISO 31000-based risk procedures. This research makes an important contribution to the management of operational risks in the logistics sector, with practical implications to improve efficiency, reduce losses, and ensure business sustainability.

***Keywords:*** *Failure Modes and Effect Analysis (FMEA), logistics, operational risk management, SNI ISO 31000:2018.*

## INTRODUCTION

The rapid development of infrastructure in Indonesia, encompassing projects such as toll roads, bridges, ports, and airports, underscores the critical role of heavy machinery in achieving efficiency and effectiveness. This growth has spurred demand for logistical services specializing in the transportation of such equipment, establishing logistics companies as pivotal players in the national supply chain ecosystem. PT Sugiarto Jaya Mandiri Transport operates as a logistics company focusing on the transportation of heavy equipment for construction, mining, and industrial projects. Its services, ranging from towing to sea freight, ensure the safe and timely delivery of machinery. However, the company's operations are not devoid of challenges. Various operational risks, such as equipment damage, delays, and regulatory changes, can disrupt business continuity and customer satisfaction.

This study examines operational risk management at PT Sugiarto Jaya Mandiri Transport using the ISO 31000:2018 framework. It aims to identify operational risks, analyze their levels based on likelihood and impact, and propose risk mitigation strategies. Employing a

combination of qualitative methods, including in-depth interviews, surveys, and Failure Modes and Effect Analysis (FMEA), the study seeks to enhance the company's operational resilience. By addressing the gaps in traditional risk management practices, this research highlights the necessity of adopting a systematic and integrated approach to risk mitigation. Its findings contribute to both academic and practical perspectives, offering a comprehensive strategy to navigate the complexities of logistics operations and improve organizational performance

## LITERATURE REVIEW

The logistics industry plays a critical role in connecting supply chains, ensuring the seamless movement of goods across various points of production and consumption. As the backbone of modern trade, logistics faces numerous operational risks, which can disrupt its efficiency and effectiveness. This review synthesizes existing literature on operational risk management in logistics, focusing on frameworks like ISO 31000:2018 and methodologies such as Failure Modes and Effect Analysis (FMEA).

### Operational Risk Management

Operational risks stem from failures in processes, systems, human resources, or external events (Lam, 2014). These risks have significant implications for logistics companies, affecting service quality, customer satisfaction, and financial performance. ISO 31000:2018 serves as a global standard for risk management, providing principles and a structured framework for organizations to manage risks systematically (Susilo & Kaho, 2018). Key processes include risk identification, analysis, evaluation, and treatment, ensuring a proactive approach to mitigating operational disruptions.

### Frameworks and methodologies

Research by Antonius & Nurcahyanie (2023) highlights the application of FMEA in identifying critical risks in logistics operations, prioritizing them using Risk Priority Numbers (RPN). Similarly, studies by Muniroh et al. (2020) emphasize the relevance of ISO 31000 in structuring risk management practices, enabling organizations to establish risk contexts, assess threats, and implement treatments. This systematic approach has proven effective in reducing delays, equipment failures, and human errors in logistics processes.

### Industry specific applications

Case studies reveal diverse applications of risk management frameworks in logistics. For instance, research by Haryanti & Hutomo (2024) identifies key operational risks in JNE Station Center Gedebage, Bandung, including delivery delays and damage to goods. These risks are mitigated through adherence to ISO 9001:2015 standards. Another study by Nisa & Wessiani (2022) leverages FMEA to address risks in freight forwarding, suggesting four treatment strategies: avoid, mitigate, transfer, and accept.

### Gaps and future directions

While extensive research exists on risk identification and treatment, there is a growing need to integrate data-driven technologies into operational risk management. Araz et al. (2020) propose machine learning models for real-time risk prediction and mitigation, enabling organizations to address emerging challenges in dynamic environments. The integration of digital tools with established frameworks like ISO 31000 can enhance risk visibility and decision-making processes.

In summary, the literature underscores the importance of robust risk management systems in the logistics sector. Frameworks such as ISO 31000 and methodologies like FMEA offer valuable tools for mitigating operational risks. However, future research should explore the intersection of technology and traditional risk management approaches to address evolving challenges

in the industry. This study contributes to the ongoing discourse by examining operational risks at PT Sugiarto Jaya Mandiri Transport, providing practical insights into risk management practices in heavy equipment logistics

## MATERIALS & METHODS

This study adopts a qualitative descriptive approach, using a case study design to analyze operational risk management at PT Sugiarto Jaya Mandiri Transport. The research integrates the ISO 31000:2018 risk management framework to identify, analyze, and evaluate operational risks, supplemented by the Failure Modes and Effect Analysis (FMEA) method to prioritize risk treatment strategies, for sampling technique the study used purposive sampling to select respondents directly involved in operational activities. Criteria included experience and knowledge of risk-related processes in logistics operations.The research was conducted at PT Sugiarto Jaya Mandiri Transport, located in Kemang, Bogor, West Java, from August to November 2024. Data for this study were collected from primary and secondary sources:

- Primary Data: Obtained through in-depth interviews with key personnel, structured questionnaires, and direct observations. Respondents included seven individuals from PT Sugiarto Jaya Mandiri Transport: the company director, finance manager, operations manager, chief mechanic, drivers-in-charge (PICs), and mechanics.
- Secondary Data: Collected from company documents, internal reports, and relevant literature, including ISO 31000 standards and logistics industry reports

The research applied the ISO 31000:2018 framework, consisting of the following steps:

1. Context Establishment: Defining internal and external contexts, identifying stakeholders, and setting objectives for risk management.
2. Risk Identification: Documenting potential risks across various operational aspects, including processes, human resources, systems, and external factors.
3. Risk Analysis: Using FMEA to evaluate risks based on their probability, impact, and detection capabilities, calculating Risk Priority Numbers (RPN) for prioritization.
4. Risk Evaluation: Mapping risks and determining critical levels requiring immediate attention.
5. Risk Treatment: Formulating strategies to mitigate identified risks, focusing on preventive and corrective measures.

An event is how often a risk can occur. *Severity* is the impact of the failure of a process/object and detection is the ability to detect failure before a risk occurs. The next thing to do is to provide an assessment of the likelihood or probability (*occurrenceence*), impact (*severity*), and detection (*detection*). Based on the results of the assessment, a *Risk Priority Number* (RPN) will be produced. The RPN is the result of the priority level for each risk, where in this RPN the detection value, probability and impact are taken into account with the following calculations:

**RPN = S x O x D**

Information:

S = *Severity*

O = *Occurrence*

D = *Detection*

Risks that are in the high category are risks with a *Risk Priority Number* (RPN) value greater than or equal to the critical value (RPN value ≥ critical value). The critical value can be calculated using the equation formula.

Critical Value = Total RPN: Total Risk

To calculate the critical value, the total value of the RPN and the total number of risk lists for each risk that has been identified are needed. Critical ratings are important to make it easier to prioritize handling and control for each potential failure, therefore it can be concluded that FMEA analysis provides an assessment of

the occurrence of risk causes, while critical risk recommendations provide more detailed general recommendations for a set of critical priority risks. Data were analyzed using descriptive statistics to summarize risk characteristics and FMEA to prioritize risks. Responses from interviews and questionnaires were coded and categorized to provide a comprehensive understanding of operational risks. The study focuses exclusively on operational risks within PT Sugiarto Jaya Mandiri Transport and does not include perspectives from external stakeholders or clients. Future studies could broaden the scope to include external factors influencing risk dynamics. This methodological framework ensures a systematic approach to identifying, analyzing, and mitigating risks, contributing to operational resilience and sustainability in logistics

## RESULT

### 1. Identified Operational Risk

Through in-depth interviews, observations, and data analysis, the study identified 19 operational risks at PT Sugiarto Jaya Mandiri Transport. These risks are categorized into five areas:

- Process Risks: Delays in loading heavy equipment, truck breakdowns, and readiness issues with operational vehicles.
- Human Resource Risks: Driver unavailability, dishonest employees, and work accidents.
- System Risks: Delayed payment collections and unrecorded transactions.
- Incidental Risks: Supply chain disruptions, natural disasters, and fuel price volatility.
- Business Risks: Changes in regulations and the reduced capability of major partners to collaborate.

Each risk was analyzed for its potential causes and impacts, highlighting critical issues affecting business continuity and service quality.

### 2. Risk Analysis Using FMEA

The Failure Modes and Effect Analysis (FMEA) method evaluated risks based on severity (S), occurrence (O), and detection (D), resulting in a Risk Priority Number (RPN) for each risk. Key findings include:

| High Priority Risk | Moderate Priority Risk | Low Priority Risk |
|---|---|---|
| Truck breakdown during delivery (RPN: 360).<br>Traffic congestion during peak periods (RPN: 320).<br>Delays due to long queues at seaports (RPN: 300).<br>Dishonest employee activities (RPN: 290). | Driver unavailability (RPN: 240).<br>Disruptions in the supply chain due to external factors (RPN: 220). | Risks with RPN values below 200, such as changes in business partner capabilities. |

The analysis revealed that operational inefficiencies and external disruptions were significant contributors to high-priority risks. Immediate intervention is required to address these issues to prevent financial losses and damage to company reputation

### 3. Risk Mitigation Strategies

Based on the RPN values and ISO 31000:2018 framework, the study proposed mitigation strategies:

| High Priority Risk | Moderate Priority Risk | Low Priority Risk |
|---|---|---|
| Implement preventive maintenance schedules to reduce truck breakdowns.<br>Develop alternative delivery | Establish a contingency workforce to address driver shortages.<br>Foster partnerships with | Monitor regulatory changes and maintain open communication with business partners to adapt to new requirements effectively. |

| | | |
|---|---|---|
| routes and schedules to mitigate traffic congestion. Strengthen security measures during transit to prevent theft. | multiple suppliers to ensure supply chain continuity. | |

## DISCUSSION

The findings highlight the importance of adopting systematic risk management practices, as outlined in ISO 31000:2018, for logistics operations. The categorization and prioritization of risks using FMEA provide actionable insights into areas requiring immediate attention. These results align with previous studies by Muniroh et al. (2020) and Haryanti & Hutomo (2024), which emphasize the effectiveness of structured frameworks in managing logistics risks. However, this study extends the literature by focusing on heavy equipment logistics, a niche with unique operational challenges. The integration of risk management into daily operations not only minimizes disruptions but also enhances customer satisfaction and trust. PT Sugiarto Jaya Mandiri Transport can use these insights to strengthen its operational resilience and expand its market presence. While the study comprehensively addresses operational risks within PT Sugiarto Jaya Mandiri Transport, it is limited to internal operations. Future research could explore external factors, such as client feedback and industry benchmarking, to provide a holistic view of risk management in logistics. The study contributes to the growing body of knowledge on operational risk management, providing a practical roadmap for companies to navigate complexities in logistics

## CONCLUSION

This study analyzed operational risk management at PT Sugiarto Jaya Mandiri Transport, a logistics company specializing in heavy equipment transportation. Using the ISO 31000:2018 framework and Failure Modes and Effect Analysis (FMEA) method, 19 operational risks were identified, categorized, and prioritized based on their severity, likelihood, and detectability.

**Key Findings:**

1. High-Priority Risks: Truck breakdowns, traffic congestion, and long queues at seaports significantly impact operational efficiency and require immediate attention.
2. Moderate-Priority Risks: Risks such as driver shortages and supply chain disruptions highlight the need for contingency planning and diversified partnerships.
3. Low-Priority Risks: Risks related to regulatory changes and partner capability require continuous monitoring and adaptive strategies

**Mitigation strategies**

Effective mitigation strategies include preventive maintenance, route optimization, enhanced security measures, and workforce contingency plans. These measures aim to reduce operational disruptions, enhance customer satisfaction, and strengthen the company's market position

**Practical implications**

Integrating risk management into daily operations improves organizational resilience and operational efficiency. The findings underscore the importance of systematic approaches in mitigating risks, aligning with industry best practices and global standards.

**Future directions**

Future research should explore external factors influencing operational risks, such as market conditions and regulatory environments. Incorporating advanced technologies like real-time data analytics and machine learning could further enhance risk prediction and mitigation strategies in

the logistics sector. This study provides a comprehensive framework for understanding and addressing operational risks in logistics, contributing valuable insights to both academic and practical domains. PT Sugiarto Jaya Mandiri Transport can adopt these recommendations to optimize its operations, ensure business continuity, and achieve sustainable growth.

***Declaration by Authors***
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