



# Industrial Logistics Performance of Thai Industry

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## Abstract

Industrial Logistics Performance Indicators (ILPI) is used as an assessing tool for 27 logistics performance, developed for Thai industry. From 1,644 companies in the database collection, the study aims at providing individuality view of logistics performance of 5 industries, i.e., food, chemicals, rubber and plastic, machinery and equipment and electrical industries. As the industry and products vary, the paper is to explore key logistics characteristics as the over- and under- performance, outstanding from others. The findings are indicative that each industry focus and pay attentions on which performances. The finding is also suggestive if ones must understand the industry or wish to support the industry in any measures.

**Keywords:** Logistics performance; Industrial Logistics Performance Indicators (ILPI); Thai industry

## 1. Introduction

Logistics Bureau, Ministry of Industry of Thailand, has developed an “Industrial Logistics Performance Indicators (ILPI)”, aiming at assessing performance of logistics activities for Thai industries. The objectives of ILPI is to educate the industry on how to assess their logistics performance and then track the development or benchmark with their peers. The assessment can be indicative if any logistics activity need attention. Then the improvement can be done accordingly [1]. It is now a priority of Thai government to leverage logistics competency of the industry as well as other state facilitation to create competitive advantages for the country as a whole [2]. In this case, the database of 1,644 companies can be used to review the logistics performance of Thai industry.

## 2. Logistics Concepts

Logistics concepts and boundaries are literary indefinite. Many researchers define logistics in different perspectives and scopes per their interest [3-5]. However, in general, industrial logistics should include activities that manage flow and storage of goods, service and information from source to meet customers’ requirements. These activities typically are sourcing, transportation, warehousing, materials handling, logistics communication, inventory management. Bywhich, the management of logistics refers to planning, execution and control of these activities. Good logistics management shall lead to customer satisfactions, balancing cost, time and reliability of goods and service.

There are vast concepts and indicators on assessing the industrial logistics performance [6-9]. It is agreed that logistics performance has a great impact on the company overall performance [10-11].

## 3. Industrial Logistics Performance Indicators (ILPI)

In Thailand, the concept of logistics performance assessment is adopted. However, in order to suitably use for Thai industry ecosystem, Thai Industrial Logistics Performance Indicators (ILPI) is developed. Of interest are 9 logistics activities, i.e., demand forecasting and planning, customer service and support, logistics communication and order processing, purchasing and procurement, material handlings and packaging, warehousing and storage, inventory management, transportation and reversed logistics [12].

All activities are focused on 3 performance dimensions, i.e., cost, time and reliability. Therefore, there are 27 ILPI. Table 1 summarises these 27 indicators.

Each indicator is selected and nominated per Thai industry suitability of data collection. Each indicator is defined and referred, so the data is collected correctly. For example, ILPI6R-Inventory Accuracy, the indicators is defined as a measure of how closely official inventory records match the physical inventory. It is undoubtful that accuracy of inventory directly affects the company production and customer fulfilment systems [13-15].

**Table 1:** 27 ILPI: 9 Logistics Activities x 3 Dimensions

Logistics Activities	Cost Dimension	Time Dimension	Reliability Dimension
<b>ILPI1</b> Demand Forecasting and Planning	ILPI1C Forecasting Cost per Sales	ILPI1T Average Forecast Period	ILPI1R Forecast Accuracy Rate
<b>ILPI2</b> Customer Service and Sup-	ILPI2C Customer Service Cost per	ILPI2T Average Order Cycle Time	ILPI2R Delivered In-Full and On-

Logistics Activities	Cost Dimension	Time Dimension	Reliability Dimension
<b>ILPI3</b> Logistics Communication and Order Processing	ILPI3C Information Processing Cost per Sales	ILPI3T Average Order Processing Cycle Time	ILPI3R Order Accuracy Rate
<b>ILPI4</b> Purchasing and Procurement	ILPI4C Procurement Cost per Sales	ILPI4T Average Procurement Cycle Time	ILPI4R Supplier DIFOT
<b>ILPI5</b> Material Handlings and Packaging	ILPI5C Damaged Value per Sales	ILPI5T Average Material Handling and Packaging Cycle Time	ILPI5R Damage Rate
<b>ILPI6</b> Warehousing and Storage	ILPI6C Warehousing Cost per Sales	ILPI6T Average Inventory Cycle Time	ILPI6R Inventory Accuracy
<b>ILPI7</b> Inventory Management	ILPI7C Inventory Carrying Cost per Sales	ILPI7T Average Inventory Day	ILPI7R Inventory Out of Stock Rate
<b>ILPI8</b> Transportation	ILPI8C Transportation Cost per Sales	ILPI8T Average Delivery Cycle Time	ILPI8R Transportation DIFOT
<b>ILPI9</b> Reversed Logistics	ILPI9C Returned Cost per Sales	ILPI9T Average Cycle Time for Customer Return	ILPI9R Rate of Returned Goods

#### 4. Thai ILPI Database

Since introduced to Thai industries in 2010, Logistics Bureau, Ministry of Industry of Thailand has educated the companies, facilitated the data collection and collected the data of 1,644 companies in the database. Of interest are the following 5 industries that has more than 100 samples in the database. The following addresses key characteristics of these industries in Thailand based on Thailand Board of Investment (boi.go.th).

Food Product (ISIC10, 355 companies): Food industry is Thailand’s economy backbone for decades. Thailand is originally an agricultural base economy. Today, the industry flourishes and Thailand is becoming well known as “Kitchen of the World”. The value of export is up to US\$30 billion per year.

Chemicals and Chemical Products (ISIC20, 140 companies): Most of chemical industry in Thailand are basic mixer and packaging. Therefore, the production does not require high technologies. And as raw materials are mostly imported, the companies are mostly multi-national.

Rubber and Plastics Products (ISIC22, 127 companies): Thailand is world’s top rubber producer, exporting more than 3 million tons (US\$15 billion) of natural rubber per year. Also produced are tires and tubes for automobile, gaskets and seals, gloves, elastic, furniture and rubber products.

Machinery and Equipment n.e.c. (ISIC27, 109 companies): The industry support other industries to the manufacturing sector. Trade value of the industry both domestic and international reaches US\$25 billion per year. However, the industry is now challenged with more sophisticated and precise technological machinery that is today demanded by the industries in Thailand.

Electrical Equipment (ISIC28, 106 companies): The industry exports more than US\$55 billion per year (24% of Thailand’s annual export). It plays an important role in Thailand’s economy as a

main growth driver, making Thailand an Asia’s electrical and electronics manufacturing hub.

#### 5. Thai Industrial Logistics Performance

Figures 1-9 illustrate the averages performance in 27 indicators of 5 industries with the total database, denoted as “All”.

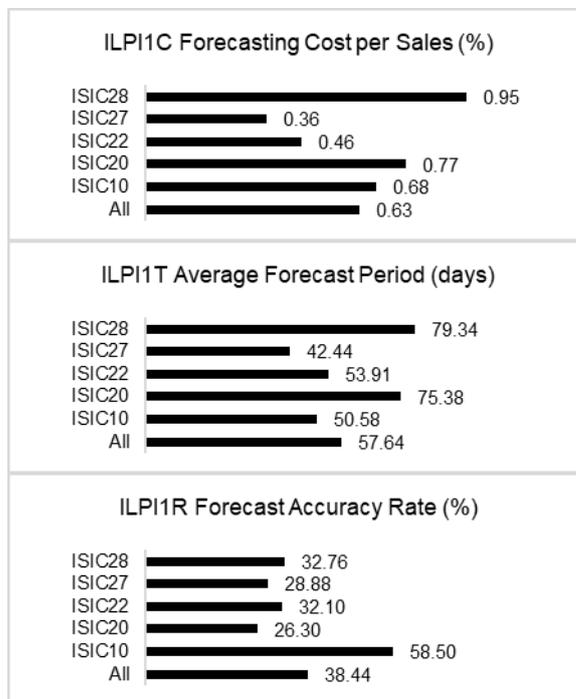


Figure 1: Average ILPI1 Demand Forecasting and Planning of 5 and “All” Industries

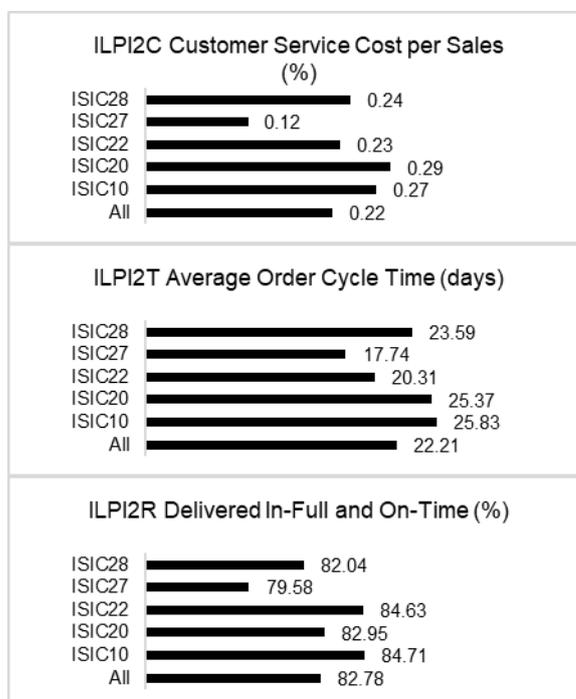


Figure 2: Average ILPI2 Customer Service and Support of 5 and “All” Industries

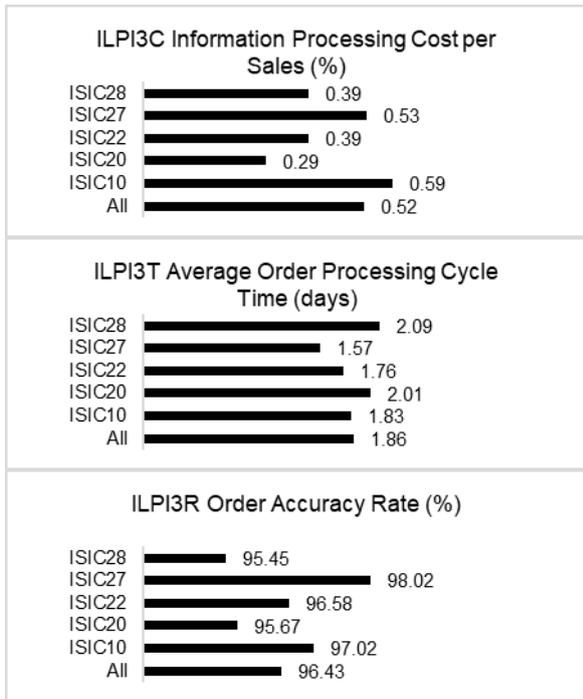


Figure 3: Average ILPI3 Logistics Communication and Order Processing of 5 and "All" Industries

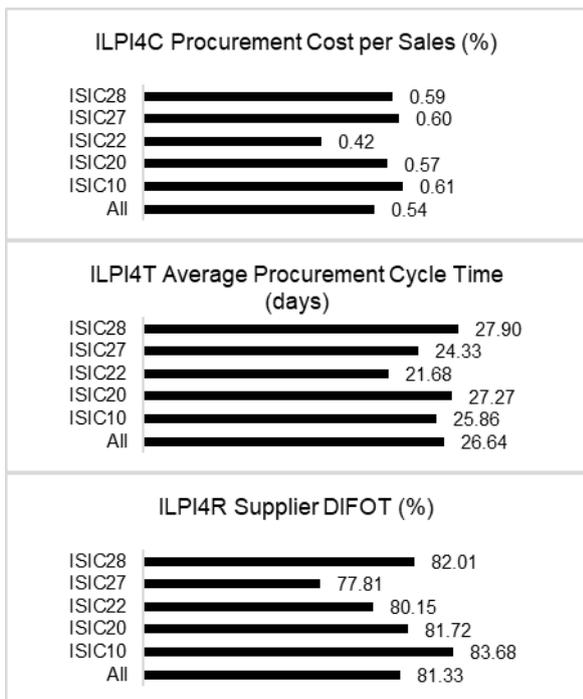


Figure 4: Average ILPI4 Purchasing and Procurement of 5 and "All" Industries

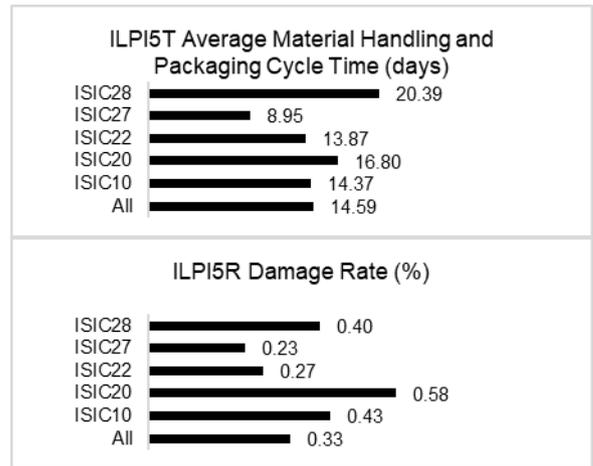
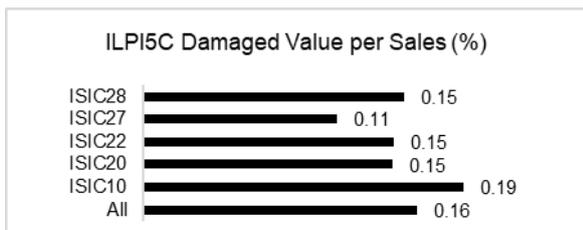


Figure 5: Average ILPI5 Material Handlings and Packaging of 5 and "All" Industries

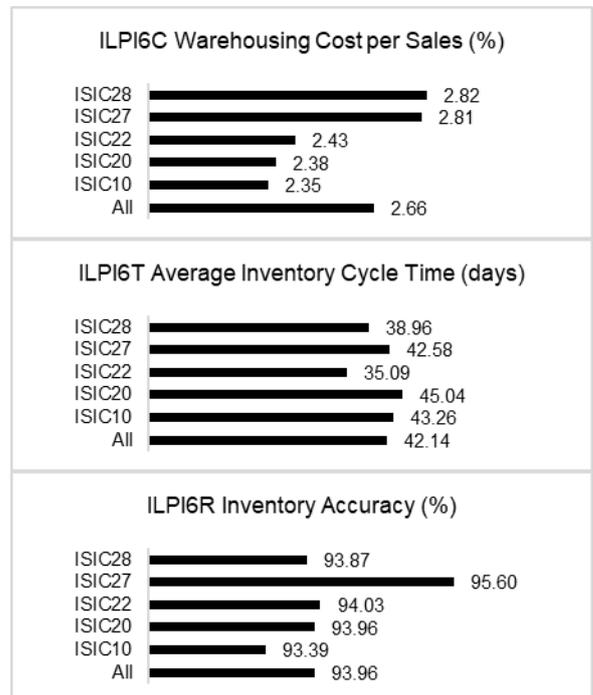


Figure 6: Average ILPI6 Warehousing and Storage of 5 and "All" Industries

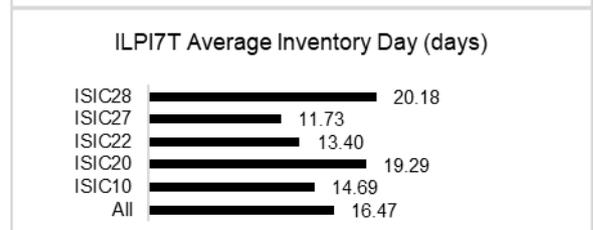
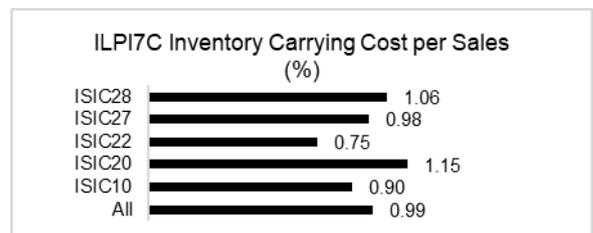




Figure 7: Average ILPI7 Inventory Management of 5 and “All” Industries

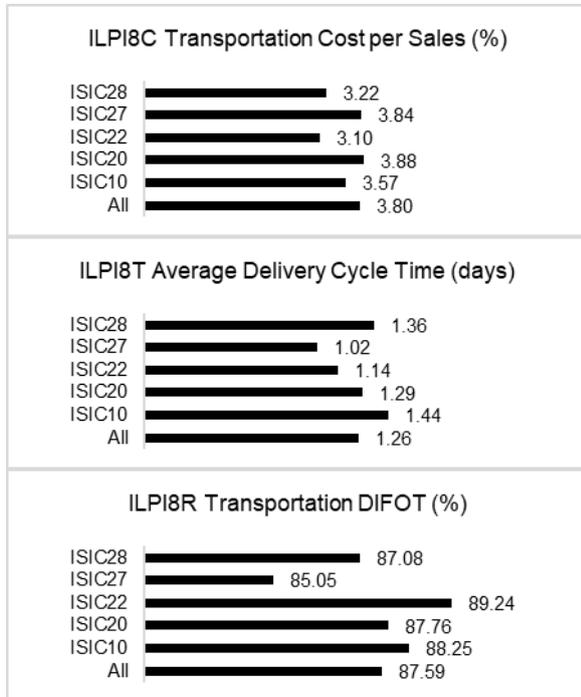


Figure 8: Average ILPI8 Transportation of 5 and “All” Industries

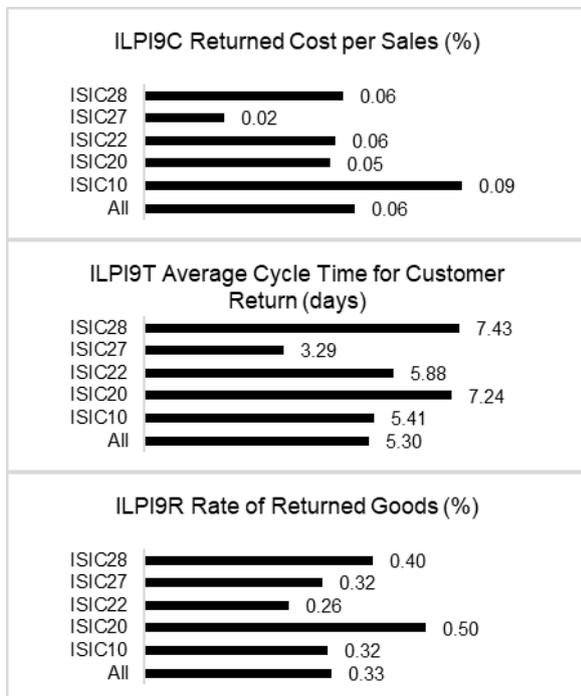


Figure 9: Average ILPI9 Reversed Logistics of 5 and “All” Industries

<b>Chemicals and Chemical Products (ISIC20)</b>	<i>Over-Performance:</i> Low information processing cost. <i>Under-Performance:</i> Long order cycle time; Low forecasting accuracy; High damage; High rate of returned goods; High forecasting cost; High customer service cost.
<b>Rubber and Plastics Products (ISIC22)</b>	<i>Over-Performance:</i> Low inventory carrying cost; Short inventory cycle time; Short inventory day; Short procurement cycle time; Low damage; Low rate of returned goods; Low forecasting cost; Low information processing cost
<b>Machinery and Equipment n.e.c. (ISIC27)</b>	<i>Over-Performance:</i> Short order cycle time; Short order processing cycle time; Short material handling and packaging cycle time; Short inventory day; Short delivery cycle time; Short return cycle time; Low forecasting cost; Low customer service cost; Low damage; Low return cost. <i>Under-Performance:</i> Low forecasting accuracy
<b>Electrical Equipment (ISIC28)</b>	<i>Over-Performance:</i> Low information processing cost. <i>Under-Performance:</i> High forecasting cost; Long material handling and packaging cycle time; Long inventory day; Long return cycle time; High damage; High rate of returned goods

## 6. Discussion

From Fig.1-9, it can be seen that each industry performs logistics activities differently both activity focus and dimension of interest. Some overperform and some underperform in terms of figures. Table 2 then summarises key logistics characteristics of each industry by picking both over- and under- performances that are outstanding from peers.

It is obvious that each industry possesses performance in their own ways. These are because each industry has different nature. Customer requirements can vary between products.

For example, the machinery and equipment industry are mostly concrete in response time, i.e., order cycle time, order processing time, inventory day, material handling and return cycle time. Rubber and plastic industry are good in inventory management. Food, chemical and electrical industries, on the other hand, are generally weak in material handling and packaging as the damage rate is high. They also get high return rate of goods.

## 7. Conclusion

The finding is conclusive that the performance of logistics of each industry varies. Each industry focuses and pay attentions on different logistics activity per their industrial characteristics. The dimensions of interest are also different per their supply chain requirement. It would make no sense if they are to be benchmarked or statistically analysis further due to their individuality. However, the findings are value as the figures are indicatives if ones must understand the industry or wish to support the industry in any measures.

## Acknowledgement

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Table 2: Performances of 5 Industries

Industry	Performances
<b>Food Products (ISIC10)</b>	<i>Over-Performance:</i> High forecast accuracy; Low inventory out of stock. <i>Under-Performance:</i> Long order cycle time; High damage; High rate of returned goods; High customer service cost.

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