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# Analysis of Logistics Risk Management at the Shipping Company PT XYZ Tbk. in North Jakarta Using the ISO 31000:2018 Risk Management Analysis Framework

**Karya Bakti Kaban**
Business Administration Lecturer, LP3I Jakarta Polytechnic, Jakarta, Indonesia

**A B S T R A C T**

*The logistics industry plays a strategic role in supporting the smooth functioning of the national supply chain; however, it faces various risks that can impact operational effectiveness, service quality, and business continuity. As a logistics and shipping service provider in Indonesia, PT XYZ Tbk. encounters potential risks such as delivery delays, cargo damage, port operational disruptions, IT system failures, workplace accidents, and external factors like extreme weather and regulatory changes. This study aims to identify, analyze, and evaluate the logistics risks faced by PT XYZ Tbk. and to provide recommendations for risk treatment, guided by the ISO 31000:2018 standard. The research employs a qualitative descriptive method using a case study approach. Data were gathered through observation, interviews, documentation, and a literature review. The risk analysis process involved establishing the context, identifying risks, analyzing risks based on likelihood and impact, evaluating risks using a risk matrix, and formulating risk treatment recommendations in accordance with ISO 31000:2018 principles. Based on the analysis using the ISO 31000 approach and a risk matrix, it is concluded that PT XYZ Tbk. faces various risks in its logistics operations. The highest-rated risks include adverse weather, vessel delays, and port congestion. These risks significantly impact the smooth distribution of goods, operational costs, and customer satisfaction. Implementing structured risk management can assist the company in more effectively identifying, analyzing, evaluating, and controlling risks. Consequently, the company can enhance its operational resilience and competitiveness within the maritime logistics industry. Recommended risk treatment strategies include logistics digitalization via IoT and GPS tracking, the use of Artificial Intelligence (AI) to assist in predicting potential delays, the implementation of an integrated risk dashboard, the development and implementation of a Business Continuity Plan (BCP), the strengthening of cybersecurity, personnel training programs, collaboration with ports and regulatory bodies, and the implementation of periodic risk monitoring and evaluation. This research is expected to contribute to PT XYZ Tbk. by enhancing the effectiveness of its logistics risk management and strengthening its operational resilience, while also serving as a reference for other logistics companies implementing ISO 31000:2018 as a risk management framework.*
**Keywords** *Logistics Risk Management, ISO 31000:2018, Risk Analysis, Supply Chain Risk Management, Risk Matrix, Business Continuity Plan.*

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## INTRODUCTION

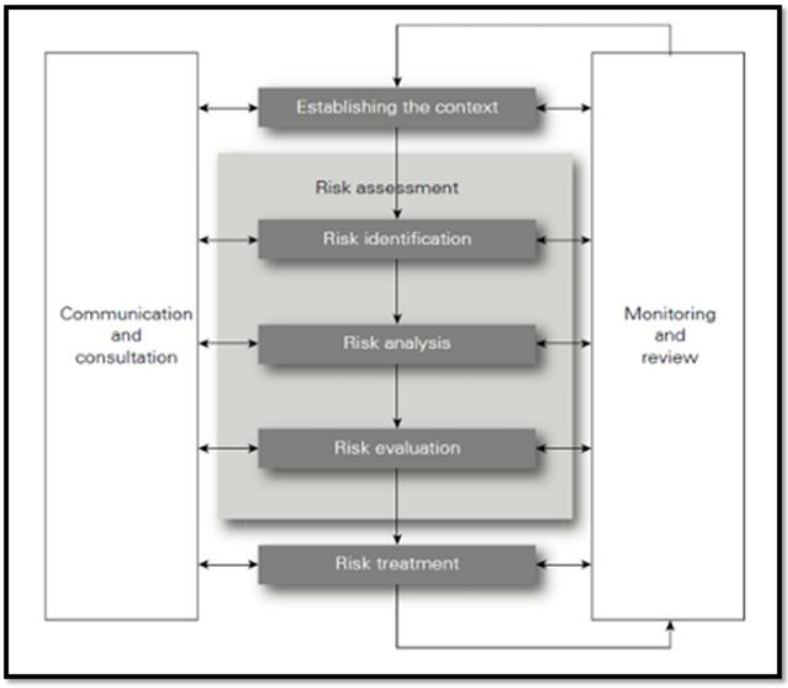
The logistics industry is a strategic sector that plays a vital role in supporting a nation's economic growth. In Indonesia, an archipelagic nation comprising over 17,000 islands, sea transport serves as the backbone for the distribution of goods between regions. The smooth flow of logistics via sea routes is crucial for ensuring the availability of goods, cost-efficient distribution, and the continuity of both domestic and international trade activities.

PT XYZ Tbk. is a key player in Indonesia's maritime logistics sector, operating in areas such as domestic container shipping, integrated logistics services, container terminals, warehousing, and goods distribution. With a shipping network spanning various regions across Indonesia, PT XYZ Tbk. stands as a logistics service provider that facilitates inter-island connectivity.

However, in conducting its logistics operations, PT XYZ Tbk. faces various risks that can impact its operational performance. These risks stem from both internal and external factors, including adverse

weather, vessel delays, port congestion, container damage, information system disruptions, fuel price fluctuations, human error, and regulatory changes. If these risks are not effectively managed, the company could suffer financial losses, a decline in service quality, distribution delays, and reduced customer satisfaction.

In the context of modern management, risk management aims not only to reduce losses but also to enhance a company's operational resilience and competitiveness. Consequently, companies need to implement structured and sustainable risk management systems. One widely adopted standard in this field is ISO 31000:2018, which provides guidelines for risk identification, analysis, evaluation, and treatment. The framework employed for risk management under ISO 31000:2018 is as follows:




Based on this premise, the author analyzes logistics management risks at PT XYZ Tbk. using the ISO 31000 framework and the Risk Matrix method. This analysis aims to provide insights into the key risks facing the company and to identify solutions that can be implemented to minimize negative impacts on logistics operations. The research employs a qualitative descriptive method using a case study approach. Data were gathered through observation, interviews, documentation, and a literature review. The risk analysis process involved establishing the context, identifying risks, analyzing risks based on likelihood and impact, evaluating risks using a risk matrix, and formulating risk treatment recommendations in accordance with ISO 31000:2018 principles.

## METHOD

Risk Management Analysis Using the ISO 31000:2018 Risk Management Guidelines is a framework for identifying, analyzing, evaluating, and addressing risks. This approach is a universal international standard and can be applied to various types of organizations, both in the public and private sectors. This standard helps organizations increase the likelihood of achieving objectives, strengthen governance, and support risk-based decision-making.

The following are the steps involved in conducting a risk analysis using the ISO 31000:2018 approach:

- Establishing the scope, context, and criteria.

This stage determines the scope of the research, the objectives of the risk analysis, the business processes being analyzed, and the risk criteria used as the basis for the evaluation. Contextualization also considers internal factors, such as the organization's resources, policies, and operational processes, as well as external factors, such as market conditions, regulations, technological developments, and the business environment.

- Risk identification.
  Identification is carried out to identify all potential risks that could impact the achievement of organizational objectives. This process is conducted through field observations, interviews with relevant parties, documentation studies, and literature reviews. The identified risks are then grouped by source, including operational risks, human resource risks, information technology risks, financial risks, and external risks.
- Risk analysis
  An assessment is conducted based on two primary parameters: the likelihood of the risk occurring and the magnitude of the resulting impact (or consequence). The assessment utilizes a five-level ordinal scale (1–5), where higher values indicate a greater probability of occurrence or a higher level of impact. The risk score is calculated using the following equation:

**Risk Score = Likelihood × Impact**

The calculated results are then mapped onto a Risk Matrix to determine the priority level of each risk.

Likelihood Scale:

| Value | Criterion | Description |
|---|---|---|
| 1 | Rare | Very rarely occurs |
| 2 | Unlikely | Rarely occurs |
| 3 | Possible | Occasionally occurs |
| 4 | Likely | Frequently occurs |
| 5 | Almost Certain | Almost certain to occur |

Scale Impact:

| Value | Criterion | Description |
|---|---|---|
| 1 | Insignificant | Very minor impact |
| 2 | Minor | Minor impact |
| 3 | Moderate | Moderate impact |
| 4 | Major | Major impact |
| 5 | Catastrophic | Very major impact on the organization |

- Risk evaluation
  At this stage, each risk value is compared against pre-established risk criteria to determine whether the risk is acceptable, requires control (tolerable), or demands immediate action (unacceptable). Priority in management is assigned to high and very high-level risks, as they have the potential to hinder the achievement of organizational objectives.
  For the purposes of this study, risk level classification may utilize the following categories:

| Risk Value | Risk Level |
|---|---|
| 1–4 | Low |
| 5–9 | Medium |
| 10–16 | High |

| | |
|---|---|
| 17–25 | Extreme |

- Risk treatment
  Based on ISO 31000:2018, risk treatment alternatives include avoiding the risk, reducing the likelihood of occurrence, reducing the consequence (impact), sharing or transferring the risk to another party, or accepting (retaining) the risk if the risk level remains within the organization's tolerance limits.
- Communication and consultation
  The risk management process is carried out continuously through communication and consultation with stakeholders, as well as the monitoring and review of risk control effectiveness. This stage ensures that changes in the internal or external environment can be promptly identified, thereby keeping the risk management process relevant and effective.

By utilizing the ISO 31000:2018 framework, the risk analysis results are expected to provide an overview of the priority risks facing the organization and their severity levels, along with recommended controls that can be implemented to enhance business process effectiveness and minimize potential losses.

**Analysis Result**

Based on field observations, interviews with stakeholders, and a literature analysis, the following results of logistics risk PT XYZ Tbk. were obtained:

- Risk Identification

| No. | Risk | Risk Type |
|---|---|---|
| 1 | Adverse weather | Environmental |
| 2 | Vessel delays | Transportation |
| 3 | Port congestion | Operational |
| 4 | Container damage | Operational |
| 5 | IT system disruptions | Information |
| 6 | Fuel price fluctuations | Financial |
| 7 | Human error | HR Risk |
| 8 | Workplace accidents | Safety Risk |
| 9 | Documentation errors | Administrative |
| 10 | Regulatory changes | Compliance |

- Risk Analysis Using Risk Matrix

| Risk | L | I | Score | Category |
|---|---|---|---|---|
| Bad weather | 5 | 5 | 25 | Extreme |
| Vessel delay | 4 | 4 | 16 | Extreme |
| Port congestion | 4 | 4 | 16 | Extreme |
| IT system disruption | 3 | 4 | 12 | High |
| Fuel price fluctuation | 3 | 4 | 12 | High |
| Container damage | 3 | 3 | 9 | Medium |
| Human error | 3 | 3 | 9 | Medium |
| Workplace accident | 2 | 5 | 10 | Medium |
| Documentation error | 2 | 3 | 6 | Medium |
| Regulatory changes | 2 | 4 | 8 | Medium |

**In-depth Analysis of Each Risk**

- Severe Weather Risk

  The risk of severe weather holds the highest score due to its high frequency and significant impact on company operations. The company is heavily dependent on weather conditions. Causes of such adverse weather include high waves, storms, strong winds, and extreme rainfall.

  The consequences of adverse weather include:
  - Delayed vessel departures
  - Changes to shipping regulations
  - Delivery delays
  - Increased operational costs

  This risk can be mitigated by:
  - Using satellite-based weather forecasting systems
  - Developing flexible schedules
  - Preparing alternative routes
  - Establishing an operational emergency response team




- Vessel Delay

  The risk of vessel delays significantly impacts the smooth flow of distribution and customer satisfaction. Most of these risks stem from external factors, such as:
  - Adverse weather conditions
  - Vessel breakdowns
  - Queues at the port
  - Loading and unloading operations

  The consequences include delayed shipments, customer complaints, and damage to the company's reputation, as well as the burden of unnecessary additional costs.

  These risks can be mitigated through:
  - Scheduled preventive maintenance for vessels
  - Real-time vessel position monitoring
  - Optimization of vessel schedules
  - Coordination with relevant port authorities




- Port Congestion

  Port congestion is caused by factors such as high vessel density, limited loading and unloading equipment, slow administrative processes, and extended cargo dwelling times. These issues result in distribution delays and increased storage costs, ultimately leading to reduced productivity.

  This situation can be addressed through:

  - Digitalization of port systems
  - Vessel slot scheduling
  - Collaboration with port authorities
  - Increasing the capacity of loading and unloading equipment




- Fuel Price Fluctuations

  Fuel price fluctuations pose a risk of significantly increasing operational costs, forcing the company to raise shipping rates and ultimately resulting in reduced profits.

  Potential solutions include:

  - Fuel efficiency management
  - Route optimization

- Long-term fuel purchase contracts
- Use of energy-saving IT systems




- Human Error

  Risks associated with human error stem from factors such as insufficient training for operational staff and vessel crews, worker fatigue, and the failure to implement or adhere to Standard Operating Procedures (SOPs).

  Solutions to address this include:
  - Regular training
  - Competency certification
  - Performance evaluation
  - Implementation of reward and punishment systems




**Risk Management Priorities**

Based on the Risk Matrix, risk handling priorities are ranked according to the highest values falling into the "extreme" and "high" categories, comprising:

- Severe weather
- Vessel delays

- Port congestion
- IT system disruptions
- Fuel price fluctuations




**Risk Control Strategy**

Risk control strategies consist of:

- Avoidance, such as avoiding high-risk routes during bad weather
- Reduction, in the form of preventive vessel maintenance
- Sharing, through shipping insurance
- Retention, by maintaining operational reserve funds




**Long-Term Strategic Recommendations**

Proposed long-term strategic recommendations include:

- Logistics digitalization through IoT and GPS tracking
- Artificial Intelligence (AI) to assist in predicting potential delays
- An integrated risk dashboard to facilitate analysis and the making of optimal, data-driven decisions
- A Business Continuity Plan (BCP), involving the development and standardization of organizational documents and procedures to ensure critical business processes continue to operate or are promptly restored following operational disruptions
- Strengthened cybersecurity to ensure IT systems remain secure and well-protected
- Continuous training programs to prepare field personnel, including vessel crews and loading/unloading equipment operators
- Collaboration with ports and regulatory bodies




In addition to the above, it is recommended that the company take measures such as:

- PT XYZ Tbk. needs to strengthen its ISO 31000-based risk management system.
- PT XYZ Tbk. needs to increase its use of digital technology.
- Risk monitoring must be conducted periodically.
- Employee training needs to be enhanced.
- PT XYZ Tbk. needs to strengthen cooperation with port authorities.
- A Business Continuity Plan should be developed.

## CONCLUSION

Based on the analysis using the ISO 31000 approach and a risk matrix, it is concluded that PT XYZ Tbk. faces various risks in its logistics operations. The highest-rated risks include adverse weather, vessel delays, and port congestion. These risks significantly impact the smooth distribution of goods, operational costs, and customer satisfaction. Implementing structured risk management can assist the company in more effectively identifying, analyzing, evaluating, and controlling risks. Consequently, the company can enhance its operational resilience and competitiveness within the maritime logistics industry. Recommended risk treatment strategies include logistics digitalization via IoT and GPS tracking, the use of Artificial Intelligence (AI) to assist in predicting potential delays, the implementation of an integrated risk dashboard, the development and implementation of a Business Continuity Plan (BCP), the strengthening of cybersecurity, personnel training programs, collaboration with ports and regulatory bodies, and the implementation of periodic risk monitoring and evaluation. This research is expected to contribute to PT XYZ Tbk. by enhancing the effectiveness of its logistics risk management and strengthening its operational resilience, while also serving as a reference for other logistics companies implementing ISO 31000:2018 as a risk management framework.

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