Factors and logistics activities affect the efficiency of the transportation process within the Eastern region

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Abstract

This research aims to: 1) investigate the logistics factors that affect the efficiency of the goods transportation process in the Eastern region, and 2) examine the logistics activities that influence the efficiency of the goods transportation process in the Eastern region. A questionnaire was distributed to a sample of 400 employees working in transportation companies across the Eastern region, with 50 participants from each province, including Prachinburi, Sa Kaeo, Chachoengsao, Samut Prakan, Chonburi, Rayong, Chanthaburi, and Trat.

The multiple regression analysis of logistics activities affecting transportation efficiency in the Eastern region shows that organizational factors account for 60.0% ($R^2 = 0.600$) of the variance in employees' overall performance, with statistical significance at the 0.001 level. Further analysis, using multiple regression, revealed that logistics activities explain 61.4% of the variance in transportation efficiency ($R^2 = 0.673$), with statistical significance at the 0.001 level. The logistics activities that significantly impact the efficiency of the transportation process in the Eastern region include service quality, transportation, warehouse location selection, and inventory management.

Keywords: Transportation Efficiency, Logistics Activities, Logistics

1. Introduction

Today, organizations must develop processes and explore new strategies to enhance efficiency and maintain a competitive advantage, especially in coordinating various business steps to meet customer needs and create added value. Key factors affecting transportation efficiency include effective inventory management, quality customer service, and fast and safe transportation. Improving these three areas will help increase operational efficiency and promote business growth (Siri Ploy Jinda and Pol. Lt. Col. Dr. Nopadol Burananath, 2019). Human resources are a critical factor in driving an organization toward its goals. Developing employees' knowledge, skills, and motivation is essential to align their work with the organization's objectives. Offering appropriate compensation, improving benefits, and creating growth opportunities will help employees work more efficiently and drive the organization toward success (Kanyakorn Sithiwong, 2023). For these reasons, the research team recognizes the importance of doing business within companies in the Eastern region, which is one of the main industries in the area. This has led the researchers to study the factors and logistics

activities that impact the efficiency of the transportation process in the Eastern region. The goal is to use the research findings to benefit the industry, develop businesses to achieve success, and improve transportation efficiency in line with target groups.

2. Research Objectives

1. To study the logistics factors that affect the efficiency of the goods transportation process in the Eastern region.

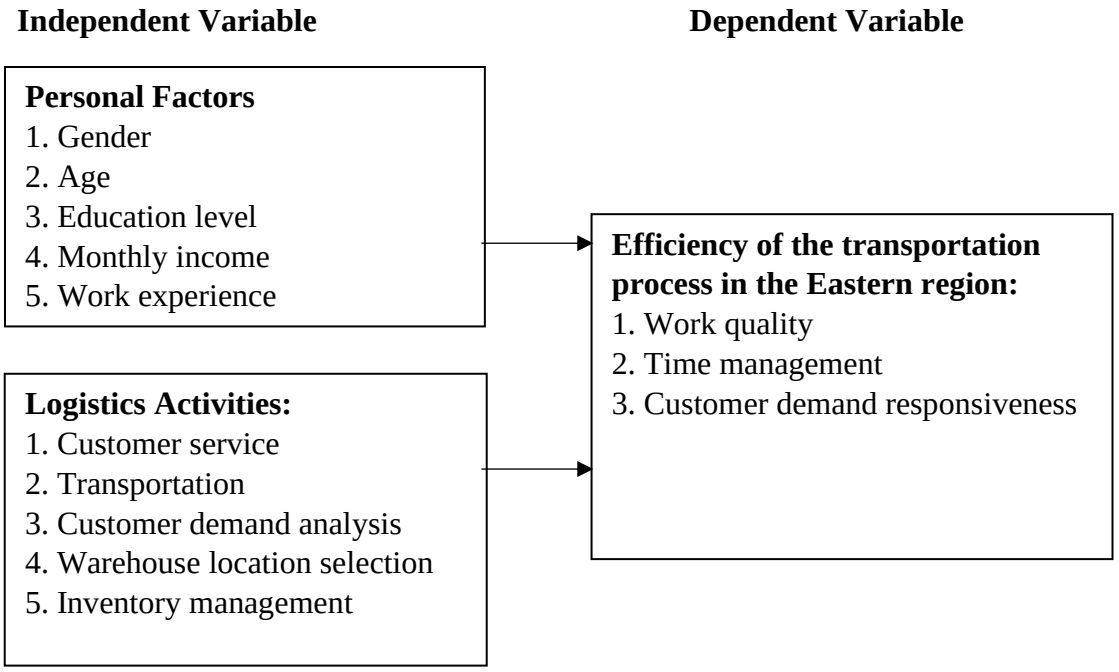
2. To examine the logistics activities that impact the efficiency of the goods transportation process in the Eastern region.

3. Research Hypotheses

Hypothesis 1: The different logistics factors and activities of companies in the Eastern region result in varying levels of work performance.

Hypothesis 2: The efficiency of the transportation process in the Eastern region across all three areas has the highest average score.

3.1 Conceptual Framework of Research



4. Related literature

4.1 Transportation of Goods

Sethawut Yenyuek, Chanakiat Samanbut, and Chalermporn Yenyuek (2023) explain the management of materials and goods from receiving products to delivery to customers, focusing on planning, control, and transportation to meet customer demands. Logistics covers the movement of goods, storage, and distribution to ensure products reach consumers with quality and at a cost-effective price. Currently, logistics connects manufacturers, distributors, and retailers to enhance production and distribution efficiency, and uses Third Party Logistics (3PL) services to allow manufacturers to focus more on product production.

Lambert, Stock & Ellran (1998, cited in Thanawan Phromngam, 2022, pp. 15-16) define logistics as the process of planning and controlling the movement and storage of goods efficiently from the point of origin to the consumer to meet customer demands at the lowest cost. The main logistics activities consist of 14 items, which are divided into two main groups:

1. Core Activities: Customer service, order management, demand forecasting, purchasing, inventory management, transportation, warehouse management, and reverse logistics management.

2. Support Activities: Spare parts management, plant location selection, material handling, packaging, communication in distribution, and waste disposal.

4.2 Individual Performance

Peterson and Plowman (1989, cited in Warin Jongmeesuk, 2019) state that effective work performance can be divided into four main factors:

1. Quality: The work must meet high standards and satisfy the beneficiaries. The process should use resources efficiently and fulfill the specified requirements.

2. Quantity: The work must produce results that meet the organization's expected volume, which can be measured numerically.

3. Time: The operations must be completed within the designated timeframe, and the duration must be appropriate for the situation.

4. Cost: The work should use resources and capital economically, while delivering results that are valuable and align with the set goals.

4.3 Transportation Process Efficiency

(Akbar, T. 2016, cited in Sirivanna Kavicha) Business management affects both organizational efficiency and customer relationships, especially in situations of inventory shortages. Organizations need to have effective management to meet customer demands and minimize the resulting impacts.

1. Inventory Planning: Forecast demand using historical and current sales data, and use an Inventory Management System (IMS) for accurate ordering.

2. Warehouse Space Management: Increase storage capacity or use technology to improve the efficiency of organizing and moving products.

3. Production and Delivery Process Improvement: Adjust production processes to be more flexible and plan efficient delivery strategies.

4. Communication and Customer Service: Communicate product status with customers and offer substitute options when shortages occur.

5. Research Methodology

This research investigates the factors and logistics activities that affect the efficiency of the goods transportation process within the Eastern region, with a focus on studying personal factors, logistics activities, and the efficiency of the goods transportation process. The research was conducted using a questionnaire divided into three sections: general information, logistics activities in the goods transportation process, and the efficiency of the goods transportation process.

A 5-point Likert scale was used for measurement. The sample group consists of 400 employees from transportation companies within the Eastern region, divided by province as follows: Prachinburi, Sa Kaeo, Chachoengsao, Samut Prakan, Chonburi, Rayong, Chanthaburi, and Trat, with 50 people from each province. The data from Section 1 of the questionnaire were analyzed using frequency distribution (Frequency) and percentage (Percentage). The data from Sections 2 and 3 were analyzed by calculating the mean (Mean) and standard deviation (Standard Deviation: S.D).

6. Results

Section 1: Analysis of Respondents' General Information

From the study of the general information of all 400 respondents, it was found that the majority of respondents were female, aged between 31 and 40 years. Most had a diploma level of education, with a monthly income ranging from 21,000 to 30,000 baht. The majority of respondents had 1-5 years of work experience. The companies were located in the provinces of Prachinburi, Sa Kaeo, Chachoengsao, Samut Prakan, Chonburi, Rayong, Chanthaburi, and Trat, with 50 respondents from each province

Section 2: Analysis of Logistics Activities in the Goods Transportation Process in the Eastern Region

The study found that the overall logistics activities were rated at the highest level (Mean = 4.49, S.D. = .32). Upon further examination, the highest-rated areas were: Service (Mean = 4.53, S.D. = .35) Transportation (Mean = 4.53, S.D. = .35) Customer Demand Analysis (Mean = 4.48, S.D. = .36) Warehouse Location Selection (Mean = 4.48, S.D. = .36) Inventory Management (Mean = 4.48, S.D. = .36) The breakdown for each area is as follows:

In the Service area, all items were rated at the highest level, listed from highest to lowest as follows: Item 5: You deliver goods accurately and completely (Mean = 4.60, S.D. = .51) Item 3: You take good care of the products (Mean = 4.58, S.D. = .50) Item 2: You can answer questions and clarify details accurately and clearly (Mean = 4.58, S.D. = .50) Item 4: You provide services in a fair, sequential order (Mean = 4.50, S.D. = .51) Item 1: You provide service politely and friendly (Mean = 4.46, S.D. = .60)

In the Transportation area, all items were rated at the highest level, listed from highest to lowest as follows: Item 3: Your company uses technology in the transportation process (Mean = 4.54, S.D. = .53) Item 4: Your company provides training for transportation drivers (Mean = 4.47, S.D. = .51) Item 3: Your company regularly inspects the vehicles used for transporting

goods (Mean = 4.46, S.D. = .52) Item 1: Your company delivers goods quickly and on time (Mean = 4.34, S.D. = .49)

The analysis of customer needs shows that all aspects are rated at the highest level, ranked from most to least as follows: Item 3: Your company provides a wide variety of service channels (Mean = 4.54, S.D. = 0.52). Item 4: Your company takes appropriate responsibility for product damage (Mean = 4.51, S.D. = 0.51). Item 5: Your company provides standard and reliable services (Mean = 4.49, S.D. = 0.52). Item 2: Your company has a sufficient number of branches to meet the needs of users (Mean = 4.47, S.D. = 0.54). Item 1: Your company has appropriate shipping prices relative to the service provided (Mean = 4.40, S.D. = 0.53).

The analysis of warehouse location selection and inventory management shows that all aspects are rated at the highest level, ranked from most to least as follows: Item 4: Your company regularly evaluates the quality of employees (Mean = 4.51, S.D. = 0.55). Item 3: Your company uses technology and automation systems in the warehouse (Mean = 4.50, S.D. = 0.54). Item 2: Your company has a systematic planning process (Mean = 4.49, S.D. = 0.52). Item 5: Your company has appropriate costs (Mean = 4.48, S.D. = 0.54). Item 1: Your company regularly checks inventory (Mean = 4.41, S.D. = 0.54).

Section 3: Analysis of the Effectiveness of Goods Transportation Processes in the Southern Region

The study found that all aspects are rated at the highest level (Mean = 4.50, S.D. = 0.34). The breakdown by individual aspect is as follows:

Quality of Work: The overall quality is rated at the highest level (Mean = 4.55, S.D. = 0.37). The ranking from highest to lowest is: Item 2: You consider the impact of your work on the company's image (Mean = 4.61, S.D. = 0.51). Item 1: You know the operational procedures to ensure quality according to the company's standards (Mean = 4.56, S.D. = 0.55). Item 4: You receive praise from users regularly (Mean = 4.52, S.D. = 0.51). Item 3: The tasks assigned to you are successful every time (Mean = 4.52, S.D. = 0.53).

Time Management: The overall rating is at the highest level (Mean = 4.47, S.D. = 0.38). The ranking from most to least is as follows: Item 3: Your company allocates workdays and holidays fairly and appropriately (Mean = 4.53, S.D. = 0.52). Item 2: The workload you are responsible for is appropriate about the time available for completion (Mean = 4.52, S.D. = 0.51). Item 1: You plan and manage your time effectively to ensure tasks are completed on schedule (Mean = 4.37, S.D. = 0.51).

Customer Demand Response: The overall rating is at the highest level (Mean = 4.55, S.D. = 0.37). The ranking from most to least is as follows: Item 3: There is continuous and consistent monitoring of the service provided to users (Mean = 4.58, S.D. = 0.52). Item 2: Users are satisfied with the service provided (Mean = 4.50, S.D. = 0.52). Item 4: Issues are resolved appropriately and promptly for users (Mean = 4.49, S.D. = 0.52). Item 5: Services are provided to users with quality and consistency (Mean = 4.48, S.D. = 0.56). Item 1: Products are delivered in perfect condition and to the correct location as requested by the user (Mean = 4.38, S.D. = 0.49).

7. Discussion of Results

The study results revealed that all four logistics activities—service provision, transportation, customer demand analysis, and warehouse location selection—received the highest satisfaction scores. Furthermore, when evaluating the effectiveness of the transportation process, it was also found to be at the highest level in all three areas: work quality, time, and customer demand response. Therefore, the findings can be discussed based on their importance as follows:

Hypothesis 1: Different logistics factors and activities within companies in the Eastern Region result in varying work performance.

This finding is consistent with the research by Nontakorn Thamchayangkorn (2021), which studied logistics activities and their impact on transportation process effectiveness. It aligns with the research of Phuden Kaewphiban and Kedsakuda Kodikul (2019), as well as Thanawan Phromngam (2022), which indicated that inventory management and the use of logistics technologies can significantly enhance transportation efficiency. Organizations with efficient transportation and inventory management processes can reduce costs and improve customer satisfaction, in line with the findings of Sirivan Kaviya (2020). Additionally, it supports the research of Juthamas Thongpwee (2021), which stated that the integration of technology into logistics processes can significantly improve efficiency, reduce transportation costs, minimize delivery errors, and increase service speed.

Hypothesis 2: The effectiveness of the transportation process in the Eastern Region across all three areas has an average score at the highest level.

It was found that the effectiveness of the transportation process in the Eastern Region, in all three areas—work quality, time, and customer demand response—was rated at the highest level. This aligns with the research of Amornwan Baigen (2022) and Peterson and Plowman (1989, cited in Worint Chommesuk, 2019), which studied service quality in logistics organizations and found that effective time management and the use of supporting technology can significantly enhance transportation efficiency and customer satisfaction. It was also found that organizations that can deliver goods on time tend to receive high customer satisfaction and are better able to maintain their competitive edge in the market.

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