

RISK MANAGEMENT STRATEGIES IN PARCEL TRANSPORTATION: A CASE STUDY OF PARCEL DELIVERY BUSINESSES IN NONG KHAI PROVINCE

Surapong Intarapak

Udon Thani Education Center, Suan Sunandha Rajabhat University, Bangkok, Thailand

E-mail: surapong.in@ssru.ac.th

Butsaraporn Saenchan

Affiliation: Udonthani Technical College, Udonthani, Thailand

E-mail: Peple2552@gmail.com

Pornchai Yaemban

Affiliation: Nong Khai Technical College, Nong Khai, Thailand

Abstract

Parcel delivery businesses in Nong Khai face unique challenges. Cross-border operations to Laos necessitate careful navigation of customs regulations and differing legal frameworks. Flooding, a common occurrence, requires robust disaster preparedness plans. Competition is fierce, necessitating continuous market analysis and competitive strategies. Addressing employee shortages demands effective recruitment and retention strategies. To mitigate risks and minimize losses, several measures are crucial. Vehicle maintenance plans, including pre-use inspections and regular servicing, can prevent delays. Implementing revised work procedures (WIs) and conducting daily training sessions can significantly reduce the incidence of damaged parcels. Ensuring the proper storage and maintenance of Point of Sale (POS) systems, such as avoiding excessive heat and sunlight, is essential for their reliable operation.

Keywords: Risk Management, Transportation, parcel

Introduction

The parcel delivery industry is undergoing a significant transformation in the digital age. Key driving factors include the rapid growth of e-commerce, evolving consumer behaviors, and the integration of innovative technologies into business operations. Despite these changes, the parcel delivery industry continues to thrive, fueled by the expansion of the e-commerce market. As consumers increasingly turn to online shopping, their demands have become more diverse and complex, requiring faster delivery services, real-time tracking systems, and a variety of delivery options, including additional value-added services. Consequently, the parcel delivery market has become highly competitive, necessitating continuous innovation and adaptation for businesses to retain their customer base and maintain a competitive edge.

The expansion of our business branches in Nong Khai Province since 2020 has led to a significant increase in the volume of goods received and distributed at our distribution center. This surge has strained our operational efficiency and planning capabilities, resulting in the following challenges:

1. Incomplete delivery rate: The actual delivery rate has fallen short of our organizational targets, indicating flaws in the delivery process.
2. Workforce management: The unpredictable volume of goods in the center has made workforce planning difficult.

3. Delivery time: Actual delivery times do not align with our organizational standards, impacting customer satisfaction and overall efficiency.

The problems within the parcel delivery industry have had a significant impact on various stakeholders, including businesses, customers, and the overall economy. Rising costs, driven by factors such as fuel prices and labor expenses, have led to decreased profits and damaged reputations. Issues related to delayed deliveries and damaged goods have resulted in customer dissatisfaction and loss of trust. Therefore, addressing these challenges promptly is crucial to ensure the efficient operation of businesses and to meet customer needs effectively. (Sutida Yanthaisong, Surapong Intarapak and Napassawan Kumklong, 2024)

Researchers at Suan Sunandha Rajabhat University, Udon Thani Center, are conducting a research project to assist parcel delivery businesses in the province that are facing economic downturn and intense competition. The research focuses on risk analysis and developing adaptation strategies to enable businesses to survive and thrive in a changing environment, particularly in the area of green logistics, which is a crucial competitive factor in today's market. As the first study to focus on the specific challenges faced by parcel delivery businesses in Udon Thani, it is expected that the research findings can be practically applied to develop businesses and strengthen the province's transportation sector.

Research Objectives

1. To study the Risk Management Process of parcel delivery businesses in Nong Khai Province, Thailand.
2. To prevent the loss of various resources within the work processes of parcel delivery businesses in Nong Khai Province, Thailand.

Scope of the Research

The research design for the study on "Workforce Planning for Parcel Delivery: A Case Study of Parcel Delivery Businesses in Nong Khai Province" employs a mixed-methods approach, combining qualitative and quantitative research methodologies. The research utilizes quantitative data on parcel delivery volumes, key performance indicators (KPIs) of parcel delivery operations, interview data, and direct observation of parcel delivery operations within Nong Khai Province.

1. Population Scope.

Study Scope (Geographic Scope): Parcel delivery businesses in Nong Khai Province.

Study Population: Various resources within parcel delivery businesses in Nong Khai Province, such as employees, motorcycles, cars, and parcels.

2. Variable Scope.

Independent Variable: Parcel delivery volume (the quantity of parcels delivered to customers).

Dependent Variable: Key performance indicators (KPIs) of successful parcel delivery operations.

Control Variable: Parcel delivery personnel of parcel delivery businesses in Nong Khai Province.

3. Time Scope

The process will take approximately 4 months, from May 2024 to October 2024.

Research Methodology

1. Data Collection

Data collection on risks of parcel delivery business of entrepreneurs in Nong Khai Province between April - July 2024 by creating a questionnaire using the online platform Google Forms and then sending the questionnaire link to the target group, 10 locations and in-depth interviews. The questionnaire will have a guideline of questions for the interviewer to ask the interviewee in-depth. And it requires the interviewer's special ability to find details in the issues studied in depth. In-depth interviews are often studied in small populations, such as executives. After collecting data, summarize the SWOT Analysis data as shown in Figure 1.

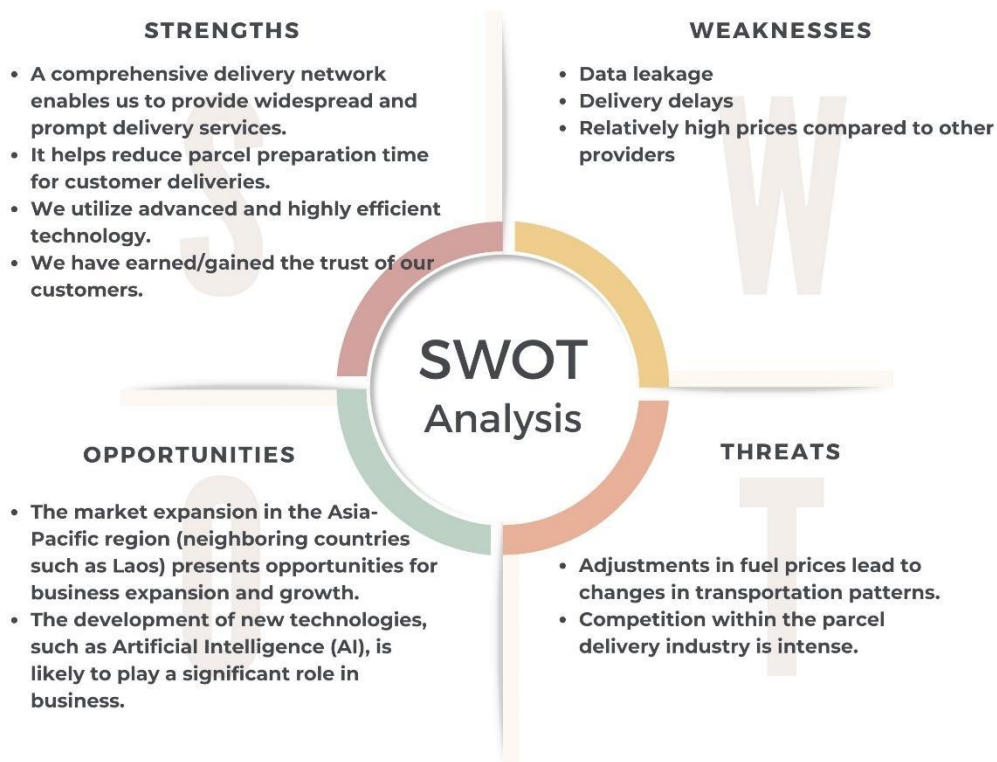


Figure 1: Summary of analysis of parcel delivery business of entrepreneurs in Nong Khai Province

2. Data Analysis

Risk identification and exploration using 4M 1E factors Risk event identification is the process of identifying risk events and risk characteristics that may negatively impact an organization’s goals, by analyzing both internal and external environments. Risk identification can be done in a variety of ways, such as through expert judgment, brainstorming, and interviews. Involving those directly involved is important, as they understand their risks best. Risk events identified Shortage of parcel delivery personnel: Due to the continuous increase in parcel volume from business partners, e-commerce platform services, online stores, and general customers, there has been a problem of parcel overflow in some branches. Employee resignation: There are groups of people trying to create a trend of employee resignation, which may affect the company's image. Problem management the company has taken action to solve the problem of parcel overflow by urgently recruiting more staff to clear parcels and deliver them to customers as soon as possible. Employee resignation trend: The company is taking

action to deal with the news. From the analysis of the internal and external environment of the organization, it was found that there are two main risks that the company is facing: a shortage of parcel delivery personnel due to the increase in parcel volume and news about employee resignation. The company has taken action to solve the problem of parcel overflow by urgently recruiting more staff and is taking action to deal with the news. However, the company should analyze the root causes of the problem, develop a prevention plan, and communicate transparently with stakeholders to reduce the impact of these risks. Summary of findings and surveys Risks based on 4M 1E factors are as follows:

Man (people/employees/personnel)

- M1. Sudden resignation Because other places offer better salary, income is not stable, from delivery volume
- M2. Sudden stoppage Because of being unwell or holiday
- M3. Delayed work Because employees are not enthusiastic about their work
- M4. Complaints from customers Because delivery staff do not pay attention to the delivery of parcels
- M5. Inexperienced Because of not knowing the route, familiarity with using the vehicle, sorting

Machine (machinery/facilities)

- M6. Damaged transport vehicle Because of lack of maintenance
- M7. Accident during transport Because of careless driving or force majeure
- M8. Delay in maintenance Because of delay in ordering spare parts

Material (raw materials/spare parts/equipment used in the process)

- M9. Damaged parcel Because of being damaged upon receipt and during delivery
- M10. Lost parcel Because of during delivery

Method (work process)

- M11. Error Because of during delivery and sorting
- M12. Parcel tracking system fails Due to internet failure
- M13. POS system delay Due to internet and server failure

Environment (weather/location/brightness/working environment)

- M14. Flood Due to the dangers of the rainy season in August - October of every year
- M15. Strong windstorm Due to the dangers of the rainy season in August - October of every year

Risk Assessment is an assessment of the likelihood of a risk occurring (Likelihood) and the impact of the risk (Impact). The risk assessment will help the organization know the likelihood of the risk and the severity of the impact of the risk that occurs. The assessment must be done before risk management (Inherent Risk) and after risk management (Residual Risk) and the results of the assessment are used to prioritize risk management. Summary in Table 1.

Table 1: Quantitative and qualitative criteria determination

Chance or frequency of Risk	Description	Rating level
Disaster	More than 16 times in 1 month	5
Major	Between 10-15 times in 1 month	4
Moderate	Between 6-9 times in 1 month	3
Minor	Between 3-5 times in 1 month	2
Nearly No	Less than 2 times in 1 month	1
Will Happen	Unable to fix it yourself, impact stop working, Supplier can't help	5
Most likely	Unable to fix it yourself, impact stop working, Supplier help.	4
Possible	Can fix it yourself, temporary impact Supplier help	3
Unlikely	Can fix it yourself, temporary impact	2
Rare	Can fix it yourself, no impact	1

From Table 1, quantitative and qualitative criteria are defined, which are evaluated in 2 dimensions, consisting of:

1. Likelihood refers to the likelihood that a risk will occur, whether high or low, based on past events and predictions of future events, and is considered against the specified qualitative and/or quantitative standards, namely: very low likelihood (1), low likelihood (2), moderate likelihood (3), high likelihood (4), and very high likelihood (5).

2. Impact refers to the result of damage that will be received if a risk occurs, whether high or low, based on the value of damage that has occurred in the past and the specified quantitative and qualitative standards, namely: very low impact (1), low impact (2), moderate impact (3), high impact (4), and very high impact (5).

Table 2: Risk Map

	Chance or frequency				
Impact	Nearly No (1)	Minor (2)	Moderate (3)	Major (4)	Disaster (5)
Will Happen (5)	medium (5)	High (10)	Very High (15)	Extreme (20)	Extreme (25)
Most likely (4)	medium (4)	medium (8)	High (12)	Very High (16)	Extreme (20)
Possible (3)	low (3)	medium (6)	medium (9)	High (12)	Very High (15)
Unlikely (2)	Very low (2)	low (4)	medium (6)	medium (8)	High (10)
Rare (1)	Very low (1)	Very low (2)	low (3)	medium (4)	medium (5)

Reference: Kaya (2018)

From Table 2, multiply the risk opportunity or frequency with the risk impact to get the risk level, namely, the highest level will have a value between 20-25, very high level will have

a value between 15-16, high level will have a value between 10-12, medium level will have a value between 4-9, low level will have a value between 3-4 and very low level will have a value between 1-2. Then take the risk level value according to the risk level to manage in order from the highest level to the very low level in order.

Risk Assessment is an assessment of the possibility of risk (Likelihood) and the impact of risk (Impact). The risk assessment will help the organization know the chance of risk and the severity of the impact of the risk that occurs. It must be assessed before risk management (Inherent Risk) and after risk management (Residual Risk) and use the assessment results to prioritize risk management. The organization must set quantitative and qualitative criteria. which will be evaluated in 2 dimensions as shown in Table 3.

Table 3: Risk Assessment

No.	Risk issues	Chance of occurrence	Impact	Score
Man (people/employees/personnel)				
M1	Sudden resignation	1	5	5
M2	Sudden stoppage	2	5	10
M3	Delayed work	1	2	2
M4	Complaints from customers	2	2	4
M5	Inexperienced	1	1	1
Machine (machinery/facilities)				
M6	Damaged transport vehicle	2	2	4
M7	Accident during transport	2	5	10
M8	Delay in maintenance	3	5	15
Material (raw materials/spare parts/equipment used in the process)				
M9	Damaged parcel	5	5	25
M10	Lost parcel	2	5	10
Method (work process)				
M11	Error	1	2	2
M12	Parcel tracking system fails	1	5	5
M13	POS system delay	3	5	15
Environment (weather/location/brightness/working environment)				
M14	Flood	2	5	10
M15	Strong windstorm	2	5	10

Risk Response is a decision choice to deal with risk after knowing the risk level. The risk response choice will be consistent with the assessed risk level. Select risk issues that are at very high and highest risk levels. There are 3 items as shown in Table 6.

Table 6: Risk hedging methods

No.	Risk issues	Prevention Methods
M8	Delay in maintenance	Short-term plan: Car/motorcycle rental Long-term plan: Prepare a pre-use vehicle inspection plan Maintenance plan Vehicle usage plan
M9	Damaged parcel	Short-term plan: Check the product, inform the customer, change the new box/return Long-term plan: Review the new operation procedure (WI) to avoid damaged parcels and organize training or Morning talk every day
M13	POS system delay	Causes: 1. The device is overheated. Solution: Avoid exposure to sunlight and should be in an environment that is not too hot. 2. Full storage. Solution: Delete unnecessary applications or image files that are installed on the device. 3. Internet signal strength. Solution: Check the router to see if it is working properly or call the internet service provider.

Research Results

1. In order to comprehensively summarize the risk management process study of the parcel delivery business in Nong Khai Province, Thailand, it is necessary to consider various related sources of information, such as research, academic articles, reports from government agencies, and direct information from entrepreneurs. However, from the information you provided and general information about the parcel delivery business, the results can summarize the risk management process that should be considered as follows: 1) Cross-border transportation risks: Since Nong Khai is a border province, parcel delivery to neighboring countries (e.g. Laos) may have additional risks, such as customs issues, different laws and regulations. 2) Natural disaster risks: Since Nong Khai is at risk of flooding, there should be a plan to deal with such situations. 3) Employee shortage risks: There should be an effective employee recruitment and retention plan. 4) Competition risks: The competition in the market should be closely monitored and analyzed.

2. To prevent the loss of various resources, the work process of the parcel delivery business in Nong Khai province, Thailand. Risk reduction is to increase control activities or change some of the steps to reduce the chance or impact of the event. Risk to an acceptable level 1) Delay in maintenance Prevention method Prepare a pre-use vehicle inspection plan, maintenance plan, vehicle use plan, periodic vehicle maintenance. 2) Damaged parcels Prevention method Review the new work procedures (WI) to avoid damaged parcels, and organize training or morning talks every day. 3) Delay in the POS system Solution Avoid exposure to sunlight and should be in an environment that is not too hot. General electronic devices that rely on the flow of electricity to work Discussion.

Acknowledgement

The researcher would like to express sincere gratitude to Suan Sunandha Rajabhat University for its invaluable support throughout this research.

References

- Boonsiri, S. (2016). A study of risk factors affecting the construction projects of petrochemical industry: An owners' perspective. An independent study in Master of Engineering, Faculty of Engineering, Burapha University.
- Charoen, C. (2003). Introduction to risk management. Bangkok: Pordee Publisher.
- Minton, B., Taillard, J., & Williamson, R. (2010). Do independence and financial expertise of the board matter for risk-taking and performance? Fisher College of Business Working Paper. The Ohio State University, Boston College, and Georgetown University.
- Naphasawan, K., Phirayu, S., & Amornrat, M. (2023). Development of product distribution channels: A case study of the community enterprise Pla Ra Lon Nikhom Songkhro, Udon Thani Province. *Journal of Public Administration, Suan Sunandha Rajabhat University*, 6(1), 180–188.
- Narumon, S. (2007). Enterprise risk management. Bangkok: Thanbook.
- Pagach, D., & Warr, R. (2011). The characteristics of firms that hire chief risk officers. *The Journal of Risk and Insurance*, 78(1), 185–211.
- Phurada, P. (2010). Risk management maturity of new product development: A case study of the chemical manufacturing. An independent study in Master of Science, Technology Management, College of Innovation, Thammasat University.
- Siwakorn, W. (2012). A study and risk analysis of high-rise buildings in Pattaya. Master dissertation, Faculty of Engineering, Suranaree University of Technology.
- Yeamchamphai, P., Pranee, S., Saisama, C., & Suwannarak, J. (2024). Food safety culture and the creation model of the demonstration schools operated by public university. *Journal of Multidisciplinary in Social Sciences*, 20(1), 70–77.