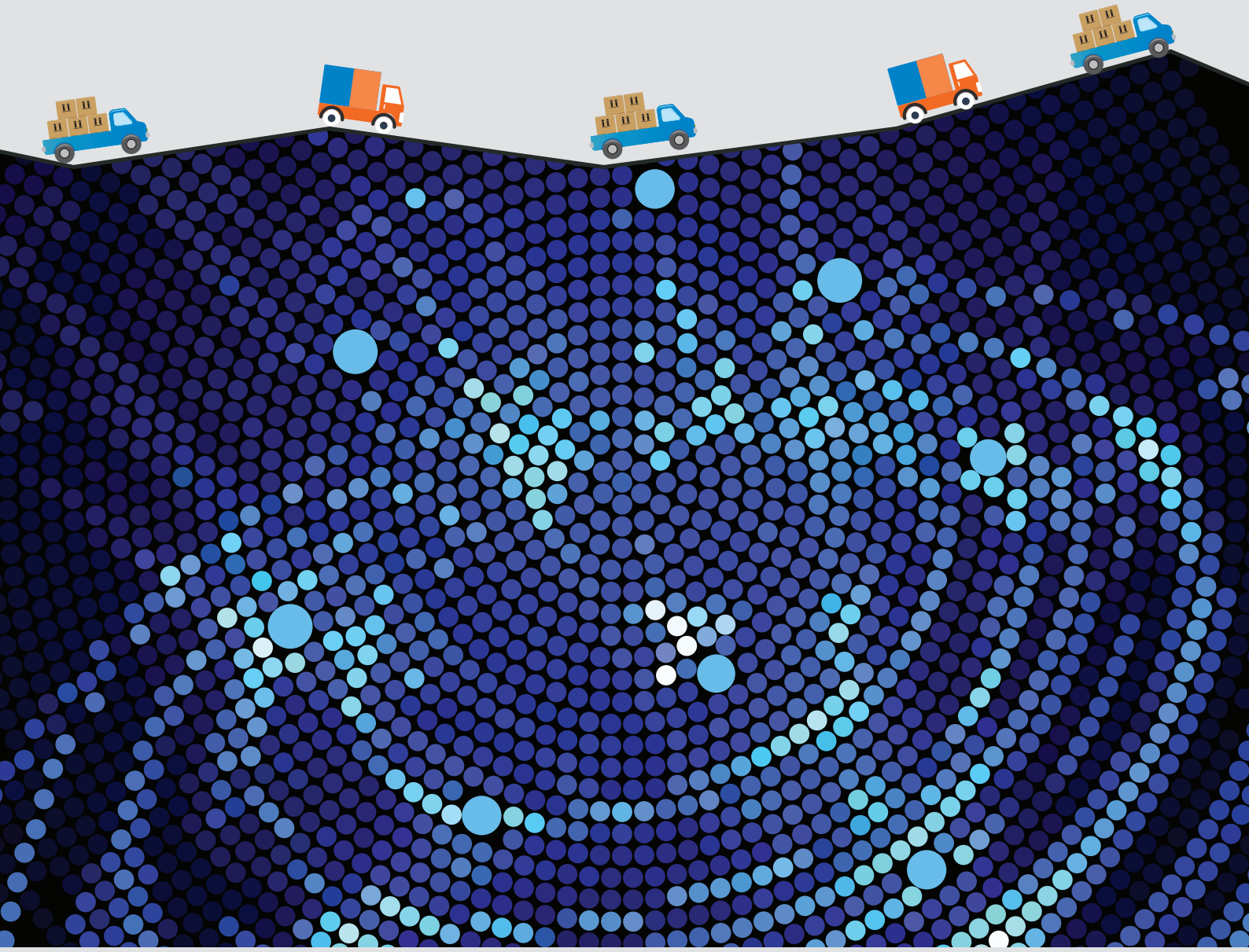
# SME Warehouse Productivity

## Benchmarking the logistics sector and goals that companies should go for



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# ABSTRACT

This benchmarking research project aimed to provide insights into the logistics sector in five Asian countries and how companies specifically in the warehousing subsector operate and support the agriculture, manufacturing, and service sectors in their countries. National experts from India, the Republic of Korea, Singapore, Thailand, and Vietnam, together with the Chief Expert of the APO Benchmarking Research Project Team, conducted the research following a seven-step framework. A set of performance metrics from the four perspectives of financial, customer, operational, and human resources was formulated together with a set of survey questionnaires developed for the warehousing subsector. Within the warehouse subsector, the team focused on obtaining insights into both the general and refrigerated warehousing subsectors.

While it was expected to be difficult to obtain the necessary data from all four perspectives, especially the financial data, the national experts gathered as much information as possible during the survey and from the available national statistics. Insights were gathered for mutual learning and sharing among SMEs, and best-in-class performance was identified to serve as a reference for SMEs to formulate improvement roadmaps for business and operational growth.

The key takeaway learning points from this benchmarking research project are the recommendations based on the findings, which SMEs in the warehousing subsector can adopt and implement to transform their businesses for sustainable growth. The APO Benchmarking Research Project Team hopes that more companies will embrace the benchmarking process as a strategic tool to innovate and transform them into successful, highly productive enterprises.

# INTRODUCTION

## BACKGROUND

In APO member economies, SMEs are important as they are growth engines and stimulators of productivity enhancement and industrial development. To illustrate this, total factor productivity was found to be the highest in SMEs, especially among medium-sized firms. SMEs are also actively engaged in acquiring and upgrading new technologies and sustaining their competitiveness in the international market. However, SMEs lack the knowledge to implement productivity initiatives to improve their performance. To help SMEs in member countries overcome this challenge and improve their productivity performance, it is necessary to provide them with benchmarking indicators against which they can compare their performance and strive to do better.

In 2012, the APO conducted research on benchmarking indexes for SMEs in the retail and food service sector, and then in the food manufacturing sector in 2013 to create a set of benchmarking indexes and best practices in each sector for SMEs. As part of a continuous effort, in 2014 research on benchmarking indexes for the warehousing subsector of the logistics sector was carried out to complete the global value chain benchmarking indexes for SMEs.

In Asia, SMEs in the logistics sector, specifically the warehousing subsector, contribute significantly to the rapidly growing service sector. They form one of the core enablers of different sectors in creating and enhancing the value added of national economies. The Global Warehousing and Storage Market Research Analysis 2015–2019 report forecast that the global warehousing and storage market would grow at a compound annual growth rate of 8.52% over the period 2014–2019 [1].

To enhance the effectiveness of the logistics value chain, it is crucial for warehousing SMEs to share and compare their business performance with one another so that they can identify gaps and enhance their organizational systems and processes. Benchmarking is one of the processes that will enable SMEs to establish goals and develop action plans to achieve strategic, breakthrough improvements to enhance their competitive advantage and overall competitiveness.

## OBJECTIVES

The four key objectives of this third benchmarking research project were outlined as below:

1) Define the research metrics with a set of key business performance indicators for benchmarking the performance of SMEs in the warehousing subsector.
2) Develop a database on the productivity performance of SMEs in the warehousing subsector.
3) Identify best practices and strategies to improve the productivity performance of SMEs in the warehousing subsector.

4) Publish a report on cross-country analysis of the productivity performance and best practices of SMEs in the warehousing subsector in selected APO member countries.

## SCOPE

The research project was divided into three parts and included the following:

1) Identification of relevant benchmarking key business performance indicators for monitoring productivity in the warehousing subsector.

2) Primary data collection through the use of questionnaires covering the four perspectives of financial, customer, operational, and human resources as well as secondary information collection.

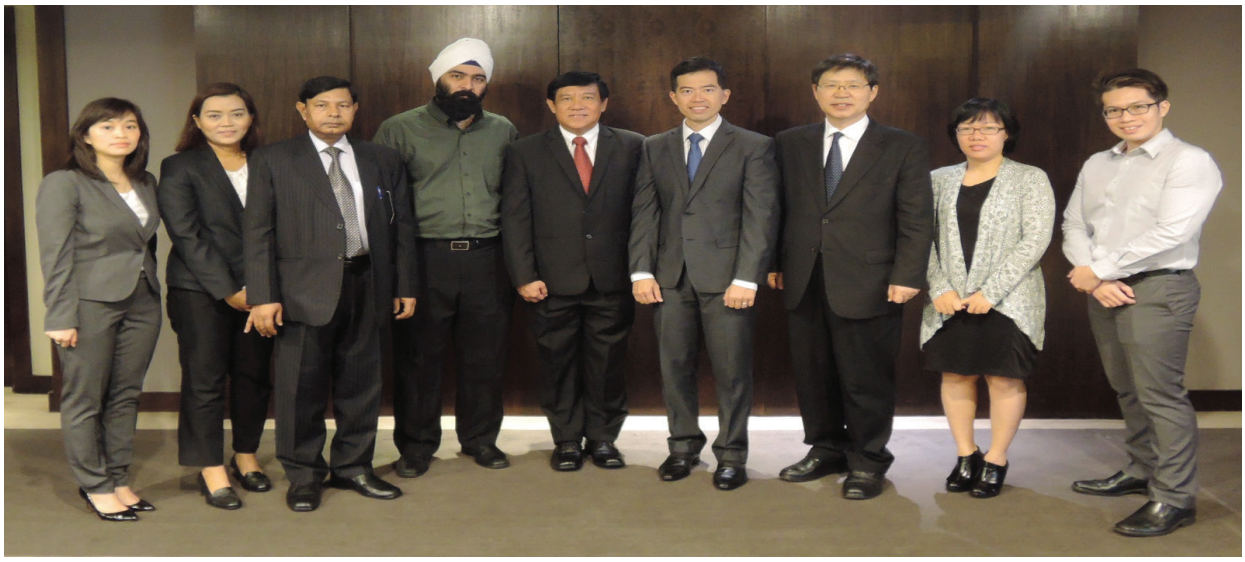
3) Quantitative and qualitative benchmarking analyses.

## METHODOLOGY

After establishing the overall research approach, a seven-phase benchmarking framework was adopted for this research project, as described below.

### Phase 1: Planning and Preparation

A coordination meeting was held from 3 to 5 March 2015 in Singapore to bring the various national experts from the participating countries together to plan the research project. The following experts were involved in this benchmarking research project: Chief Expert George Wong (Singapore); and national experts Tomer Krishan Pal Singh (India), Dr. Keun Hee Rhee (ROK), Vincent Lee Mun Sun (Singapore), Patcharasri Dangthongdee (Thailand), and Nguyen Thi Van (Vietnam). Chief Expert George Wong and APO Secretariat Program Officer, Research and Planning Department, Huong Thu Ngo facilitated the coordination meeting and managed this research project.



Research team at the coordination meeting in Singapore, March 2015

To ensure consistency and mutual understanding among the national experts, the research team members were introduced to the approach, concept, and methodology of the benchmarking process to be adopted for this project. Thereafter, the project milestones were developed and endorsed by the project team. For this research project, the seven-phase benchmarking framework (Figure 1) provided a structured process for SMEs to share and adapt learning/insights from the best business performers for follow-on continuous and breakthrough improvements in their companies.


Figure 1. Seven-phase benchmarking framework

## Phase 2: Formulation of Key Performance Indicators for the Logistics Sector (Warehousing Subsector)

The expert team discussed the key performance indicators (KPIs) and their computation relevant to the warehousing subsector. The various KPIs were categorized in the four perspectives of financial, customers, operational, and human resources.

*Financial Perspective*

A set of KPIs was formulated to measure the financial performance of SMEs such as value added, revenue, and profitability. The established list of financial perspective ratios together with their corresponding definitions and formulas are shown below.

| 1. Financial Perspective | | |
|---|---|---|
| **KPI** | **What it measures** | **Formula** |
| VA | Wealth generation/creation by the company | Sales – Bought-in materials and services |

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| 1. Financial Perspective | | |
|---|---|---|
| **KPI** | **What it measures** | **Formula** |
| VA-to-sales ratio | Proportion of sales created by the organization over and above purchased materials and services | VA ÷ Sales |
| Labor cost competitiveness | Efficiency and effectiveness of the organization in term of its labor cost | VA ÷ Labor cost |
| Working capital ratio | Operating liquidity and short-term financial health | Sales ÷ (Current assets – Current liabilities) |
| Profit margin | Proportion of sales left to the organization after deducting all costs | Earnings before interest, tax, depreciation, and amortization ÷ Sales |

VA, value added

*Customer Perspective*

A set of KPIs was formulated to measure the customer service performance and customer satisfaction level. The established list of customer perspective ratios together with their corresponding definitions and formulae is shown below.

| 2. Customer Perspective | | |
|---|---|---|
| **KPI** | **What it measures** | **Formula** |
| Customer loyalty | Customer retention,good customer service | (No. of customers this year – No. of customers last year)/No. of customers last year × 100% |
| No. of complaints | Operational/service satisfaction | No. of complaints |
| Sales per employee (FTE) | Efficiency and effectiveness of marketing strategy | Sales ÷ No. of employees (FTE) |

FTE, full-time equivalents

*Operational Perspective*

A set of KPIs was formulated to measure the operational performance of SMEs, such as service delivery responses, utilization of facilities and assets, etc. The established list of operational perspective ratios together with their corresponding definitions and formulae is shown below.

| 3. Operational Perspective | | |
|---|---|---|
| **KPI** | **What it measures** | **Formula** |
| Annual inventory turnover rate | Effectiveness in inventory management of materials used, e.g., efficient buying practices, inventory cost and quality (obsolescence level) | Cost of goods sold ÷ Average inventory or Total inventory movement (UOM)/ Average inventory (UOM) |

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| 3. Operational Perspective | | |
|---|---|---|
| **KPI** | **What it measures** | **Formula** |
| Inventory accuracy | Stock accuracy, physical stock against records | [1 – (No. of discrepancies ÷ Total items counted)] × 100% |
| Sales to warehouse space | Warehouse space profitability | Sales/warehouse area ($m^2$) |
| Receiving leadtime | Operational efficiency | Time taken to discharge goods from vehicle to put away (hours) |
| Order-processing lead time (in hours) | Operational efficiency | Time from order given to items ready for dispatch (hours) |
| Order-picking accuracy (%) | Operational accuracy | [1 – (No. of errors/Total items picked)] × 100% |
| Warehouse utilization | Business effectiveness | Area used/total area (UOM) |

UOM, unit of measure

*Human Resources Perspective*

A set of KPIs was formulated to measure the staff development, staff engagement, and morale to support business operations such as training hours per employee, employee satisfaction index, etc. The established list of human resources perspective ratios together with their corresponding definitions and formulae is shown below.

| 4. Human Resources Perspective | | |
|---|---|---|
| **KPI** | **What it measures** | **Formula** |
| Training hours per staff | Learning and development emphases of the organization to enhance competencies of staff | Training hours ÷ No. of staff |
| Training expenditure per staff | Learning and development emphases of the organization to enhance competencies of staff | Training cost ÷ No. of staff |
| Staff turnover rate | Retention rate of staff and overall staff satisfaction level | No. of staff resigned ÷ Total no. of staff |
| Absenteeism rate | Engagement and morale of staff | No. of absentees ÷ Total no. of staff |

## Phase 3: Formulation of Research Survey Questionnaires

To facilitate data gathering, a comprehensive set of survey questionnaires was developed for use during the data-collection and information-gathering exercises based on the following four types of questions: open-ended questions; multiple-choice questions; scaled-choice questions; and forced-choice questions. The survey questionnaires can be found in Annex A.

### Phase 4: Data Collection

Guidelines were established for data collection by each national expert. Selected participating SMEs were briefed on the objectives and approach of the research project prior to data collection and administering survey questionnaires. The briefing sessions provided a better understanding of the objectives and importance of this research project.

### Phase 5: Analysis of Findings

After the data were collected, the various KPIs were computed, analyzed, and tabulated following the research templates. Analyses, findings, and conclusions were derived based on the data collected for each of the subsectors of the warehousing subsector.

### Phase 6: Compilation of Best Practices Identified

From the survey exercise and data from national statistics, the performance and best practices were identified in the warehousing subsector. This information could be used as references for follow-on reviews by SMEs to improve their productivity levels and growth rates.

### Phase 7: Final Report Compilation

The key findings and conclusions, together with recommendations, were then summarized for reference and follow-on implementation by SMEs in the warehousing subsector.

## OVERVIEW OF REPORT

The report comprises the following nine main sections:

1) Introduction
2) Key Findings on the Logistics Sector (Warehousing Subsector) in India
3) Key Findings on the Logistics Sector (Warehousing Subsector) in the ROK
4) Key Findings on the Logistics Sector (Warehousing Subsector) in Singapore
5) Key Findings on the Logistics Sector (Warehousing Subsector) in Thailand
6) Key Findings on the Logistics Sector (Warehousing Subsector) in Vietnam
7) Best Practices
8) Recommendations
9) Conclusion

# KEY FINDINGS ON THE LOGISTICS SECTOR (WAREHOUSING SUBSECTOR) IN INDIA

## INTRODUCTION

According to the Associated Chambers of Commerce and Industry of India [2], the Indian Logistics Industry generated revenue of about USD125 billion and employment for 45 million people in 2010. Revenue was expected to grow annually at the rate of 15–20% to approximately USD385 billion by 2015. The market share of organized logistics players was also expected to double to approximately 12% by 2015–2016.

The size of the third-party logistics (3PL) industry was estimated to be USD1.5 billion in FY2011 (1% of logistics cost). The share of 3PL services was expected to increase from 6% in FY2006 to 13% in FY2011, at a compound annual growth rate (CAGR) of 25%. Logistics costs are 10–20% of GDP.

Based on The World Bank's Logistics Performance Index (LPI) 2014 [3], India was ranked 54th among the 160 countries (road, 56th; rail, 25th; seaports, 51st; and airports, 40th). The score and ranking of the six key dimensions used to benchmark national performance are shown in Table 1.

Table 1. Logistics performance index of India [3]

| Performance area | Score | Rank |
|---|---|---|
| Overall LPI | 3.08 | 54 |
| Customs | 2.72 | 65 |
| Infrastructure | 2.88 | 58 |
| International shipments | 3.20 | 44 |
| Logistics competence | 3.03 | 52 |
| Tracking & tracing | 3.11 | 57 |
| Timeliness | 3.51 | 51 |

Many factors contributed to the growth of the logistics industry in India over the decade, which included: changing the tax system; foreign direct investment; and rapid growth in industries such as agriculture, automobiles, pharmaceuticals, fast-moving consumer goods (FMCGs), and retail. However, major sectors also invested huge amounts in the logistics industry, such as aviation, metal mining, and consumer durables. With increasing competition and higher costs, the focus on outsourcing and entry of foreign players had positive impacts on the industry. Three major contributors to the growth of the logistics industry were: the emergence of organized retail businesses; increased foreign trade; and India becoming a manufacturing hub.

With government policies in place on improvement of the infrastructure facilities in the logistics sector, both the government and private sector implemented several projects such as the Golden Quadrilateral Project, east–west and north–south corridors (connecting four major metropolitan areas), and the Free Trade and Warehousing Zones.

## Cost of Warehousing in India

Logistics costs in India, comprising inventory holding, transportation, warehousing, packaging, losses, and related administrative costs, are estimated at approximately 13% of GDP. The breakdown of the cost of logistics in India is: transportation, 35%; inventory, 25%; losses, 14%; packaging, 11%; and handling and warehousing, 9%. The share of the logistics cost in the total cost for various industries is shown in Table 2.

Table 2. Share of logistics cost in total sales for various industries

| Industry | Share of logistics cost in total sales (%) |
|---|---|
| Cement | 15 |
| Steel | 6 |
| Food & beverages | 5 |
| FMCGs | 4 |
| Durables | 4 |
| Apparel | 3 |
| Automotive | 3 |

## Types of Warehouses in India

The major types of services provided by the warehousing sector in India are based on sector-specific needs. For the agriculture sector, main services cover goods and commodity transportation, goods and commodity storage, packaging, fumigation, repackaging, insurance, and credit on agri-commodities through negotiable warehousing receipt (NWR) systems. For other warehousing, companies offer logistics support, consolidation, labeling, packaging, bar-coding, custom clearance systems, distribution services, and reverse logistics services. Table 3 shows the major players in the Indian warehousing industry.

Table 3. Major warehousing players in India

| Public sector | Private sector | Cooperatives |
|---|---|---|
| Centre Warehousing Corporation (CWC) | Star Warehousing<br>National Building Handling Corporation<br>NCML<br>Adani Warehousing | National Cooperative Development Council<br>Cooperative agri-marketing societies |

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| Public sector | Private sector | Cooperatives |
|---|---|---|
| Food Corporation of India (FCI) | All Cargo Limited | |
| State Warehousing Corporation (SWC) | Gateway Distripark TCI | |
| Concor | Blue Dart | |

## Trends in the Warehousing Subsector

*Transportation*

Container cargo represents only about 30% (by value) of India's external trade, which is much lower compared with the global containerized cargo average of 70–75%. At a growth rate of 12%, India's container cargo traffic was estimated to reach 15 million 20-foot equivalent units (TEUs) by FY2016 from about 7.5 million TEUs at the time of writing (at 12 major ports). In comparison, PR China has created capacity at its ports to handle more than 100 million TEUs a year. Out of the 15 million TEUs of total container traffic, it is estimated that export-import rail container traffic will be 5 million TEUs by FY2016. This will be a huge opportunity and will significantly benefit container rail operators. Rising investment in the railways and port spaces also fuels growth in allied industries like wagon manufacturing, port handling equipment, railway electrification systems, and construction companies.

To reduce transportation costs and for quicker movement of cargo, multimodal transport operation (MTO) is being introduced. MTO helps exporters with less documentation, for example, requiring only a single document for all modes of transport.

*3PL*

Outsourcing is common everywhere today. The logistics industry is no exception. Logistics services like transportation, warehousing, cross-docking, inventory management, packaging, and freight forwarding all are part of 3PL services. Companies in India currently outsource an estimated 52% of logistics. The 3PL industry was estimated to be worth USD1.5 billion in FY2011. 3PL represents only 1% of logistics costs, however. With more outsourcing activities, growth in the 3PL market was expected to be in the range of 25–30% CAGR over FY2011–13. At present, 3PL activity is limited to only a few industries such as automotive, IT hardware, telecommunications, and infrastructure equipment.

The organized 3PL market in India can be categorized into three major segments: public sector; private sector; and foreign entrants. Some of the major players are TVS Logistics, DIESL (Tata), Panalpina, TCI, Gati, All Cargo, V Trans, VRL, Reliance, etc.

*Private Participation*

The warehousing subsector is becoming more competent with the entry of global organizations such as Gazeley Broekmen (Wal-Mart's logistics partner), CH Robinson, and

Kerry Logistics and large Indian corporate houses like the Tata, Reliance, and Bharti groups.

A series of mergers and acquisitions by national and international logistics express services are also occurring to provide warehousing services in India. DHL acquired Blue Dart, TNT acquired Speedage Express Cargo Service, and Fedex bought Pafex. This has led to consolidation of the industry at various levels and segments. Many of these companies are planning to broaden their areas of operations and to develop their own logistics parks across the country. These companies are renting SME warehousing and cold storage facilities in India. Accordingly, the share of organized logistics players was expected to double from 6% in 2007 to approximately 12% by 2015.

*Express Logistics*

Organized players have a monopoly on the express logistics industry and control 65% of the express business. Semi-organized and unorganized players account for 25%, and the remaining 10% of the market is controlled by EMS Speed Post. However, an altogether different picture is seen in the domestic segment, where unorganized players hold 41% of the market share based on a price advantage, while organized players account for 45% and EMS Speed Post the remaining 14%. Key players in express cargo are DHL, FedEx, TNT, UPS, AFL, DTDC, First Flight Couriers, TCI Express, Gati, and VRL.

*Warehouses*

Recently, warehouses have become key growth drivers in the logistics industry. Apart from conventional storage services, warehouses are now providing value-added services like consolidation and breaking up of cargo, packaging, labeling, bar-coding, reverse logistics, etc. Warehousing and related activities account for approximately 20% of the total logistics industry.

*Logistics Parks*

About 110 logistics parks are spread over approximately 3,500 acres with the majority planned in close proximity to state capitals. However, the availability of large land parcels at relatively low cost, along with connectivity to multiple markets across states and industrial clusters, has led to the emergence of some second-tier and third-tier cities as favored destinations for the development of logistics parks and warehouses.

*Government Policy and Regulations*

To emphasize the significance of the warehousing sector and to increase the competence in it, the government introduced private participation, especially in the port sector. The Government of India has introduced an NWR system by enacting the Warehousing (Development and Regulation) Act, 2007, which came into force from 25 October 2010 [4]. The Warehousing Development and Regulatory Authority was established on 26 October 2010 for implementation of the provisions of the act [5].

A major initiative in the transport infrastructure was the introduction of the National Maritime Development Program (NMDP) with an investment of INR568 billion (USD8.26

billion). The NMDP will address the challenges of the growing international traffic demand along with developing the port facilities on a par with world standards.

## Classification of Logistics Sectors in India

The National Industrial Classification (NIC) Code is an essential statistical standard for developing and maintaining comparable standard bases according to economic activities [6]. The NIC is an Indian standard compatible with the International Standard Industrial Classification (SIC) system. The details of the Indian SIC are given in Tables 4 and 5 below.

Table 4. Classification of the logistics sector in India

| SIC code | | Sector |
|---|---|---|
| 2-digit | 3-digit | |
| Section H | | Transportation & storage services |
| | 491/522 | Land transport |
| | 501 | Water transport |
| | 511 | Air transport |
| | 502 | Warehousing & storage |
| | 492 | Other transport |
| | 501 | Post & courier |
| | 492 | Other land warehouses |

Table 5. Classification of the warehousing and storage subsector in India

| SIC code | | Sector |
|---|---|---|
| 2-digit | 3-digit | |
| 52 | | Warehousing & storage |
| | 101 | General warehousing |
| | 102 | Cold storage (refrigerated warehousing) |
| | 103 | Storage for class cargo (i.e., hazardous materials) |
| | 109 | Specialized storage (i.e., petroleum & chemical storage) |
| | | Other warehousing |

India has about 33,000 major warehousing and storage facilities in different locations. The two major types of warehouse are open and closed. The closed type is further divided into the following major types: temporary and field warehousing (at production sites); roadside conventional warehousing; roadside modern warehousing; railside warehousing; transit and terminal warehousing and cold storage; integrated warehousing and cold storage; silo warehousing; and coastal warehousing.

The subsector is evolving into an important economic area with great potential for improvement in road transportation and railside, transit, and portside warehousing. The major reasons for this are India's indirect tax structure, with tax paid on cross-border (state-border) sales not being fully set off against local tax liabilities. As a result, most players resorted to establishing small warehouses rather than large, centralized set-ups across different states. This has led to the prevalence of small, fragmented warehouses, with corresponding inefficiencies. Therefore, the Government of India is putting emphasis on improving this sector by providing credit and finance facilities.

## PROFILES OF THE PARTICIPATING LOGISTICS SMES

The field study under this APO benchmarking research project covered a total of 30 SMEs from the general warehousing (15 SMEs) and refrigerated warehousing and cold storage (15 SMEs) subsectors. The majority of warehousing units are located in Delhi (National Capital Territory), Haryana, Maharashtra, and Madhya Pradesh. The operating capacities of the general warehousing units were in the ranges from 1,000 to 20,000 metric tons, whereas the cold storage warehouses had operating capacities from 1,000 to 10,000 metric tons. All the participating SMEs were registered with the government and operated as single-owner companies or by third-party operators.

### Subsector 1: General Warehousing

The general warehousing SMEs engage in all types of business operations from inventory management to logistics to value-added services depending on the types of commodity they deal with and their locations. Warehousing business operations consist of acquiring raw materials at farms or from producers/manufacturers and processors to the delivery of finished products. This segment consists of inbound or outbound transshipment warehouses or "terminals" used for bulking/debulking, stuffing/destuffing, cross-docking, and temporary storage. The services in transportation and logistics are handled by the producers themselves or third-party companies.

### Subsector 2: Refrigerated Warehousing (Cold Storage)

The refrigerated (cold storage) subsector may be defined as a series of interrelated facilities for maintaining ideal storage conditions for perishable goods from the point of origin to the point of consumption. The chain starts at the farm/factory level (e.g., harvest, postharvest, and precooling) and continues to the consumer or retail level. A well-organized cold chain reduces spoilage, retains the quality of the harvested products, and guarantees cost-efficient delivery to consumers. Cold chains form an integral part of the supply chain for the storage and distribution of perishable goods and temperature-sensitive pharmaceuticals and biological preparations.

The estimated size of the Indian cold-chain industry is INR8,000–10,000 crore (USD1.20–1.47 billion) and is expected to grow at 20% to 25% annually. It was estimated that this industry would grow to over INR40,000 crore (USD9.09 billion) by 2015. The erstwhile Planning Commission estimated that there are presently around 4,762 cold storage units in

India with a capacity of 19.6 million metric tons, with potatoes constituting almost 81% of the total capacity of cold storage handled.

### Subsector 3: Express Services

Although this research did not cover any SME in the express service subsector, it has been emerging as a third subsector. Express services by both road and air (air express and courier) are growing fast, but the road express segment is relatively less developed. Technology for tracking and tracing is inevitably going to become a dependable part of transportation. Human resources capable of operating and maintaining the systems will be increasingly in demand. Cold chain services are likely to gain significance with the growth of organized food retail businesses. This will result in the need for technically competent manpower capable of understanding the temperature and humidity control requirements of various perishable goods and operating sophisticated, controlled-atmosphere equipment.

## KPIS OF PARTICIPATING COMPANIES FROM INDIA

This study focused on KPIs in warehousing and storage SMEs, which cover the management and operating systems for general merchandise, refrigerated goods, and warehouse products. These indicators include the current physical and financial status of establishments providing logistics services such as labeling, bulk breaking, inventory control and management, assembly, order entry and fulfillment, packaging, picking and packing, price marking, and transportation.

### Financial Perspective

The SMEs surveyed reported that increasing land costs and tax construction were major upcoming challenges. Some were hesitant to share their financial data during the study as they are managed under 3PL arrangements, and data in standard financial formats were lacking. However, the data collected showed that major expenditures were on inventory management, packaging, transportation, and human resources.

In India, the warehousing subsector is often a cash-sensitive business. This has led some companies to improper account management of cash, and they may have overstated profits in their account documents. Furthermore, time assets such weighing bridges, trucks, etc. are not properly utilized by operators.

*Subsector 1: General Warehousing*

Table 6 shows the consolidated performance of the general warehousing subsector. The participating SMEs are profiting from their business activities and created wealth ranging from USD9,285,371.01 to USD11,329,098.97 during the last three years. The average value added over the last three years was USD10,124,566.91, which also showed that the overall sector showed a positive growth trend. Overall, the profit margin generated by SMEs in general warehousing was between 17–18%, which is better than that by the other economic sectors, for example, manufacturing, in India.

Table 6. Results of the financial perspective for the general warehousing subsector in India

| KPI | 2012 | 2013 | 2014 |
|---|---|---|---|
| VA (INR)<br>(in USD) | 638,660,480.20<br>(9,285,371.01) | 708,159,811.80<br>(9,759,230.75) | 803,589,174.40<br>(11,329,098.97) |
| VA-to-sales ratio | 0.35 | 0.45 | 0.43 |
| Labor cost competitiveness | 8.43 | 7.02 | 8.27 |
| Working capital ratio | 2.63 | 2.71 | 3.03 |
| Profit margin (%) | 18 | 18 | 17 |

VA, value added

*Subsector 2: Refrigerated Warehousing (Cold Storage)*

Table 7 shows that the wealth created by SME cold storage companies was on an increasing trend during the last three years studied. The value added-to-sales ratios were 0.93 and 0.87 in 2012 and 2014, respectively, which were higher than those of the general warehousing subsector. The labor cost competitiveness, in terms of efficiency and effectiveness, showed a slightly fluctuating trend. The working capital ratio increased from 15.11 in 2012 to 46.58 in 2014, while the profit margin after interest, taxes, depreciation, and amortization was only on a marginally increasing trend. This showed that the cold storage subsector is becoming cost intensive due to the use of technologies and customers' needs compared with the general warehousing subsector.

Table 7. Results of the financial perspective for the refrigerated warehousing (cold storage) subsector in India

| KPI | 2012 | 2013 | 2014 |
|---|---|---|---|
| VA (INR)<br>(in USD) | 7,701,656.54<br>(111,973.01) | 6,092,417.76<br>(83,960.30) | 8,406,118.42<br>(118,510.49) |
| VA-to-sales ratio | 0.93 | 0.89 | 0.87 |
| Labor cost competitiveness | 8.01 | 5.22 | 6.54 |
| Working capital ratio | 15.11 | 52.73 | 46.58 |
| Profit margin (%) | 34 | 28 | 30 |

VA, value added

## Customer Perspective

During discussions with participating SMEs, it was observed that lower use and penetration of IT, along with a lack of skills and proper communications infrastructure, resulted in inadequate customer services. The main complaints received were delays in services and lack of visibility, quality, and real-time tracking ability for shipments. The unavailability

or absence of a seamless flow of information among the constituents of logistics service providers created a lot of uncertainty, unnecessary paperwork, and delays, as well as a lack of transparency in terms of cost structures and service delivery. However, some public- and private-sector SMEs had installed IT-based operations to save costs and time. This had helped enhance employee effectiveness and efficiency in the handling of commodity and product portfolios in refrigerated warehouses.

*Subsector 1: General Warehousing*

Table 8 shows that most warehousing SMEs' priority was to retain customers and provide effective services such as safe custody of commodities, insurance of products, timely deliveries, etc. The survey also showed that complaints had decreased drastically over the past three years from 104.80 to 14.40 due to better customer service with the adoption of modern warehousing management systems. These had enhanced customer loyalty and contributed to a substantial increase in the sales per employees in those SMEs.

Table 8. Results of the customer perspective for the general warehousing subsector in India

| KPI | 2012 | 2013 | 2014 |
|---|---|---|---|
| Customer loyalty (%) | 55.00 | 58.00 | 63.00 |
| No. of complaints | 104.80 | 64.80 | 14.40 |
| Sales per employee (FTE)<br>(INR)<br>(in USD) | 14,574,266.64<br>(211,892.67) | 12,634,981.49<br>(174,124.11) | 14,630,039.02<br>(206,256.09) |

FTE, full-time equivalents

*Subsector 2: Refrigerated Warehousing (Cold Storage)*

Table 9 shows that the main priority of the refrigerated warehouse SMEs was the retention of customers and providing effective services such as safe custody of commodities, insurance of products, timely deliveries, etc. The survey found that customer loyalty had increased from 69.50% to 74.30% and the number the complaints had decreased significantly from 2.00 to 0.60 over the three years studied. Hence the sales per employee in full-time equivalents had increased during the period from 2012 to 2014.

Table 9. Results of the customer perspective for the refrigerated warehousing (cold storage) subsector in India

| KPI | 2012 | 2013 | 2014 |
|---|---|---|---|
| Customer loyalty (%) | 69.50 | 72.50 | 74.30 |
| No. of complaints | 2.00 | 1.20 | 0.60 |
| Sales per employee (FTE)<br>(INR)<br>(in USD) | 531,116.63<br>(7,721.81) | 494,383.69<br>(6,813.16) | 621,790.96<br>(8,766.09) |

FTE, full-time equivalents

## Operational Perspective

Participating SMEs used standard operating procedures and adopted warehouse management systems for effective, efficient handling of their warehousing operations and supply chain management.

*Subsector 1: General Warehousing*

Table 10 shows that the annual turnover rate, calculated based on the cost of goods sold divided by average inventory, remained nearly constant and increased only slightly over the three years studied. In general, inventories were kept between one to six months and the annual average was three and six-tenths months. The inventory turns were higher near urban hubs.

Table 10. Results of the operational perspective for the general warehousing subsector in India

| KPI | 2012 | 2013 | 2014 |
|---|---|---|---|
| Annual inventory turnover rate | 65.29 | 66.53 | 67.17 |
| Inventory accuracy (%) | 95.80 | 95.90 | 95.60 |
| Sales-to-warehouse space ($m^2$) (INR) (in USD) | 1513.19 (22) | 1886.64 (26) | 2482.60 (35) |
| Receiving lead time (hours) | 1.40 | 1.40 | 1.40 |
| Order-processing lead time (hours) | 3.20 | 3.20 | 3.20 |
| Order-picking accuracy (%) | 47.30 | 49.60 | 51.80 |
| Warehouse utilization rate (%) | 80.40 | 83.00 | 83.80 |

The field survey revealed that the capacity utilization of warehouses was between 80.40% to 83.80%, showing that about 16% to 20% of existing capacity was not well utilized. The data on receiving lead times and order-processing lead times among participating SMEs were on average 1.4 hours and 3.2 hours, respectively. The time taken depended on both the warehousing operation procedures and efficiency of manpower involved. Modern warehouses required shorter lead times because less time was needed to receive commodities with their weight measurement systems, receipt systems, and designated storage locations. IT-enabled warehouses with automated systems for commodity identification and handling also took less time. Order-processing systems required a number of verifications, such as test report verifications, insurance forms, and outward receipts, which depend on the efficient existing benchmarks for operation. The study indicated that packing efficiencies had increased from 47.30% to 51.70%.

The overall capacity utilization of warehouses was on an increasing trend per annum. The data showed that SMEs were balancing between supply and demand by establishing minimum holding stocks to cover lead times. To achieve this, inventory managers constantly liaised with the companies' systems/programs to keep abreast of changing needs and

priorities. The warehouse management also facilitated the accurate management of inventory/stocks to cover the lead time for replacement and prevent stock-outs.

*Subsector 2: Refrigerated Warehousing (Cold Storage)*

The research found that energy was a major input for refrigerated warehouses, and energy consumption was therefore a key consideration. Shortages and erratic power supplies decreased the operational efficiencies of refrigerated warehouses. The use of alternate sources of energy such as diesel to compensate contributed to higher costs of operations, in addition to other costs such as maintenance, equipment, and cold storage stock management.

As shown in Table 11, the annual average inventory turnover rate remained relatively constant at 6.1 to 6.4 from 2012 to 2014. Normally, for cold storage the inventory use is very high. Sometimes inventory was kept for a day, a week, or a month with an average annual inventory turnover of 0.5. The high inventory turnover rate is slightly harder to interpret. It could mean that the newly constructed cold storage facilities had unexpectedly strong sales or that the inventory was not appropriately managed and administered. There were inadequate data available on receiving and order picking in cold storage, which also hindered the analysis of the causes. However, the inventory accuracy rate, from the viewpoint of participating SMEs, was also high, ranging from 90 in 2012 to 95 in 2014. This means that there were still 5–10% defects in operations.

Table 11. Results of the operational perspective for the refrigerated warehousing (cold storage) subsector in India

| KPI | 2012 | 2013 | 2014 |
|---|---|---|---|
| Annual inventory turnover rate | 64.43 | 63.88 | 62.82 |
| Inventory accuracy (%) | 90.40 | 92.20 | 95.10 |
| Sales-to-warehouse space ($m^2$)<br>(INR)<br>(in USD) | 1849.53<br>(26) | 1667.62<br>(23) | 2060.05<br>(30) |
| Receiving lead time (hours) | 0.00 | 0.00 | 0.00 |
| Order-processing lead time (hours) | 3.00 | 3.00 | 3.00 |
| Order-picking accuracy (%) | 90 | 92 | 95 |
| Warehouse utilization rate (%) | 84.00 | 85.00 | 86.00 |

The data on capacity utilization revealed that 84% to 86% was adequately used compared with the existing available capacity during the period 2012 to 2014, meaning that about 14% to 16% of capacity remained unused. Some participating SMEs had adopted IT and mechanical handling systems to manage commodities, chemicals, and perishable food products effectively. They had also adopted real-time delivery-based systems integrated with the cold chain to shorten order-processing times.

## Human Resources Perspective

*Subsector 1: General Warehousing*

Table 12 indicates that the training hours per staff member for participating SMEs had increased from 119.20 hours in 2012 to 172.80 hours in 2014, while the training expenditure per staff member had increased from USD142.48 to USD229.52, respectively. There was an emphasis on training to develop and enhance staff capabilities to improve and streamline conventional work processes, digitalization, and supply-side solutions.

Table 12. Results of the human resources perspective for the general warehousing subsector in India

| KPI | 2012 | 2013 | 2014 |
|---|---|---|---|
| Training hours per staff | 119.20 | 145.20 | 172.80 |
| Training expenditure per staff<br>(INR)<br>(in USD) | 9800.00<br>(142.48) | 12220.00<br>(168.41) | 16280.00<br>(229.52) |
| Staff turnover rate (%) | 4.60 | 3.80 | 4.20 |
| Absenteeism rate (%) | 2.60 | 2.00 | 1.90 |

The survey data also showed that staff turnover and absenteeism rates had decreased over the years. These positive rates together with good staff punctuality resulted in improved operational efficiency and effectiveness in the warehouses.

*Subsector 2: Refrigerated Warehousing (Cold Storage)*

Table 13 indicates that although the training hours per staff member had remained constant for refrigerated warehouses, the training expenditure per staff had increased annually from USD4.36 in 2012 to USD5.64 in 2014. The training expenditures were used for developing capabilities, upgrading cold storage technologies, operation and maintenance, and work processes. The data collected also showed that most of the management and operational staff were permanent due to zero staff turnover rates and lowered absenteeism rates over the previous three years. The provision of training and punctuality of staff resulted in improved warehouse efficiency and effectiveness.

Table 13. Results of the human resources perspective for the refrigerated warehousing (cold storage) subsector in India

| KPI | 2012 | 2013 | 2014 |
|---|---|---|---|
| Training hours per staff | 1.20 | 1.20 | 1.20 |
| Training expenditure per staff<br>(INR)<br>(in USD) | 300.00<br>(4.36) | 320.00<br>(4.41) | 400.00<br>(5.64) |
| Staff turnover rate (%) | 0.00 | 0.00 | 0.00 |
| Absenteeism rate (%) | 5.30 | 4.70 | 4.50 |

# ANALYSIS OF THE PERFORMANCE OF THE LOGISTICS SECTOR (WAREHOUSING SUBSECTOR) IN INDIA

## Financial Perspective

There are many instances when tax can be managed to avoid significant tax liability, leading to financial irregularities in the service sector. Warehousing subsector operators in India need to start adopting standard financial systems. Companies with warehouses and cold storage facilities registered under the Warehousing Development Regulation Authority should submit documents to prove their positive net worth (by a chartered accountant) or creditworthiness certificates (from a bank) for licenses to carry out the business of warehousing.

## Customer Perspective

The warehousing and cold storage units have initiated processes to put in place IT platforms for end-to-end solutions for customers. Due to emerging competition among many warehousing companies, the timely delivery of goods is now becoming a central item on the agenda. Therefore, good tracking systems for customers in India are necessary.

## Operational Perspective

Some firms were following industry-specific requirements in terms of operating procedures. The accuracy and quality of material handling and financial transaction records were verified on a test basis against office/secretarial records when firms had IT systems integrated with their financial accounting systems.

The operations of many SMEs with cold storage facilities depend on the reliability of the electricity supply. Many use conventional sources of energy such as purchasing electricity from service providers or relying on diesel generators. Some participants in this research had also explored the use of alternate sources of energy, i.e., solar power at some locations.

## Human Resources Perspective

SME warehousing and cold storage firms had identified the health and safety risks arising from their activities and recognized the need to put in place proper systems, processes, and control mechanisms to ensure safety and environmental awareness among employees. They were also committed to providing a healthy, safe workplace for all employees by providing free medical checkups, insurance, etc. as an essential part of their business strategy. Various welfare initiatives and safety training programs were also implemented, in addition to setting company policies on drugs and alcohol, occupational health, driver and vehicle safety, mobile telephone use, smoking, etc.

# KEY FINDINGS ON THE LOGISTICS SECTOR (WAREHOUSING SUBSECTOR) IN THE REPUBLIC OF KOREA

## INTRODUCTION

Based on the Logistics Performance Index (LPI) by the World Bank, the ROK ranked 21st among 160 countries in 2014 (Table 14) [3, 7, 8]. Compared with 2012, its ranking dropped in the key performance indicators (KPIs) of customs, international shipments, and timeliness. However, there was improvement in terms of infrastructure, logistics quality, and tracking.

Table 14. LPI ranking of the ROK by component

| Year | Overall LPI rank | Customs | Infrastructure | International shipments | Logistics quality | Tracking | Timeliness |
|---|---|---|---|---|---|---|---|
| 2012 | 21/155 | 23 | 22 | 12 | 22 | 22 | 21 |
| 2014 | 21/160 | 24 | 18 | 28 | 21 | 21 | 28 |

Source: World Bank (2012, 2014): *Connecting to Compete: Trade Logistics in the Global Economy*

In international comparisons of the LPI, countries such as Germany, Singapore, the Netherlands, and Belgium generally have "world-class" status and are highly competitive in logistics, as shown in Table 15.

Table 15. LPI ranking by country

| Country | 2014 | 2012 | Country | 2014 | 2012 |
|---|---|---|---|---|---|
| Germany | 1 | 4 | Norway | 7 | 22 |
| Netherlands | 2 | 5 | Luxembourg | 8 | 15 |
| Belgium | 3 | 7 | USA | 9 | 9 |
| UK | 4 | 10 | Japan | 10 | 8 |
| Singapore | 5 | 1 | ROK | 21 | 21 |
| Sweden | 6 | 13 | | | |

Source: World Bank (2012, 2014): *Connecting to Compete: Trade Logistics in the Global Economy*

Some issues faced by the logistics sector in the ROK include cost, third-party logistics (3PL), firm size, and labor productivity. First, the issue of logistics costs needs to be addressed because they are higher than in other advanced countries, even for home shopping, Internet purchases, etc. The share of logistics costs to sales was 9.1% in the ROK but only 4.8% in Japan in 2007 (Figure 2). This means that the ROK may not be outstanding in the logistics sector in terms of cost competitiveness.

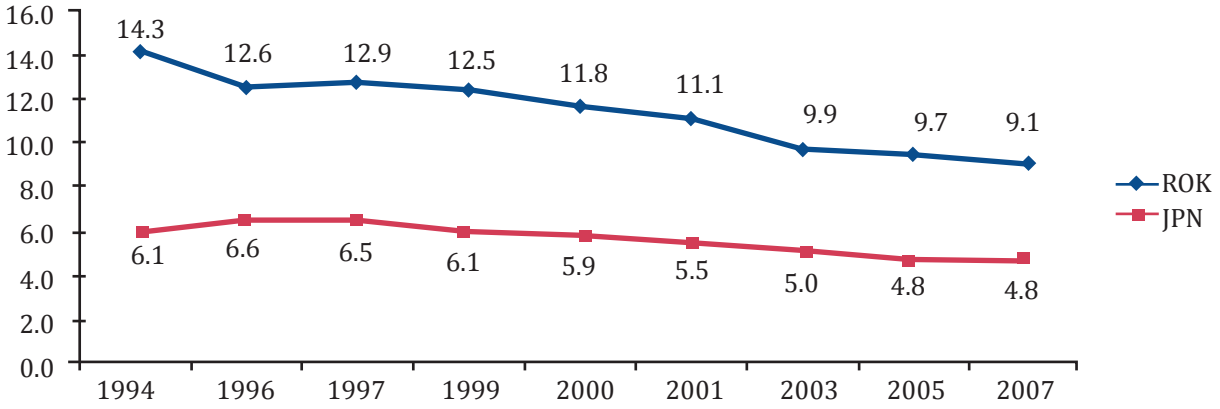


Figure 2. Share of logistics costs to sales (%)

Source: Korea Institute for Industrial Economics & Trade (2010): *Analysis on the Efficiency and Competitiveness of Logistics Industry*

One of the global trends in the logistics market is "total service." Recently, the 3PL model has been extended to fourth-party logistics covering the entire supply chain process. Even though the usage rate of 3PL in the ROK increased from 25.7% in 2002 to 48.2% in 2009 (Figure 3), the absolute usage rate is lower than in countries such as the USA (79%) and Japan (90%) [9].

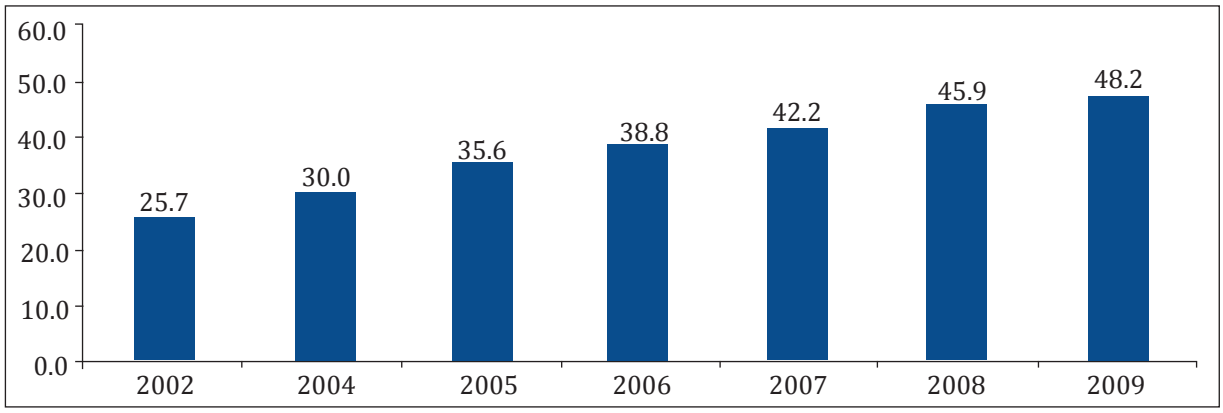


Figure 3. Usage rate of 3PL (%)

Source: Korea Institute for Industrial Economics & Trade (2010): *Analysis on the Efficiency and Competitiveness of Logistics Industry*

Figures 4 and 5 show firm size in terms of employment and value added in the warehousing subsector in the ROK. The employment per firm is an average 10.2 persons, and the real value added per firm is an average KRW635 million (USD547,509.70) [10]. Therefore, it is assumed that firm size in the ROK's logistics sector is smaller than in other advanced countries.

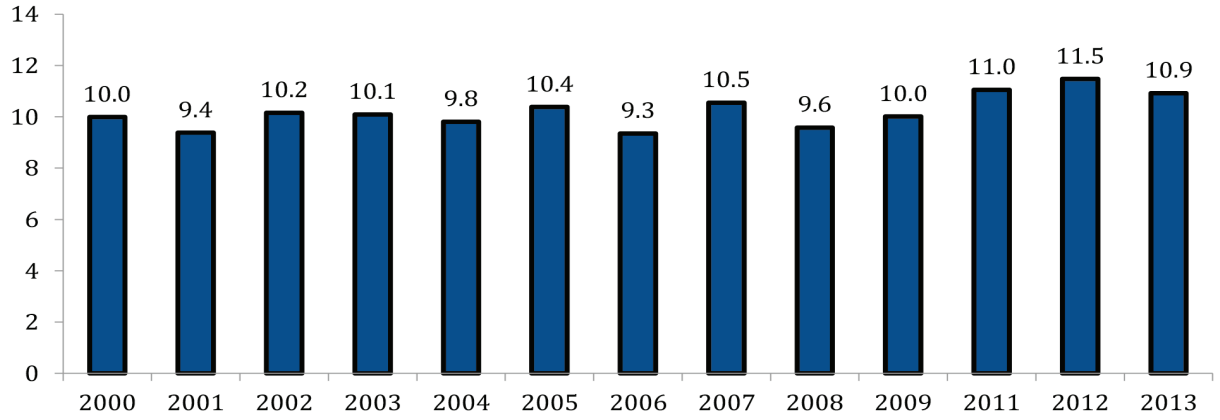


Figure 4. Employment per firm (persons) in the logistics sector in the ROK
Source: Statistics Korea (2000–2013): *Report on the Transportation Survey*

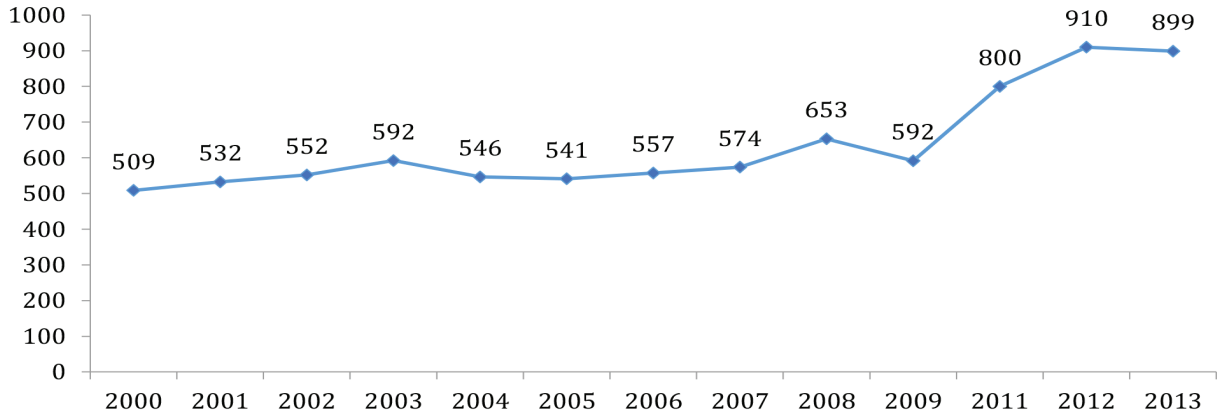


Figure 5. Real value added per firm (million KRW) in the logistics sector in the ROK
Source: Statistics Korea (2000–2013): *Report on the Transportation Survey*

Before measuring labor productivity, the number of firms by size in the warehousing sector was examined. In 2013, 1,175 SMEs and five large enterprises were operating in the sector. It is obvious that the share of SMEs is far higher than that of large enterprises in the warehousing sector (Table 16).

Table 16. Number of firms in the warehousing subsector in 2013 in the ROK

| Type of warehousing service | All sizes | SMEs | Large enterprises |
|---|---|---|---|
| **Total warehousing** | **1,180** | **1,175** | **5** |
| General warehousing | 181 | 177 | 4 |
| Refrigerated warehousing | 232 | 232 | 0 |
| Farm product warehousing | 712 | 711 | 1 |
| Storage of hazardous goods | 38 | 38 | 0 |
| Other warehousing | 17 | 17 | 0 |

Source: Statistics Korea (2000–2013): *Report on the Transportation Survey*

Labor productivity was KRW80.2 million (USD76,000) in the warehousing sector for all firm sizes in 2013 (Table 17). The "storage of hazardous goods" subtype had higher labor productivity due to lower labor inputs relative to others. On the other hand, labor productivity was lower in "farm-product warehousing" due to the low value-added creation relative to labor input (Table 17). This situation was similar in SMEs, but the labor productivity of large businesses could not be analyzed in detail due to insufficient observations. Thus, the ROK needs to develop large, competitive warehousing firms to deal with the emerging global market trends (Tables 17–19).

Table 17. Labor productivity in 2013 (all firm sizes)

| Warehousing subtype | Real VA (million KRW) (in million USD) | Employment (persons) | Labor productivity (million KRW) (in million USD) |
|---|---|---|---|
| **All warehousing** | **902,196 (854.5)** | **11,247** | **80.2 (0.076)** |
| General warehousing | 386,788 (366.3) | 4,459 | 86.7 (0.082) |
| Refrigerated warehousing | 278,127 (263.4) | 3,023 | 92.0 (0.087) |
| Farm-product warehousing | 43,144 (40.9) | 2,836 | 15.2 (0.014) |
| Storage of hazardous goods | 186,413 (176.6) | 803 | 232.1 (0.220) |
| Other warehousing | 7,724 (7.3) | 126 | 61.3 (0.058) |

VA, value added

Source: Statistics Korea (2000–2013): *Report on the Transportation Survey*

Table 18. Labor productivity in 2013 (SMEs)

| Warehousing subtype | Real VA (million KRW) (in million USD) | Employment (persons) | Labor productivity (million KRW) (in million USD) |
|---|---|---|---|
| **All warehousing** | **857,275 (812.0)** | **10,224** | **83.8 (0.079)** |
| General warehousing | 341,867 (323.8) | 3,436 | 99.5 (0.082) |
| Refrigerated warehousing | 278,127 (263.4) | 3,023 | 92.0 (0.087) |
| Farm-product warehousing | 43,144 (40.9) | 2,836 | 15.2 (0.014) |
| Storage of hazardous goods | 186,413 (176.6) | 803 | 232.1 (0.220) |
| Other warehousing | 7,724 (7.3) | 126 | 61.3 (0.058) |

VA, value added

Source: Statistics Korea (2000–2013): *Report on the Transportation Survey*

Table 19. Labor productivity in 2013 (large firms)

| Warehousing subtype | Real VA (million KRW) (in million USD) | Employment (persons) | Labor productivity (million KRW) (in million USD) |
|---|---|---|---|
| **All warehousing** | **44,921 (42.6)** | **1,023** | **43.9 (0.042)** |
| General warehousing | 44,921 (42.6) | 1,023 | 43.9 (0.042) |
| Refrigerated warehousing | — | — | — |
| Farm-product warehousing | — | — | — |
| Storage of hazardous goods | — | — | — |
| Other warehousing | — | — | — |

VA, value added
Source: Statistics Korea (2000–2013): *Report on the Transportation Survey*

## PROFILES OF PARTICIPATING LOGISTICS SMES

Eight companies participated in this benchmarking research project from the following subsectors: general warehousing; refrigerated warehousing (cold storage); and other. Six observations concentrated on general warehousing (75%), and one observation each on the refrigerated warehousing and other subsectors (Table 20).

Table 20. Participating SMEs by type of warehousing

| Type of warehousing | No. of SMEs | % of total |
|---|---|---|
| General | 6 | 75.0 |
| Refrigerated | 1 | 12.5 |
| Other | 1 | 12.5 |
| Total | 8 | 100.0 |

The years in which the participating SMEs were incorporated are shown in Table 21. The percentage incorporated before 1990 was 37.5%, that between 1991 and 2000 was 12.5%, and that after 2000 was 50%. Thus, the years of incorporation were distributed relatively equally before and after 2000. By type of business ownership, 62.5% were sole proprietorships and 37.5% were private limited companies (Table 22).

Table 21. Years of incorporation of participating SMEs

| Year of incorporation | No. of SMEs | % |
|---|---|---|
| Before 1990 | 3 | 37.5 |
| 1991–2000 | 1 | 12.5 |
| After 2000 | 4 | 50.0 |
| Total | 8 | 100.0 |

Table 22. Ownership type of participating SMEs

| Ownership | No. of SMEs | % |
|---|---|---|
| Sole proprietorship | 5 | 62.5 |
| Partnership | — | — |
| Private limited company | 3 | 37.5 |
| Public listed company | — | — |
| Total | 8 | 100.0 |

A detailed summary of the number of warehouses operated by each company is shown in Table 23. The majority (62.5%) operated only one warehouse, while 25.0% operated one to five and 12.5% operated more than five.

Table 23. Number of warehouses operated by participating SMEs

| No. of warehouses operated | No. of SMEs | % |
|---|---|---|
| 1 | 5 | 62.5 |
| 1–5 | 2 | 25.0 |
| More than 5 | 1 | 12.5 |
| Total | 8 | 100.0 |

The size of warehouses operated by the participating companies is given in Table 24. Fifty percent were less than 10,000 $m^2$, 12.5% were 10,000–50,000 $m^2$, 25.0% were 50,000–100,000 $m^2$, and 12.5% were more than 100,000 $m^2$. Therefore, SMEs participating in this benchmarking exercise tended to be small operations.

Table 24. Warehouse sizes of participating SMEs

| Warehouse size | No. | % |
|---|---|---|
| Less than 10,000 $m^2$ | 4 | 50.0 |
| 10,000–50,000 $m^2$ | 1 | 12.5 |
| 50,000–100,000 $m^2$ | 2 | 25.0 |
| More than 100,000 $m^2$ | 1 | 12.5 |
| Total | 8 | 100.0 |

## KPIS OF PARTICIPATING COMPANIES FROM THE ROK

### Financial Perspective

As one KPI, the value added created in the general warehousing subsector was more than 1.5-fold higher than that in the other warehousing subsector (Tables 25 to 27). The average value added was KRW694 million (USD660,000) in the general warehousing subsector and KRW417 million (USD390,000) in the other subsector in 2014. The efficiency of

value-added creation in terms of the value-added ratio was also superior in general warehousing (0.45) compared with the other subsector (0.31) in 2014.

However, the competitiveness of labor cost in terms of unit labor cost was inferior in general warehousing (1.80) compared with the other subsector (4.21). The working capital ratio as an indicator of capital productivity was superior in general warehousing (4.36) compared with the other subsector (0.61). The profit margin in the general warehousing subsector (0.24) was almost the same as in the other subsector (0.25), although refrigerated warehousing had a lower margin compared with the two other subsectors in 2014. Therefore, from the financial perspective, the general warehousing subsector performed better than the other and refrigerated subsectors except for labor cost competitiveness.

Table 25. Results of the financial perspective for the general warehousing subsector in the ROK

| KPI | 2012 | 2013 | 2014 |
|---|---|---|---|
| VA (million KRW)<br>(in million USD) | 1,035<br>(0.98) | 596<br>(0.56) | 694<br>(0.66) |
| VA-to-sales ratio | 0.40 | 0.44 | 0.45 |
| Labor cost competitiveness | 2.09 | 2.14 | 1.80 |
| Working capital ratio | 4.79 | 6.67 | 4.36 |
| Profit margin (%) | 26 | 25 | 24 |

VA, value added

Table 26. Results of the financial perspective for the refrigerated warehousing subsector in the ROK

| KPI | 2012 | 2013 | 2014 |
|---|---|---|---|
| VA (million KRW)<br>(in million USD) | — | — | — |
| VA-to-sales ratio | — | — | — |
| Labor cost competitiveness | — | — | — |
| Working capital ratio | –11.37 | –0.53 | –0.87 |
| Profit margin | 13 | 8 | 5 |

VA, value added

Table 27. Results of the financial perspective for the other subsector in the ROK

| KPI | 2012 | 2013 | 2014 |
|---|---|---|---|
| VA (million KRW)<br>(in million USD) | 291<br>(0.28) | 407<br>(0.39) | 417<br>(0.39) |
| VA-to-sales ratio | 0.22 | 0.30 | 0.31 |

*(continued on next page)*

(continued from previous page)

| KPI | 2012 | 2013 | 2014 |
|---|---|---|---|
| Labor cost competitiveness | 1.23 | 3.42 | 4.21 |
| Working capital ratio | 1.00 | 0.77 | 0.61 |
| Profit margin (%) | 8 | 24 | 25 |

VA, value added

## Customer Perspective

The indicator of customer loyalty was collected based on one observation in the general warehousing subsector. Customer loyalty was 70% in 2012, 65% in 2013, and 60% in 2014 (Table 28), showing an improving trend. The number of complaints was examined only in the refrigerated warehousing subsector. There were 900 complaints received in 2013 and 700 by one company in 2014. Thus, customer loyalty was around 60–70% in the general warehousing subsector and there were not many problems in terms of complaints. However, the refrigerated warehousing subsector was more vulnerable.

When sales per employee as an indicator of labor productivity in the sense of technical efficiency were investigated, the level was lower in general warehousing compared with the refrigerated warehousing subsector, possibly due to the capital-intensive nature of the latter. The level of labor productivity was KRW100 million (US94,714) in the general warehousing subsector, KRW394 million (USD373,177) in the refrigerated warehousing subsector, and KRW269 million (USD254,783) in the other subsector in 2014 (Tables 28 to 30). Labor productivity in the refrigerated warehousing subsector was therefore about four-fold higher than that in the general subsector in 2014.

Table 28. Results of the customer perspective for the general warehousing subsector in the ROK

| KPI | 2012 | 2013 | 2014 |
|---|---|---|---|
| Customer loyalty (%) | 70 | 65 | 60 |
| No. of complaints | — | — | — |
| Sales per employee (million KRW)<br>(in USD) | 68<br>(64,406) | 94<br>(89,032) | 100<br>(94,714) |

Table 29. Results of the customer perspective for the refrigerated warehousing subsector in the ROK

| KPI | 2012 | 2013 | 2014 |
|---|---|---|---|
| Customer loyalty (%) | — | — | — |
| No. of complaints | — | 900 | 700 |
| Sales per employee (million KRW)<br>(in USD) | 516<br>(488,729) | 483<br>(457,473) | 394<br>(373,177) |

Table 30. Results of the customer perspective for the other subsector in the ROK

| KPI | 2012 | 2013 | 2014 |
|---|---|---|---|
| Customer loyalty (%) | — | — | — |
| No. of complaints | — | — | — |
| Sales per employee (million KRW) (in USD) | — | — | 269 (254,783) |

*Gathering Feedback from Customers*

In terms of gathering feedback from customers in the warehousing sector, it was found that the mechanisms used were telephone (71.4%), e-mail messages (42.9%), and in person (42.9%), as shown in Table 31.

Table 31. Methods of obtaining feedback from customers

| Method | No. | % |
|---|---|---|
| Telephone | 5 | 71.4 |
| Letters | 0 | 0.0 |
| e-Mail messages | 3 | 42.9 |
| Websites | 0 | 0.0 |
| In person | 3 | 42.9 |
| Never | 1 | 14.3 |
| Other channels | 1 | 14.3 |

*Customer Relationship Management*

In the warehousing SMEs that participated in this research, customer relationship management focused on activities such as monitoring customer complaints (62.5%) and recording wrong deliveries (50.0%). However, they were inattentive (Table 32) in terms of recording customer complaints (25.0%), recording compliments (25.0%), recording on-time deliveries (25.0%), and measuring customer loyalty (0.0%). Thus, the systems for customer feedback appeared ineffective even though 37.5% of the warehousing firms had formalized systems for that purpose.

Table 32. Customer relationship management

| Activity | No. | % |
|---|---|---|
| Formalized system for customer feedback | 3 | 37.5 |
| Recording of customer complaints | 2 | 25.0 |
| Recording of compliments | 2 | 25.0 |
| Monitoring of customer complaints | 5 | 62.5 |

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| Activity | No. | % |
|---|---|---|
| Recording of wrong deliveries | 4 | 50.0 |
| Recording of on-time deliveries | 2 | 25.0 |
| Measurement of customer loyalty | 0 | 0.0 |

## Operational Perspective

Inventory accuracy was found to be inferior in the general warehousing subsector (54.6%) compared with the refrigerated one (100%) in 2014, as shown in Tables33 to 35. However, space productivity was higher in the general (KRW930,000/$m^2$, USD880/$m^2$) compared with the refrigerated subsector (KRW130,000/$m^2$, USD123/$m^2$) in 2014, making the former more efficient. In terms of order-picking accuracy, the general warehousing subsector was inferior (31.3%) to the refrigerated subsector (100%) in 2014. In addition, warehouse utilization was lower in the general compared with the refrigerated subsector. From the operational perspective, the competitiveness of general warehousing was lower than that of refrigerated warehousing, except for the KPI of sales to warehousing space.

Table 33. Results of the operational perspective for the general warehousing subsector in the ROK

| KPI | 2012 | 2013 | 2014 |
|---|---|---|---|
| Annual inventory turnover rate | — | — | — |
| Inventory accuracy (%) | 47.4 | 52.2 | 54.6 |
| Sales to warehousing space (USD/m2) (in KRW)<br>(in USD) | 520,000<br>(493) | 900,000<br>(852) | 930,000<br>(880) |
| Receiving lead time (hours) | — | — | — |
| Order-processing lead time (hours) | — | — | — |
| Order-picking accuracy (%) | 16.4 | 30.8 | 31.3 |
| Warehouse utilization (%) | 15.0 | 24.2 | 26.7 |

Table 34. Results of the operational perspective for the refrigerated warehousing subsector in the ROK

| KPI | 2012 | 2013 | 2014 |
|---|---|---|---|
| Annual inventory turnover rate | — | — | — |
| Inventory accuracy (%) | 90.0 | 100.0 | 100.0 |
| Sales to warehousing space (USD/m2) (in KRW)<br>(in USD) | 60,000<br>(56.8) | 80,000<br>(75.8) | 130,000<br>(123.1) |

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| KPI | 2012 | 2013 | 2014 |
|---|---|---|---|
| Order-processing lead time (hours) | — | — | — |
| Order-picking accuracy (%) | 95.0 | 100.0 | 100.0 |
| Warehouse utilization (%) | 100.0 | 100.0 | 100.0 |

Table 35. Results of the operational perspective for the other subsector in the ROK

| KPI | 2012 | 2013 | 2014 |
|---|---|---|---|
| Annual inventory turnover rate | — | — | — |
| Inventory accuracy (%) | — | — | — |
| Sales to warehousing space (USD/$m^2$)<br>(in KRW)<br>(in USD) | <br>1,020,000<br>(966) | <br>1,020,000<br>(966) | <br>1,020,000<br>(966) |
| Receiving lead time (hours) | — | — | — |
| Order-processing lead time (hours) | — | — | — |
| Order-picking accuracy (%) | — | — | — |
| Warehouse utilization (%) | — | — | — |

*Management of Operations*

Regarding the management of operations, the Korean warehousing firms achieved inventory accuracy of 62.5%, a warehouse utilization rate of 50.0%, order-picking accuracy of 37.5%, and an inventory turnover rate of 12.5%. In addition, 50% of them used IT and software to increase productivity. However, some elements of operations such as receiving lead time (0.0%) and order-processing lead time (0.0%) were not managed properly, as shown in Table 36.

Table 36. Status of operational management

| Operational KPI | No. | % |
|---|---|---|
| Inventory turnover rate | 1 | 12.5 |
| Inventory accuracy | 5 | 62.5 |
| Receiving leadtime | 0 | 0.0 |
| Order-processing lead time | 0 | 0.0 |
| Order-picking accuracy | 3 | 37.5 |
| Warehouse utilization | 4 | 50.0 |
| Technology to increase productivity | 4 | 50.0 |

*Management Innovation Systems*

In general, warehousing firms in the ROK are interested in management innovation systems and have implemented the measures listed in Table 37. It can therefore be expected that warehousing firms will build innovative foundations to enhance productivity and efficiency in the future.

Table 37. Management innovation systems

| Type of system | No. | % |
|---|---|---|
| Warehouse management system | 5 | 62.5 |
| Human resources management system | 7 | 87.5 |
| e-Commerce system | 7 | 87.5 |
| Inventory management system | 6 | 75.0 |
| Enterprise resource planning system | 7 | 87.5 |
| Customer relationship management system | 7 | 87.5 |
| Purchasing system | 8 | 100.0 |
| Financial management system | 8 | 100.0 |

## Human Resources Perspective

From the viewpoint of training for improving labor quality, it was found that the emphasis was weak in the warehousing subsector based on the number of hours provided and training expenditure data. The training hours per staff member in the general warehousing subsector was only four, and training expenditure per staff member was KRW30,000 (USD28.4) in 2014 [11]. It was noted that the absenteeism rate was low for both the general warehousing (0.83%) and other subsectors (0%) in 2014 (Tables 38 to 40). Although information was not sufficient to evaluate labor conditions in the warehousing sector, there is a need to invest consistently in human capital in SMEs to improve labor quality through job training and to enhance job satisfaction.

Table 38. Results of the human resources perspective for the general warehousing subsector in the ROK

| KPI | 2012 | 2013 | 2014 |
|---|---|---|---|
| Training hours per staff | 4 | 4 | 4 |
| Training expenditure per staff (KRW) (in USD) | 30,000 (28.4) | 30,000 (28.4) | 30,000 (28.4) |
| Staff turnover rate (%) | — | — | — |
| Absenteeism rate (%) | 0.00 | 0.83 | 0.83 |

Table 39. Results of the human resources perspective for the refrigerated warehousing subsector in the ROK

| KPI | 2012 | 2013 | 2014 |
|---|---|---|---|
| Training hours per staff | — | — | — |
| Training expenditure per staff (KRW) (in USD) | — | — | — |
| Staff turnover rate (%) | — | — | — |
| Absenteeism rate (%) | 0.00 | 0.00 | 0.00 |

Table 40. Results of the human resources perspective for the other subsector in the ROK

| KPI | 2012 | 2013 | 2014 |
|---|---|---|---|
| Training hours per staff | — | — | — |
| Training expenditure per staff (KRW) (in USD) | — | — | — |
| Staff turnover rate (%) | — | — | — |
| Absenteeism rate (%) | 0.00 | 0.00 | 0.00 |

*Activities for Human Resources Management*

As shown in Table 41, the warehousing SMEs that participated in this benchmarking research did not undertake extensive activities to manage their human resources. For example, none tracked the staff turnover rate, and only two offered performance-based incentive systems.

Table 41. Activities for human resources management

| Activity | No. | % |
|---|---|---|
| Tracking turnover rate | 0 | 0.0 |
| Training employees | 4 | 50.0 |
| Offering on-the-job training programs | 1 | 12.5 |
| Offering performance-based incentive systems | 2 | 25.0 |
| Tracking absenteeism rate | 2 | 25.0 |

## ANALYSIS OF THE PERFORMANCE OF THE LOGISTICS SECTOR (WAREHOUSING SUBSECTOR) IN THE ROK

### Financial Perspective

Even though there were insufficient samples to analyze the financial perspective of the warehousing sector, it was noted that almost all the financial KPIs in the general subsector were better than in the refrigerated warehousing and the other subsector, except for the labor cost competitiveness KPIs.

### Customer Perspective

Customer loyalty was around 60% to 70% in the general warehousing subsector, and there were few problems in the subsector in terms of complaints. However, the refrigerated warehousing subsector was found to be more vulnerable to customer complaints.

### Operational Perspective

As a whole, the labor cost competitiveness of the general warehousing subsector appeared to be inferior compared with that of the refrigerated subsector, except for the indicator of sales to warehousing space.

### Human Resources Perspective

Even if the information was insufficient to estimate labor conditions in the warehousing sector, it is necessary to invest consistently in human capital in SMEs to improve labor quality through job training and for greater job satisfaction.

# KEY FINDINGS OF THE LOGISTICS SECTOR (WAREHOUSING SUBSECTOR) IN SINGAPORE

## INTRODUCTION

In 2013, there were over 7,606 registered companies in Singapore in the logistics sector, which contributed SGD18.4 billion or 5.2% of GDP [12]. Singapore is recognized as a leading logistics hub in the Asia-Pacific. It was ranked second as a world logistics hub in the World Bank Logistics Performance Index for 2014 [3]. Its seaport is linked to 600 ports in 123 countries via 200 shipping lines, and its airport is served by over 4,500 flights connecting 200 cities in 60 countries. Fully maximizing its strategic geographic location, Singapore serves as a gateway to Asia and the ASEAN members.

Most SMEs in the warehousing sector do not rely on just one service offering to customers. Logistics companies in Singapore must offer more than just freight, storage, and transportation to meet the changing demands of customers. In addition, specialization in cold-chain, pharmaceutical, and marine logistics is required to meet the specific demands of target industries. The warehousing subsector provides importation, trading, freight, transportation, and value-added services (such as kitting, bulk-breaking, and labeling). The classifications of the logistics sector and the warehousing and storage subsector are given in Tables 42 and 43, respectively.

Table 42. Classification of the logistics Sector

| SIC code | | Sector |
|---|---|---|
| 2-digit | 3-digit | |
| Section H 49 | | Transportation & storage services |
| | 49 | Land transport |
| | 500 | Water transport |
| | 510 | Air transport |
| | 521 | Warehousing & storage |
| | 492 | Other land transport |
| | 53 | Post & courier |

Table 43. Classification of the warehousing and storage subsector

| SIC code | | Sector |
|---|---|---|
| 2-digit | 3-digit | |
| | | Warehousing & storage |
| 52 | 101 | General warehousing |
| | 102 | Cold storage (refrigerated warehousing) |
| | 103 | Storage for class cargo (i.e., hazardous materials) |
| | 109 | Specialized storage (i.e., petroleum & chemical storage) |

## PROFILES OF THE PARTICIPATING LOGISTICS SMES

A total of seven SMEs participated in this benchmarking research project from the following subsectors: general warehousing; refrigerated warehousing (cold storage); and other warehousing. They shared information on their key performance indicators (KPIs).

### Subsector 1: General Warehousing

Six SMEs dealt with general cargo. One had installed air-conditioning in its warehouse as the products stored are IT items. However, as there is no standard on temperature and humidity control, the cargo is classified as general.

### Subsector 2: Refrigerated Warehousing (Cold Storage)

One cold storage warehouse participated in this survey. As the only warehouse with an automated storage and retrieval system (ASRS), it offers an insight into robotic arms at work in a warehouse as compared with manual operations.

## KPIS OF PARTICIPATING COMPANIES FROM SINGAPORE

### Financial Perspective

The participating SMEs generally had lower profit margins over the years from 2012 to 2014. They believed that more challenges were ahead in terms of pressure to reduce costs from customers and rising labor costs. Almost all the SMEs were not in the business of storage alone. Most were positioning themselves as one-stop service centers for customers. Storage or delivery could be operated at a reduced profit margin so as to maintain the business volume with current customers. There were different core businesses ranging from trading, freight, printing, and delivery to offering warehousing alone.

*Subsector 1: General Warehousing*

Table 44 shows the financial perspective results for the general warehousing subsector. While labor cost competitiveness had improved, companies mentioned that they were not in a position to recruit talent into the trade. Labor costs improved partly due to the hiring of unskilled workers. Profit margins remained razor thin in this highly competitive sector.

Table 44. Results of the financial perspective for the general warehousing subsector in Singapore

| KPI | 2012 | 2013 | 2014 |
|---|---|---|---|
| VA (SGD)<br>(in USD) | 10,667,117<br>(8,589,353) | 9,962,426<br>(8,021,923) | 9,475,269<br>(7,629,655) |
| VA-to-sales ratio | 0.38 | 0.36 | 0.35 |
| Labor cost competitiveness | 2.43 | 2.40 | 2.47 |
| Working capital ratio | 13.80 | 16.46 | 15.30 |
| Profit margin (%) | 8 | 5 | 7 |

VA, value added

*Subsector 2: Refrigerated Warehousing (Cold Storage)*

Table 45 shows the financial perspective results for the refrigerated warehousing subsector. Refrigerated warehouses can command a premium when it comes to storage rates, but their maintenance costs are much higher than those of conventional warehouses. Using ASRS can greatly reduce reliance on manpower in put-away activity but labor is still required to pick the correct items from pallets to cartons. Profit margins were better than in the general warehousing category. The challenge of filling up every space of refrigerated warehouses remained high on the "to-do" lists.

Table 45. Results of the financial perspective for the refrigerated warehousing (cold storage) subsector in Singapore

| KPI | 2012 | 2013 | 2014 |
|---|---|---|---|
| VA (SGD)<br>(in USD) | 12,500,000<br>(10,065,223) | 15,000,000<br>(12,078,267) | 20,000,000<br>(16,104,356) |
| VA-to-sales ratio | 0.50 | 0.50 | 0.50 |
| Labor cost competitiveness | 4.39 | 5.00 | 6.12 |
| Working capital ratio | NA | NA | NA |
| Profit margin (%) | 10 | 10 | 10 |

VA, value added

## Customer Perspective

Two of the participating SMEs measured customer loyalty in their operations. For the remainder, the pressure to fill up warehouse space and offer value-added services was deemed to be of more importance than customer loyalty.

*Subsector 1: General Warehousing*

Table 46 shows the customer perspective results for the general warehousing subsector. The participating SMEs that measured customer loyalty achieved a 100% retention rate. Sixty-seven percent of SMEs recorded the number of complaints received from customers. Customer satisfaction was important to the companies, and mechanisms to record complaints and to improve on performance were in place for companies paying attention to customers. Sales per employee recorded an upward trend from 2012 to 2014. This was partly due to the cost of foreign workers remaining stable while sales revenue inched upward.

Table 46. Results of the customer perspective for the general warehousing subsector in Singapore

| KPI | 2012 | 2013 | 2014 |
|---|---|---|---|
| Customer loyalty (%) | 100 | 100 | 100 |
| No. of complaints | 1.33 | 0.67 | 2.25 |
| Sales per employee (FTE) (SGD)<br>(in USD) | 364,733<br>(293,690) | 357,857<br>(288,153) | 386,023<br>(310,833) |

FTE, full-time equivalents

*Subsector 2: Refrigerated Warehousing (Cold Storage) Subsector*

The customer perspective results for the refrigerated warehousing subsector are given in Table 47. Having received an average of two to four complaints per month, this refrigerated warehouse lost 5% of its customers per year. While it strived to win back those customers, it reached out via annual surveys and inviting customers to its premises for meetings. After expanding its sales team to contact more customers, sales per employee improved considerably over the three years.

Table 47. Results of the customer perspective for the refrigerated warehousing (cold storage) subsector in Singapore

| KPI | 2012 | 2013 | 2014 |
|---|---|---|---|
| Customer loyalty (%) | 95 | 95 | 95 |
| No. of complaints | 36 | 36 | 36 |
| Sales per employee (FTE) (SGD)<br>(in USD) | 265,700<br>(213,946) | 302,752<br>(243,781) | 370,058<br>(297,977) |

FTE, full-time equivalents

## Operational Perspective

Operationally, not all the participating SMEs used the same KPIs. Annual inventory turnover was by far the least recorded by all. One SME used different performance standards for different customers. All companies utilized warehouse management systems (WMS) and IT to assist in the management of their warehouses.

*Subsector 1: General Warehousing*

Table 48 shows the operational perspective results for the general warehousing subsector. Most companies were using WMS to track order picking and inventory accuracy. The accuracy rates reported were very high (average above 98%). The receiving lead time was not given much priority compared with order-processing lead time, due to the fact that customers are only concerned with the order-processing lead time. Some of the participating

SMEs used different receiving and order-processing KPIs for different customers. On the whole, they were able to maintain service standards in both the receiving and order-processing lead times.

Half the participating SMEs did not track warehouse utilization. The reason for this could be due to the fact that one SME reported the "happy problem" that its warehouse was overfilled almost all the time.

Table 48. Results of the operational perspective for the general warehousing subsector in Singapore

| KPI | 2012 | 2013 | 2014 |
|---|---|---|---|
| Annual inventory turnover rate | — | — | — |
| Inventory accuracy (%) | 99 | 99 | 98 |
| Sales to warehouse space ($m^2$) (SGD)<br>(in USD) | 5,675<br>(4,570) | 5,398<br>(4,347) | 5,530<br>(4,453) |
| Receiving lead time (hours) | 3.13 | 3.13 | 3.13 |
| Order-processing lead time (hours) | 2.11 | 2.11 | 2.58 |
| Order-picking accuracy (%) | 96 | 97 | 99 |
| Warehouse utilization (%) | 90 | 90 | 72 |

*Subsector 2: Refrigerated Warehousing (Cold Storage)*

Table 49 shows the operational perspective results for the refrigerated warehousing subsector. As a third-party logistics firm, this refrigerated warehouse did not calculate its inventory turnover. In the new premises with ASRS technology, warehouse utilization was tracked by the computer system. There was a conventional warehouse space beside the ASRS storage area. This conventional warehouse space required manual operations for order-picking and put-away activities. The receiving and order-processing lead times were kept to within its KPI goal of 12 hours. Actual figures were not available.

Table 49. Results of the operational perspective for the refrigerated warehousing (cold storage) subsector in Singapore

| KPI | 2012 | 2013 | 2014 |
|---|---|---|---|
| Annual inventory turnover rate | NA | NA | NA |
| Inventory accuracy (%) | 99 | 99 | 99 |
| Sales to warehouse space ($m^2$) (SGD)<br>(in USD) | 2,500<br>(2,013) | 3,000<br>(2,416) | 4,000<br>(3,221) |
| Receiving lead time (hours) | 12.00 | 12.00 | 12.00 |
| Order-processing lead time (hours) | 12.00 | 12.00 | 12.00 |
| Order-picking accuracy (%) | 99 | 99 | 99 |
| Warehouse utilization (%) | 50 | 60 | 70 |

## Human Resources Perspective

Human resources management can be the most challenging aspect of business operations. The SMEs reported difficulties in attracting talent. Be it low-skilled, general workers, or experienced executives, SMEs mentioned that government restrictions on foreign labor had hurt their recruitment policies and affected the wages offered.

The most common training given by SMEs was on-the-job training and using experienced workers to guide new employees. Structured training was offered by half the SMEs, and the pain of trained and experienced workers leaving was hampering the development of human resources by them.

*Subsector 1: General Warehousing*

Table 50 shows the human resources perspective results for the general warehousing subsector. The training hours per staff had been reduced considerably over the years. With high staff turnover rates, companies were finding it hard to retain and train staff. Most of the training mentioned was on the job, with experienced staff leading junior staff. Staff turnover rates remained high for all SMEs interviewed. Singapore's economy was not performing as vibrantly as the leading economies in ASEAN, but the tight labor market resulted in high staff turnover rates.

Table 50. Results of the human resources perspective for the general warehousing subsector in Singapore

| KPI | 2012 | 2013 | 2014 |
|---|---|---|---|
| Training hours per staff | 22.2 | 12.8 | 10.4 |
| Training expenditure per staff (SGD)<br>(in USD) | 1,606<br>(1,293) | 1,411<br>(1,136) | 1,649<br>(1,328) |
| Staff turnover rate (%) | 21.67 | 22.67 | 21.50 |
| Absenteeism rate (%) | 3 | 3 | 4 |

*Subsector 2: Refrigerated Warehousing (Cold Storage)*

Table 51 shows the human resources perspective results for the refrigerated warehousing subsector. Training was given priority in this refrigerated warehouse. As one of the biggest ASRS facilities in Singapore, visits by foreign industry representatives were common. This company ensured that workers were well versed in their jobs by investing in training and setting up an in-house academy to offer industry-related courses for employees.

Using the ASRS only reduced the mistakes people can make when picking items from pallets. It still required manpower to order-pick the items correctly from pallets to fulfill orders. The other special training this company employed was utilizing a mobile generator to simulate electrical blackouts. There were exercises to switch operations from the power grid to the mobile generator to ensure that workers were able to react to an actual blackout.

Table 51. Results of the human resources perspective for the refrigerated warehousing (cold storage) subsector in Singapore

| KPI | 2012 | 2013 | 2014 |
|---|---|---|---|
| Training hours per staff | 20.0 | 20.0 | 20.0 |
| Training expenditure per staff (SGD) (in USD) | 1,000 (805) | 1,000 (805) | 1,000 (805) |
| Staff turnover rate (%) | 5.00 | 5.00 | 5.00 |
| Absenteeism rate (%) | 2 | 2 | 2 |

## ANALYSIS OF THE PERFORMANCE OF THE LOGISTICS SECTOR (WAREHOUSING SUBSECTOR) IN SINGAPORE

### Financial Perspective

Overall, from the financial perspective, profits and value added were shrinking in the warehousing subsector in Singapore. Labor productivity and the use of IT were not enough to offset the increase in operational costs over the years. It was, however, difficult to determine warehousing storage costs and revenues precisely as companies generally use workers to multitask in different operations in the value chain (e.g., workers performed value-added services such as order processing, packing, labeling, stock auditing, and visual quality checking). The revenues for all value-added services may not be under the "warehousing" sector.

### Customer Perspective

SMEs were customer focused, offering tailored services to attract and retain customers. The services offered were able to satisfy customers so as to minimize complaints. Communication channels were in place to receive feedback from customers.

### Operational Perspective

Singapore's warehousing subsector is characterized by the heavy use of IT to manage warehouses. Companies in the subsector do not offer standard services to all customers, but instead follow the rule of "different customers have different standards." Inventory accuracy was identified as the most important factor operationally.

### Human Resources Perspective

It is difficult to attract talent, especially Singaporeans, in the warehousing subsector. It is also not easy to send workers to structured off-site training. Therefore most training offered in-house is of the informal on-the-job type.

# KEY FINDINGS ON THE LOGISTICS SECTOR (WAREHOUSING SUBSECTOR) IN THAILAND

## INTRODUCTION

Based on The World Bank's Logistics Performance Index 2014, Thailand was ranked 35th among the 160 countries [3]. Thailand's logistics and supporting sector is classified in the service industry. In 2013, its logistics costs were estimated at THB1,835.2 billion (USD58.0 billion) or 14.2% of GDP at current prices. It fell from 14.4% of GDP in 2012 as a result of the reduction in domestic demand due to the accelerated spending in previous years to restore damage from floods in 2011 as well as an increase in economic and political uncertainties.

In the cost structure, freight costs constituted the highest proportion of total logistics costs in 2013, amounting to 51.9%. The second highest was the cost of inventory storage or warehousing, which increased from 38.4% in 2012 to 39.0% in 2013. The cost of managing the logistics accounted for only 9.1%. In 2013, freight cost was THB953.2 billion (USD30.1 billion), representing 7.4% of GDP, which grew slightly from 2012 by about 1.78%. The two factors of freight volume and production price for transport were affected by fuel oil and labor costs.

The Thai Standard Classification of Industry (TSIC) classifies industrial information according to economic activities. The TSIC for 2009 (revised by the National Statistical Office) was prepared in five digits on the basis of a standard classification of economic activities in three international editions: the International Standard Industrial Classification of all economic activities, revision 4 (ISIC Rev. 4) prepared by the United Nations Statistics Division; ASEAN Common Industrial Classification, prepared by the Secretariat of ASEAN as a standard industrial classification for ASEAN members; and the East Asia Manufacturing Industrial Classification Ver. 1 by the East Asia Expert Meeting on Manufacturing Statistics Secretariat, together with the ASEAN Secretariat for data integration industry statistics, covering members of ASEAN + 3 (ASEAN member countries plus PR China, Japan, and the ROK). The logistics sector is a service sector in one of 20 economic activities (sections A–H) in Thailand. It covers agriculture, production, and services. For section H, Transportation and Storage, there are subcategories from 49 to 53, as shown in Table 52.

Table 52. Classification of the logistics sector

| TSIC code | | Sector |
|---|---|---|
| | 2-Digit | |
| Section H | | Transportation & storage |
| | Subcategory 49 | Land transport & pipeline transport |
| | Subcategory 50 | Water transportation |
| | Subcategory 51 | Air transportation |
| | Subcategory 52 | Warehousing & support activities for transportation |
| | Subcategory 53 | Postal & parcel delivery |

Subcategory 52, "Warehousing and support activities for transportation," includes storage and related logistics support activities. The activities of transportation and cargo handling are categorized largely under Section 521, "Warehouses and storage," and Section 522, "Support activities for transportation"(Table 53).

Table 53. Classification of the warehousing and storage subsector

| TSIC Code | | Sector |
|---|---|---|
| 3-Digit | 5-Digit | |
| 521 | | Warehousing & storage activities |
| | 52101 | Chilled or frozen storage of goods warehousing activities |
| | 52102 | Grain storage warehousing activities |
| | 52109 | Other storage product warehousing activities |

Under the "warehousing and storage activities" subset are operations and facilities to store all types of goods, and they are categorized as general or refrigerated storage. Chilled or frozen goods warehousing and storage activities comprise chilled or frozen warehousing and storage services, including those for perishable products. Grain warehousing and storage activities involve grain storage services and the operation of silos. Other warehousing and storage activities cover liquid and gas warehousing and storage services and storage management of other items not classified elsewhere.

## PROFILES OF THE PARTICIPATING LOGISTICS SMES

Thirty SMEs participated in this benchmarking research project, representing general warehousing, refrigerated warehousing (cold storage), and others such as container deposits, chemical warehousing, bonded warehousing, and seed storage warehousing. Twelve of the participating companies were cold storage or refrigerated warehouses, 11 were general warehouses, five were other types of warehouses, and two were classified as general, refrigerated, and other categories of warehousing. All shared information on their key performance indicators (KPIs) and other data.

## KPIS OF PARTICIPATING COMPANIES FROM THAILAND

### Financial Perspective

In terms of KPIs from the financial perspective, the value added of warehousing was around THB21.7–24.4 million (USD686,000–772,000) per year from 2012 to 2014. Warehousing companies were able to achieve higher value added-to-sales ratios from 0.20 in 2012 to 0.34 in 2014 due to higher competitiveness of labor. Labor cost competitiveness rose from 1.39- to 2.29-fold over the same period. For the liquidity ratio, it was found that working capital caused it to decrease from 1.19- in 2012 to 0.13-fold in 2014. However, the net profit margin was expected to increase from 5% in 2012 to 12% in 2014.

*Subsector 1: General Warehousing*

Table 54 shows the financial perspective results for the general warehousing subsector. The value added was THB25.1–26.8 million (USD805,067–846,493) during 2012–2014. However, the value added-to-sales ratios were greater during 2012 to 2014, increasing from 0.27 to 0.36, which were higher than in the other warehousing groups. This was due to the ability to compete in labor costs, which were from 1.54-to 2.81-fold higher in the latter. The liquidity of general warehouses decreased to a deficit in 2014, which means a lack of liquidity (current liabilities were higher than current assets). However, the profitability ratio increased from 7% in 2012 to 17% in 2014.

Table 54. Results of the financial perspective for the general warehousing subsector in Thailand

| KPI | 2012 | 2013 | 2014 |
|---|---|---|---|
| VA (THB)<br>(in USD) | 25,452,631.01<br>(805,067) | 25,056,191.09<br>(792,527) | 26,762,338.83<br>(846,493) |
| VA-to-sales ratio | 0.27 | 0.33 | 0.36 |
| Labor cost competitiveness | 1.54 | 2.03 | 2.81 |
| Working capital ratio | 0.08 | 6.28 | –1.62 |
| Profit margin (%) | 7 | 12 | 17 |

VA, value added

*Subsector 2: Refrigerated Warehousing (Cold Storage)*

Table 55 shows the financial perspective results for the refrigerated warehousing subsector. The value added increased from THB23.7 to 27.7 million (USD751,159–876,675) during 2012–2014. The value added-to-sales ratio was relatively lower (ranging between 0.14 to 0.33) compared with the general warehousing subsector due to lower labor cost competitiveness. Moreover, the profit margin was also rather low at 4–6% during 2012–2014. However, this group managed its working capital more efficiently than the others, causing the working capital ratio to increase from 1.93- to 2.91-fold during 2012–2014.

Table 55. Results of the financial perspective for the refrigerated warehousing (cold storage) subsector in Thailand

| **KPI** | **2012** | **2013** | **2014** |
|---|---|---|---|
| VA (THB)<br>(in USD) | 23,748,307.44<br>(751,159) | 30,836,249.03<br>(975,351) | 27,716,558.13<br>(876,675) |
| VA-to-sales ratio | 0.14 | 0.15 | 0.33 |
| Labor cost competitiveness | 1.40 | 1.77 | 1.80 |
| Working capital ratio | 2.91 | 2.08 | 1.93 |
| Profit margin (%) | 4 | 6 | 6 |

VA, value added

*Subsector 3: Other (Container Deposits, Chemical Warehousing, Bonded Warehousing, and Seed Storage) Warehousing*

Table 56 shows the financial perspective results for the other warehousing subsector. This subsector increased value added from 2012 to 2014, but it was lower than in other warehouse groups, at THB3.5 million (USD112,213) in 2012 and rising to THB7.0 million (USD220,042) in 2014. The value added to sales increased during the period from 0.16-fold in 2012 to 0.25-fold in 2013. The profit margin ranged between –0.3% and 13%. The liquidity of the assets in this group improved from –0.34-fold in 2012 to 1.72-fold in 2013 and was down to –0.69-fold in 2014.

Table 56. Results of the financial perspective for the other warehousing subsector in Thailand

| KPI | 2012 | 2013 | 2014 |
|---|---|---|---|
| VA (THB)<br>(in USD) | 3,547,667.86<br>(112,213) | 5,039,271.02<br>(159,392) | 6,956,749.96<br>(220,042) |
| VA-to-sales ratio | 0.16 | 0.15 | 0.25 |
| Labor cost competitiveness | 0.87 | 1.45 | 1.97 |
| Working capital ratio | –0.34 | 1.72 | –0.69 |
| Profit margin (%) | –0.3 | 6 | 13 |

VA, value added

## Customer Perspective

Table 57 shows the number of companies that received feedback via various channels. They received feedback from customers mainly in three ways: phone; e-mail; and in person or from employees. The most commonly used channel was the telephone (25 companies, 83.3% of participating SMEs), followed by in-person or from employees (17 companies, 56%) and through e-mail (15 companies, 50%). Only one company did not acknowledge any customer feedback. Customer feedback through websites and postal mail channels was the least common. This may be due to the fact that small businesses may not have their own websites, and postal mail is outdated, time-consuming, and costly.

Table 57. Customer feedback channels by type of warehouse

| Type | Telephone | Mail | e-Mail | Website | In person | Not used | Other channels |
|---|---|---|---|---|---|---|---|
| General<br>(%) | 11<br>(84.6) | 1<br>(7.7) | 8<br>(61.5) | 4<br>(30.8) | 5<br>(38.5) | 1<br>(7.7) | 1<br>(7.7) |
| Refrigerated<br>(%) | 11<br>(91.7) | 1<br>(8.3) | 5<br>(41.7) | 1<br>(8.3) | 9<br>(75.0) | 0<br>(0.0) | 0<br>(0.0) |
| Other<br>(%) | 3<br>(60.0) | 1<br>(20.0) | 2<br>(40.0) | 0<br>(0.0) | 3<br>(60.0) | 0<br>(0.0) | 1<br>(20.0) |
| Total | 25 | 3 | 15 | 5 | 17 | 1 | 2 |

It was noted that 56.7% of companies had formal systems to acquire customer feedback (Table 58). Seventy-five percent of the refrigerated warehousing subsector had formal systems, followed by general warehousing (46.2%). For the other warehousing subsector, up to 60% did not have a formal system to obtain customer feedback.

Table 58. Formal systems to obtain customer feedback by type of warehouse

| Type | Yes | | No | | Total | |
|---|---|---|---|---|---|---|
| | No. | % | No. | % | No. | % |
| General | 6 | 46.2 | 7 | 53.8 | 13 | 100 |
| Refrigerated | 9 | 75.0 | 3 | 25.0 | 12 | 100 |
| Other | 2 | 40.0 | 3 | 60.0 | 5 | 100 |
| Total | 17 | 56.7 | 13 | 43.3 | 30 | 100 |

For businesses that used formal systems to acquire customer feedback (e.g., complaints, compliments, suggestions for improvements, etc.), the systems were prepared by themselves via customer satisfaction surveys every six months or annually, comment boxes, or executive telephone numbers posted for clients. Some of the companies collected customer feedback due to ISO 9001:2008 Quality Management System requirements.

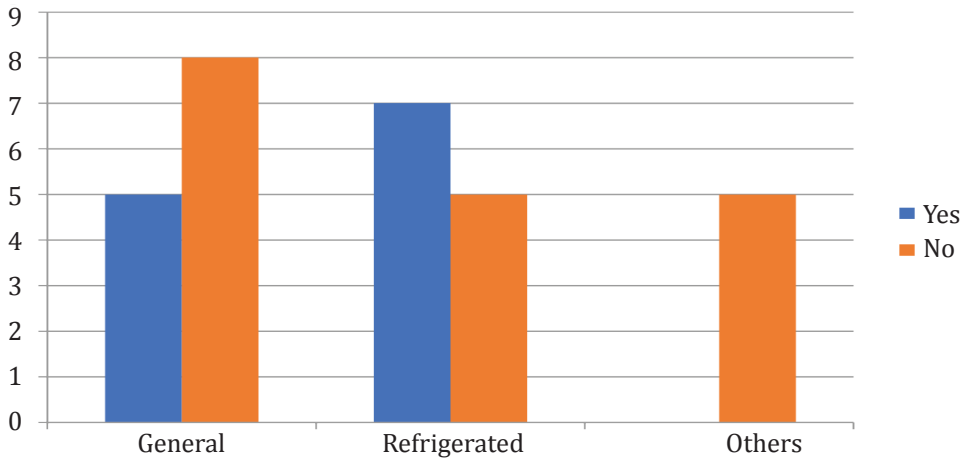


Figure 6. Customer complaints by type of warehouse subsector

Forty percent of the companies had customer complaint information (Figure 6). The refrigerated warehousing subsector had a higher percentage of complaints than other groups, followed by the general warehousing subsector. The other subsector had no data on customer complaints.

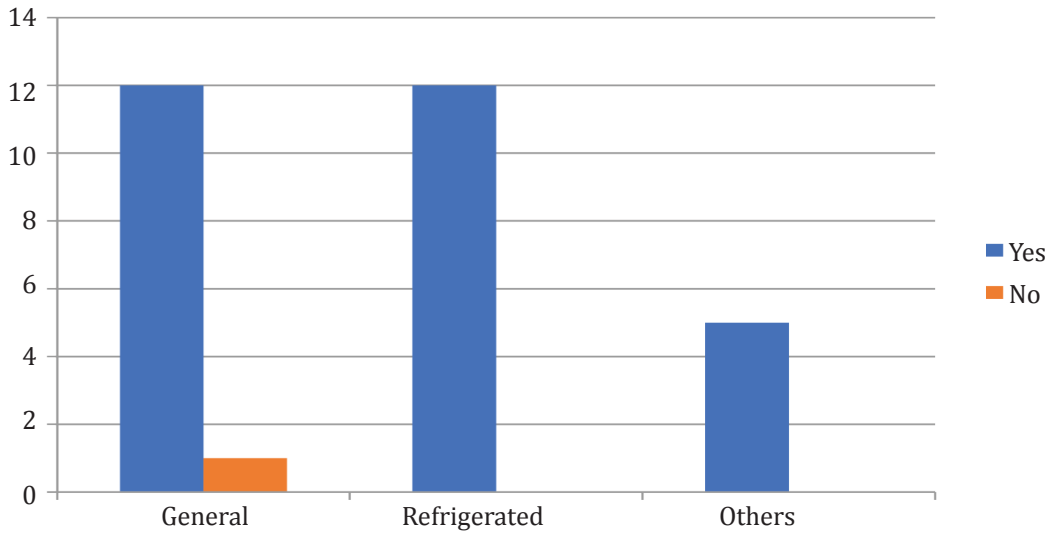


Figure 7. Monitoring of customer complaints by type of warehousing subsector

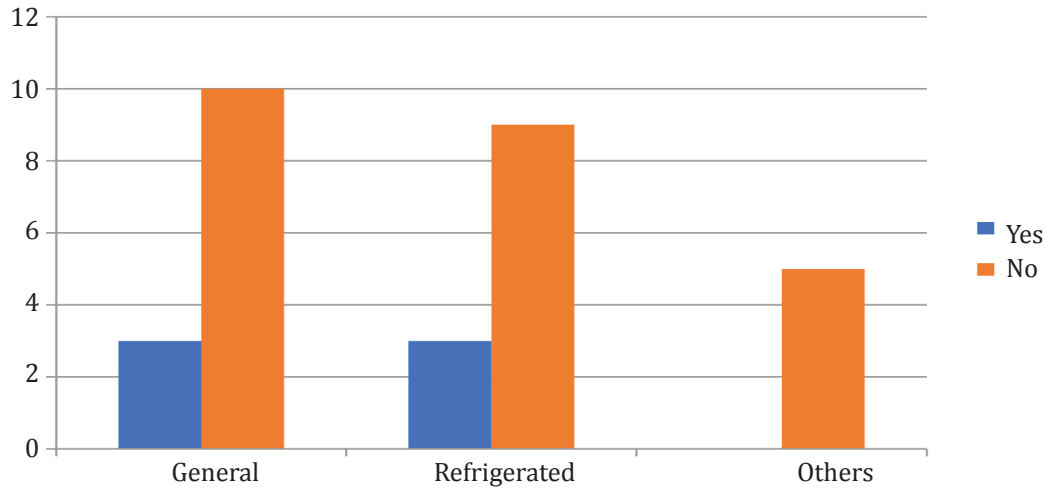


Figure 8. Recorded number of compliments by type of warehousing subsector

Almost all the companies focused on monitoring customer complaints (Figure 7), although one in the general warehousing subsector did not. Eighty percent of the companies did not record customer compliment data (Figure 8). A minority of companies in the general and refrigerated warehousing subsectors recorded this information. None in the other warehousing subsector recorded customer compliments.

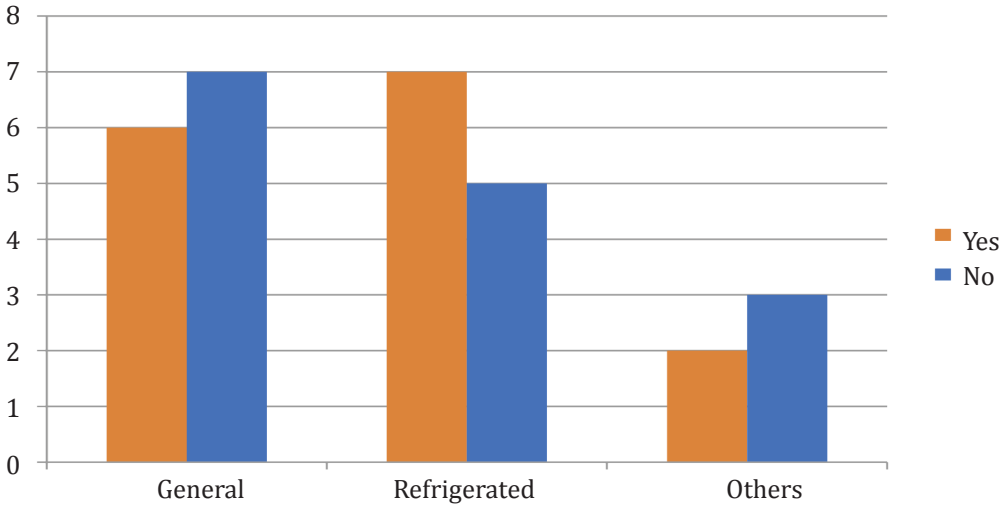


Figure 9. Recorded number of wrong deliveries by type of warehousing subsector

Fifty percent of companies collected wrong delivery data (Figure 9). The percentage in the refrigerated warehousing subsector which recorded wrong deliveries was higher than in the general warehousing and other warehousing subsectors.

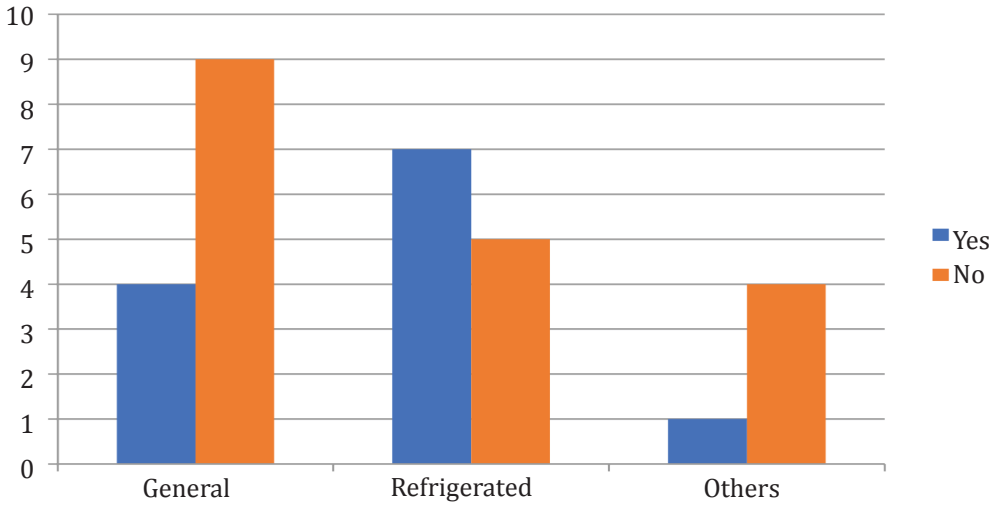


Figure 10. Recorded number of on-time deliveries by type of warehousing subsector

It was noted that seven of the 12 companies (58%) in the refrigerated warehousing subsector recorded on-time delivery data (Figure 10). A low percentage of companies in the general and other warehousing subsectors recorded on-time delivery data.

*Subsector 1: General Warehousing*

Table 59 shows the customer perspective results for the general warehousing subsector. It had the highest number of customer complaints. Complaints ranged from 14.0 to 17.3 during 2012–2014, and customer loyalty was lower than in the other subsectors at 70% in 2014. This meant that those warehouses lost some customers each year. However, this group generated much higher sales per employee.

Table 59. Results of the customer perspective for the general warehousing subsector in Thailand

| KPI | 2012 | 2013 | 2014 |
|---|---|---|---|
| Customer loyalty (%) | — | — | — |
| No. of complaints | 14.0 | 16.3 | 17.3 |
| Sales per employee (FTE) (THB) (in USD) | 3,466,374 (109,641) | 2,914,248 (92,178) | 1,062,194 (33,597) |

FTE, full-time equivalents

*Subsector 2: Refrigerated Warehousing (Cold Storage)*

The customer perspective results for the refrigerated warehousing subsector are given in Table 60. This subsector took care of customers very well as compared with the others. The companies received only an average of 2.4 to 2.9 complaints per year, and customer loyalty was the highest at around 100%. This meant that they could maintain the same customers during the three-year research period. However, the sales per employee were only THB0.79 to 0.90 million (USD24,966–28,375) per person (full-time equivalents) per year, which was slightly lower than in the other warehousing subsectors.

Table 60. Results of the customer perspective for the refrigerated warehousing (cold storage) subsector in Thailand

| KPI | 2012 | 2013 | 2014 |
|---|---|---|---|
| Customer loyalty (%) | 100 | 100 | 100 |
| No. of complaints | 2.4 | 2.3 | 2.9 |
| Sales per employee (FTE) (THB) (in USD) | 897,106 (28,375) | 868,121 (27,459) | 789,321 (24,966) |

FTE, full-time equivalents

*Subsector 3: Other (Container Deposits, Chemical Warehousing, Bonded Warehousing, and Seed Storage) Warehousing*

Table 61 shows the customer perspective results for the other warehousing subsector. The customer care provided by this subsector was inferior to that by the refrigerated subsector. Customer loyalty stood at 80% during the three-year period, while sales per employee improved from THB0.54 million in 2012 to THB1.1 million (USD17,215–34,490) in 2014. Apart from such measures, the companies used other metrics such as customers' repeat purchases, quality targets, number of customers, amount of inventory, revenue, time to document deposits or pick inventory, customer satisfaction, etc.

Table 61. Results of the customer perspective for the other warehousing subsector in Thailand

| KPI | 2012 | 2013 | 2014 |
|---|---|---|---|
| Customer loyalty (%) | 80 | 80 | 80 |
| No. of complaints | — | — | — |
| Sales per employee (FTE) (THB) (in USD) | 544,246 (17,215) | 1,068,515 (33,797) | 1,090,409 (34,490) |

FTE, full-time equivalents

## Operational Perspective

The participating companies had almost no information on the operational perspective. They did not measure inventory turnover, order-picking accuracy, receiving lead time, or warehouse utilization. Nevertheless, it was noted that the inventory accuracy data of the general and refrigerated warehousing subsectors had increased. Only about 23% of companies measured inventory turnover (Figure 11). Five of the 12 companies in the refrigerated warehousing subsector measured inventory turnover. In the general warehousing subsector, only two of 13 companies measured inventory turnover, while none of the other type of warehouse did so.

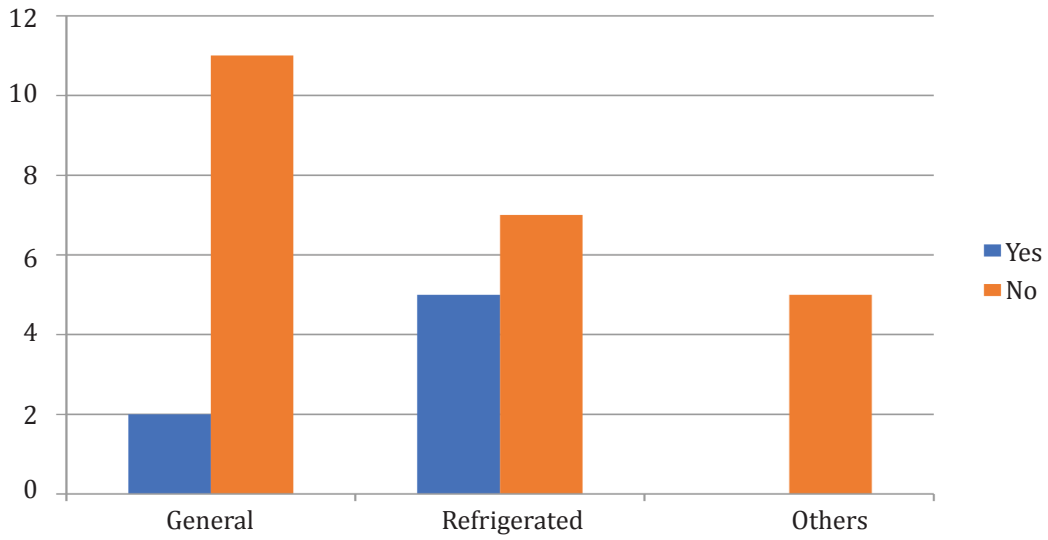


Figure 11. Measuring inventory turnover by type of warehousing subsector

It was found that only half of the participating companies measured inventory accuracy (Figure 12), with the lowest percentage of companies measuring this indicator in the other warehousing subsector.

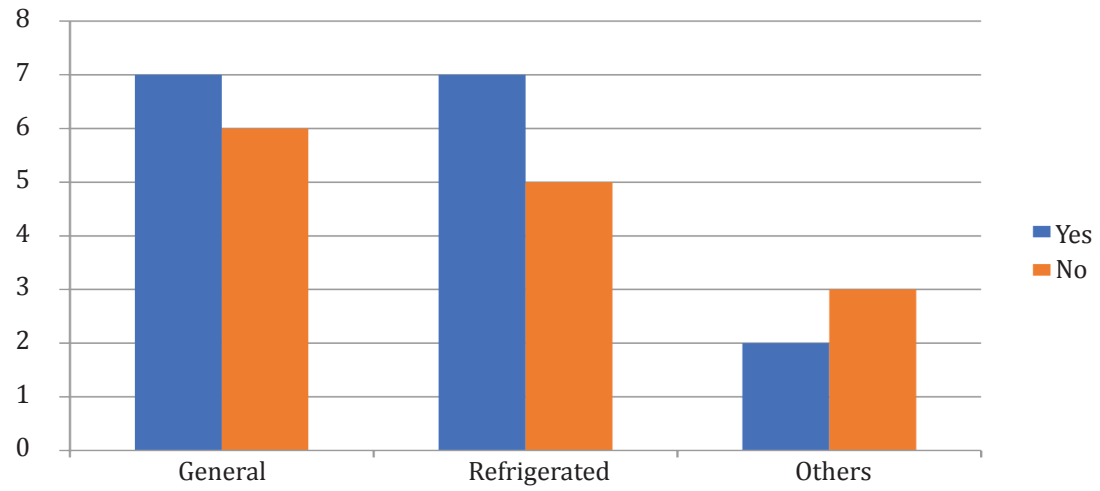


Figure 12. Measuring inventory accuracy by type of warehousing subsector

Very few companies measured receiving lead time (Figure 13) and order-processing lead time (Figure 14). On average, only 30% of the companies measured receiving lead time indicators, and 13% measured processing lead time. Only a few (23%) measured order-picking accuracy (Figure 15) and warehouse utilization (30%) (Figure 16).

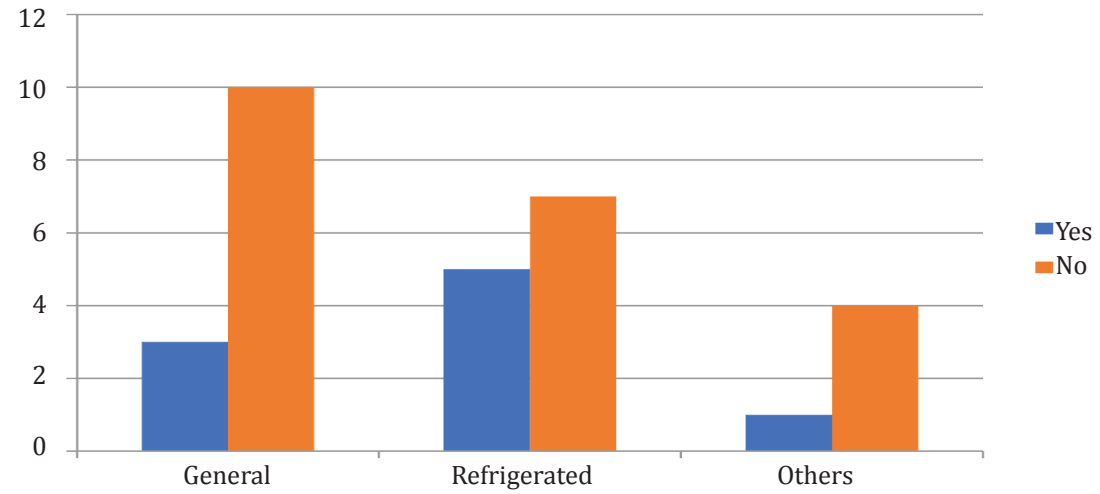


Figure 13. Measuring receiving lead time by type of warehousing subsector

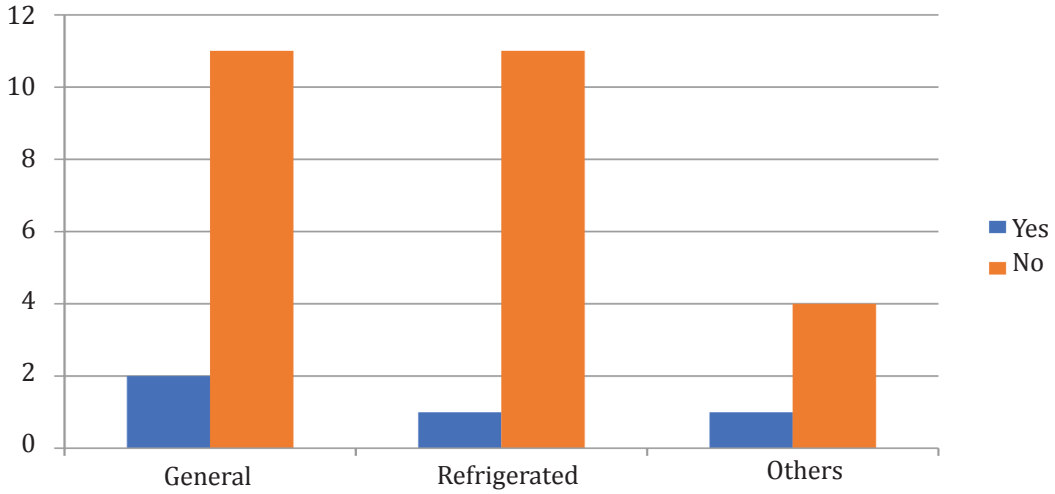


Figure 14. Measuring order-processing lead time by type of warehousing subsector

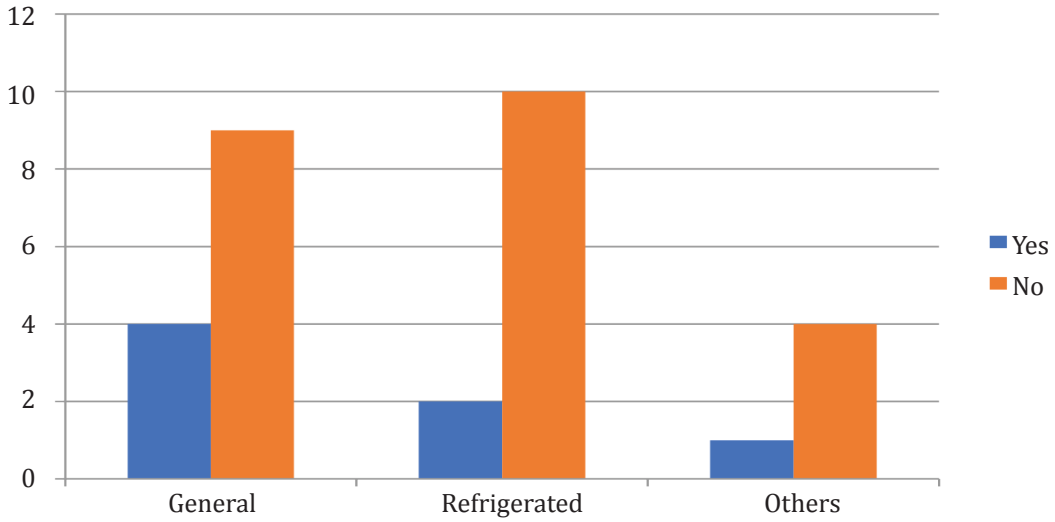


Figure 15. Measuring order-picking accuracy by type of warehousing subsector

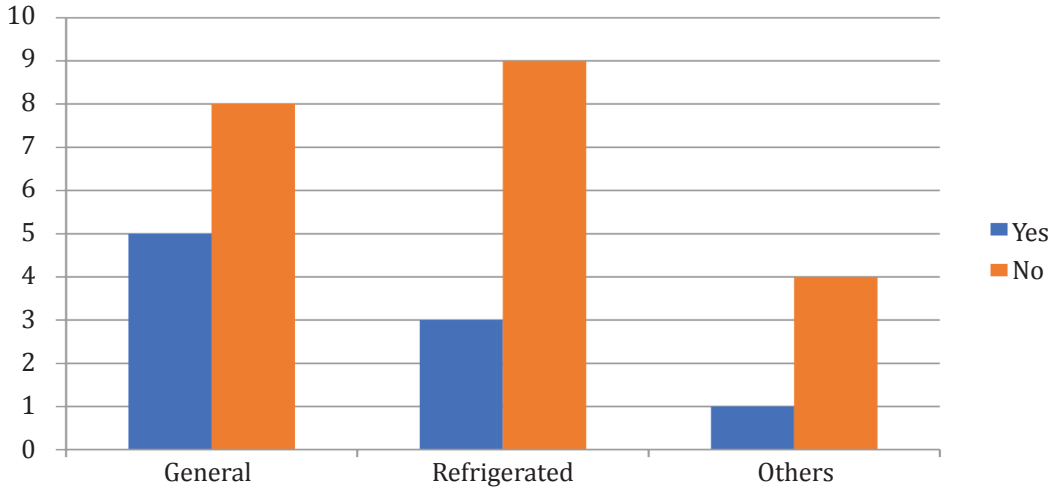


Figure 16. Measuring warehouse utilization by type of warehousing subsector

From the results of the survey, it was found that the most important factor in doing business in the warehousing subsector was good service, with a response rate of 53.3%. The second factor was good value for money, with a response rate of 33.4%. Only a few stated that a strong reputation or brand name was important, with a response rate of 23.3%. Other success factors noted were low operational costs of administration and value for money. Table 62 shows the various key success factors identified.

Table 62. Key success factors by type of warehousing subsector

| Type | Value for money | % | Strong reputation/ brand name | % | Low operating costs | % | Good customer service | % |
|---|---|---|---|---|---|---|---|---|
| General | 5 | 38.5 | 3 | 23.1 | 4 | 30.8 | 6 | 46.2 |
| Refrigerated | 4 | 33.3 | 3 | 25.0 | 2 | 16.7 | 5 | 41.7 |
| Other | 1 | 20.0 | 1 | 20.0 | 3 | 60.0 | 5 | 100.0 |
| All | 10 | | 7 | | 9 | | 16 | |

More than half of participating companies (56.7%) used technology (IT systems and automation) in the management of their businesses (Figure 17). The most common technology and systems used were warehouse management systems (41.2%) and inventory and financial management systems (29.4%).

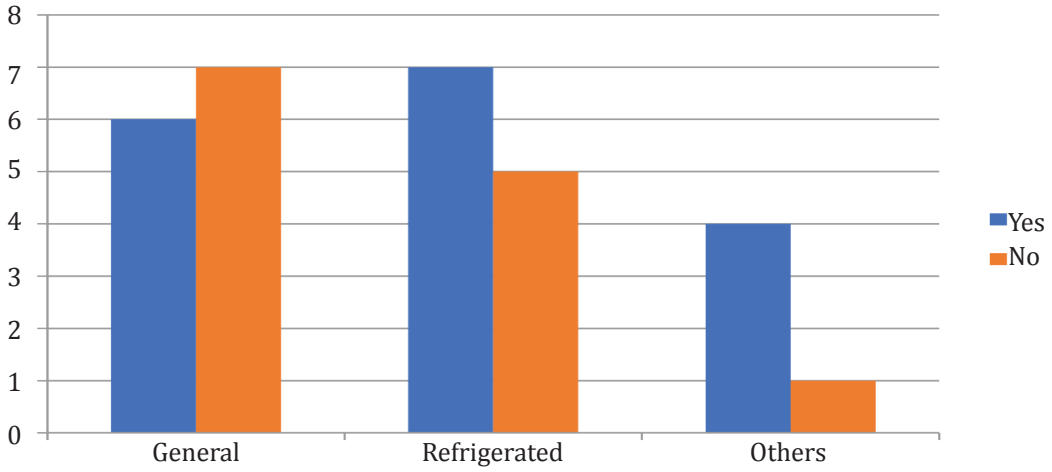


Figure 17. Use of technology by type of warehousing subsector

Table 63 shows the types of systems used by warehousing companies. About 50% of the general warehousing subsector used warehouse management and financial management systems, while 42.9% of the refrigerated warehousing subsector used warehouse management systems. Fifty percent of the warehousing subsector used financial management systems.

Table 63. Types of systems used by type of warehousing subsector

| Type | WMS | % | Human resources management | % | e-Commerce | % | Inventory management system | % |
|---|---|---|---|---|---|---|---|---|
| General | 3 | 50.0 | 2 | 33.3 | 0 | 0.0 | 2 | 33.3 |
| Refrigerated | 3 | 42.9 | 2 | 28.6 | 0 | 0.0 | 2 | 28.6 |
| Other | 1 | 25.0 | 0 | 0.0 | 0 | 0.0 | 1 | 25.0 |
| All | 7 | | 4 | | 0 | | 5 | |
| **Type** | **ERP** | **%** | **CRM** | **%** | **Purchasing system** | **%** | **Financial management system** | **%** |
| General | 0 | 0.0 | 1 | 16.7 | 0 | 0.0 | 3 | 50.0 |
| Refrigerated | 0 | 0.0 | 1 | 14.3 | 0 | 0.0 | 0 | 0.0 |
| Other | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 | 2 | 50.0 |
| All | 0 | | 2 | | 0 | | 5 | |

WMS, warehouse management system; ERP, enterprise resource planning; CRM, customer relationship management

*Subsector 1: General Warehousing*

Table 64 shows the operational perspective results for the general warehousing subsector. All companies measured inventory turnover, inventory accuracy, receiving lead time, order-processing lead time, order-picking accuracy, and warehouse utilization. Most had high efficiency levels because of high operating rates, especially in the general warehousing subsector where the sales per warehouse space were higher than in the other groups at THB48,797–51,140 (USD1,543–1,618) per square meter. They also reported nearly full utilization of their warehouses, ranging from 92.5% to 103.3%. The order-picking accuracy rate was 100% during 2012–2014, and the inventory accuracy was also very high at 96.2% to 97.5%. However, the companies did not disclose other operational KPIs.

Table 64. Results of the operational perspective for the general warehousing subsector in Thailand

| KPI | 2012 | 2013 | 2014 |
|---|---|---|---|
| Annual inventory turnover rate | — | — | — |
| Inventory accuracy (%) | 96.2 | 97.0 | 97.5 |
| Sales to warehouse space ($m^2$) (THB) (in USD) | 51,140.25 (1,618) | 48,797.34 (1,543) | 49,798.00 (1,575) |
| Receiving lead time (hours) | — | — | 8 |
| Order-processing lead time (hours) | — | — | — |
| Order-picking accuracy (%) | 100.0 | 100.0 | 100.0 |
| Warehouse utilization (%) | 92.5 | 98.3 | 103.3 |

*Subsector 2: Refrigerated Warehousing (Cold Storage)*

Table 65 shows the operational perspective results for the refrigerated warehousing subsector. The refrigerated warehouses had inventory turnover 5.0 times per year and receiving lead time of 1.4 hours during 2012–2014. However, the order-processing lead time was around 72 hours, which was quite long. This group also managed inventory well, with the inventory accuracy at 97.9% and order-picking accuracy at 100%. However, the warehouse utilization was not as efficient as in the general warehousing subsector. This group had also created sales to warehouse space of THB6,155–6,990 (USD195–221) per square meter. Refrigerated warehouse utilization was lower at 88.7–95.7% during the period of the study.

Table 65. Results of the operational perspective for the refrigerated warehousing (cold storage) subsector in Thailand

| KPI | 2012 | 2013 | 2014 |
|---|---|---|---|
| Annual inventory turnover rate | 5.0 | 5.0 | 5.0 |
| Inventory accuracy (%) | 97.9 | 97.4 | 97.6 |
| Sales to warehouse space ($m^2$) (THB) (in USD) | 6,155.11 (195) | 6,332.27 (200) | 6,990.03 (221) |
| Receiving lead time (hours) | 1.4 | 1.4 | 1.4 |
| Order-processing lead time (hours) | 72 | 72 | 72 |
| Order-picking accuracy (%) | 100.0 | 100.0 | 100.0 |
| Warehouse utilization (%) | 93.0 | 95.7 | 88.7 |

*Subsector 3: Other (Container Deposits, Chemical Warehousing, Bonded Warehousing, and Seed Storage) Warehousing*

Table 66 shows the operational perspective results for the other warehousing subsector. The subsector used KPIs in managing inventory. Inventory accuracy was at 100% during the study period with receiving lead time at one hour, which was faster than the other subsectors. Moreover, the warehouse utilization rate reached 100%, but the order-picking accuracy rate was slightly lower than in the other groups at 90%. Sales to warehouse space were rather low as compared with the other subsectors at THB 2,493–3,796 (USD79–120) per square meter. In addition, the companies also measured and monitored the rate of damage claims and conducted annual performance evaluations.

Table 66. Results of the operational perspective for the other warehousing subsector in Thailand

| KPI | 2012 | 2013 | 2014 |
|---|---|---|---|
| Annual inventory turnover rate | — | — | — |
| Inventory accuracy (%) | 100.0 | 100.0 | 100.0 |
| Sales to warehouse space ($m^2$) (THB) (in USD) | 2,493.11 (79) | 2,804.14 (89) | 3,795.86 (120) |

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| KPI | 2012 | 2013 | 2014 |
|---|---|---|---|
| Receiving lead time (hours) | 1 | 1 | 1 |
| Order-processing lead time (hours) | — | — | — |
| Order-picking accuracy (%) | 90.0 | 90.0 | 90.0 |
| Warehouse utilization (%) | 100.0 | 100.0 | 100.0 |

## Human Resources Perspective

Almost all of the participating companies relied on permanent staff, who composed nearly 90% of the total workforce. They employed an average of 50 to 52 staff members during the 2012–2014 period. The refrigerated warehousing subsector employed an average of 56 to 69 and the other subsector employed 26 to 36. Only three companies had temporary staff. The one in the general warehousing subsector employed 8.3% temporary staff, but the two refrigerated warehouses employed 20%. Around 53.3% of companies recorded turnover of employees during the three-year study period (Figure 18).

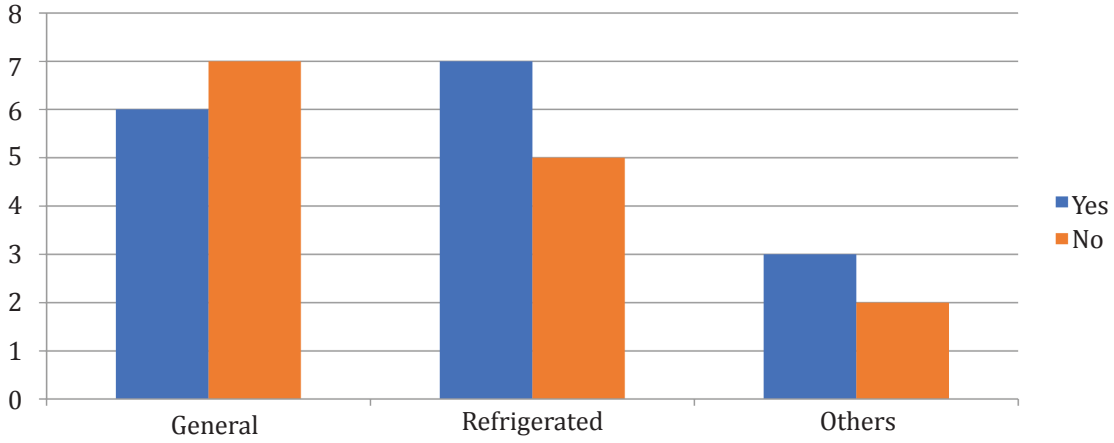



Figure 18. Recorded staff turnover rates by type of warehousing subsector

Figure 19 shows the number of companies that recorded absenteeism rates. Absenteeism rates across all types of warehousing subsectors were high, at 76.7%.

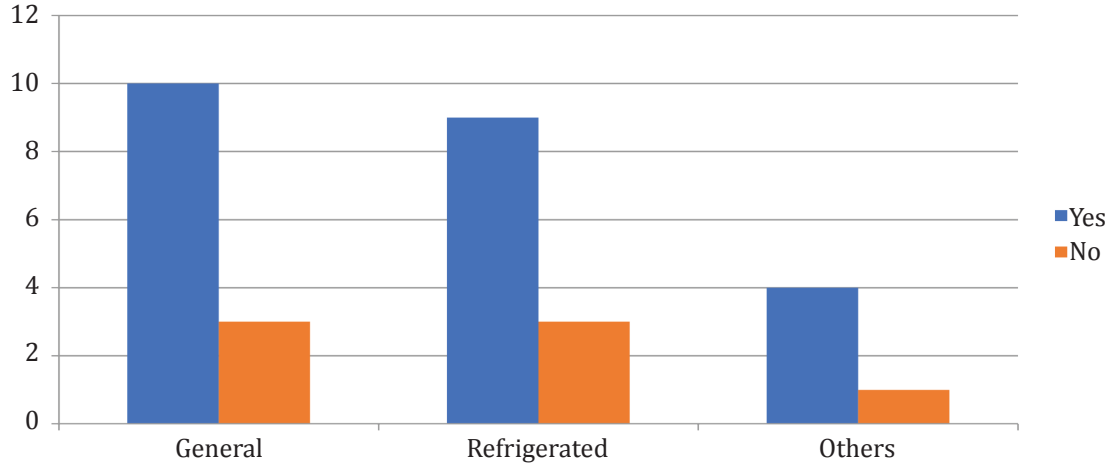



Figure 19. Recorded absenteeism rates by type of warehousing subsector

Figure 20 shows the number of companies that trained employees. More than 63% held training for their staff. Refrigerated warehouses had the highest staff training rate of 91.7%, followed by the general and other types (46.2% and 40%, respectively).

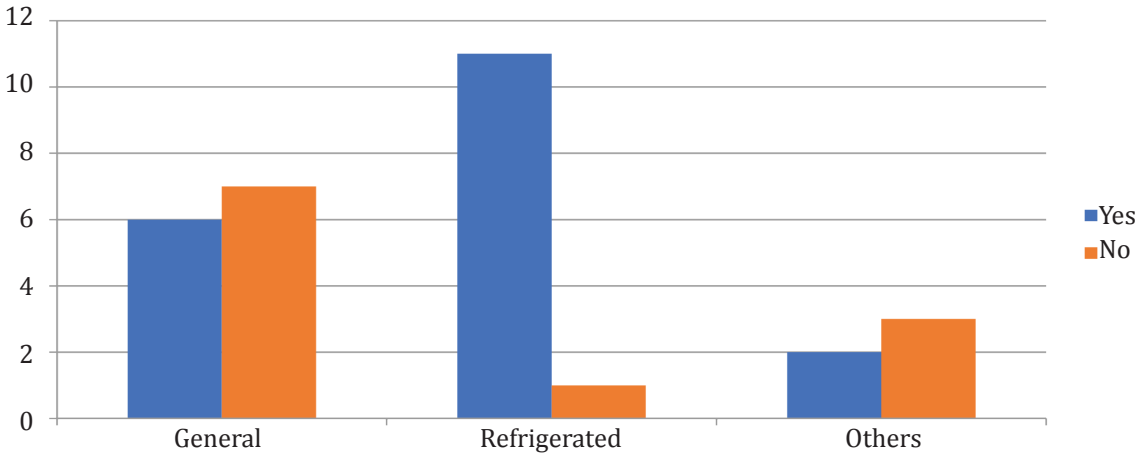



Figure 20. Training of employees by type of warehousing subsector

Figure 21 shows the number of companies with informal training or on-the-job training (OJT). The average ratio was nearly 60%. The refrigerated warehousing subsector had the highest percentage of workers trained by OJT (83.3%), followed by the other subsector (60%) and general subsector (38.5%).

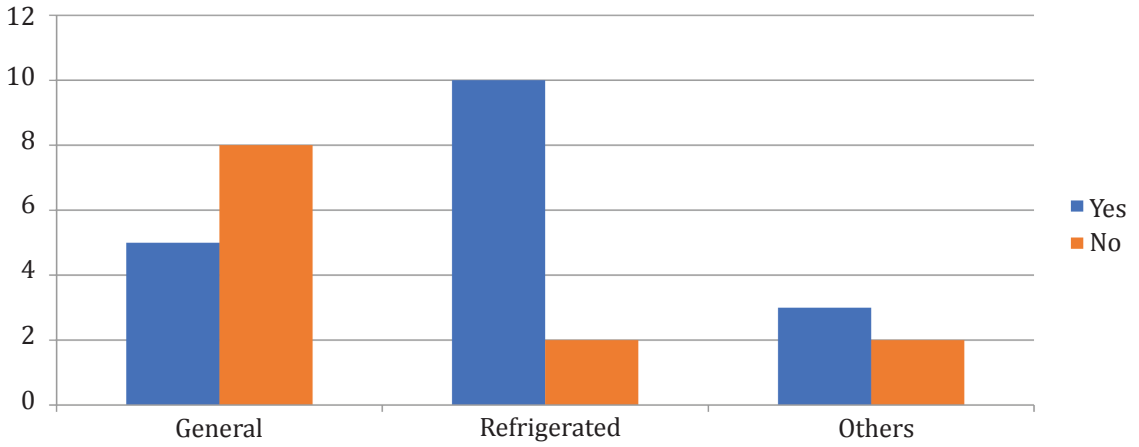



Figure 21. OJT by type of warehousing subsector

*Subsector 1: General Warehousing*

Table 67 shows the human resources perspective results for the general warehousing subsector. The average training hours per staff member ranged from 12.8 to 15.4 hours per person per year during 2012–2014, with training costs averaging THB1,667–2500 (USD52.72–79.08) per person per year. The turnover rate was relatively low at 3.2% to 4.2%, and the absenteeism rate ranged from 8.9% to 9.5% during the period.

Table 67. Results of the human resources perspective for the general warehousing subsector in Thailand

| KPI | 2012 | 2013 | 2014 |
|---|---|---|---|
| Training hours per staff | 12.8 | 14.3 | 15.4 |
| Training expenditure per staff (THB) (in USD) | 2,500.00 (79.08) | 2,500.00 (79.08) | 1,666.70 (52.72) |
| Staff turnover rate (%) | 4.2 | 3.2 | 3.5 |
| Absenteeism rate (%) | 9.5 | 9.5 | 8.9 |

*Subsector 2: Refrigerated Warehousing (Cold Storage)*

Table 68 shows the human resources perspective results for the refrigerated warehousing subsector. The average training hours ranged from 17.6 to 18.0 per person per year during 2012–2014, the highest rate among subsectors. However, the cost of training employees was about THB1,485.7–1,628.6 (USD46.99–51.51) per person per year because some of the courses were free of charge.

Workers in refrigerated warehousing had a relatively high turnover rate, ranging from 14.3% to 18.0% during the study period. The absenteeism rate ranged from 8.9% to 10.4%, which was slightly higher than in the other two warehousing subsectors.

Table 68. Results of the human resources perspective for the refrigerated warehousing (cold storage) subsector in Thailand

| KPI | 2012 | 2013 | 2014 |
|---|---|---|---|
| Training hours per staff | 18.0 | 17.6 | 18.0 |
| Training expenditure per staff (THB) (in USD) | 1,628.60 (51.51) | 1,485.70 (46.99) | 1,628.60 (51.51) |
| Staff turnover rate (%) | 18.0 | 15.6 | 14.3 |
| Absenteeism rate (%) | 8.9 | 9.8 | 10.4 |

*Subsector 3: Other (Container Deposits, Chemical Warehousing, Bonded Warehousing, and Seed Storage) Warehousing*

Table 69 shows the human resources perspective results for the other warehousing subsector. Each staff member received about six hours of training per year from 2012 to 2014, with training expenditures of about THB2,333.3 (USD73.80) per person per year. The staff turnover rate was relatively low at an average of 3.7% per year, and the absenteeism rate was 7.3% each year.

Table 69. Results of the human resources perspective for the other warehousing subsector in Thailand

| KPI | 2012 | 2013 | 2014 |
|---|---|---|---|
| Training hours per staff | 6.0 | 6.0 | 6.0 |
| Training expenditure per staff (THB) (in USD) | 2,333.30 (73.80) | 2,333.30 (73.80) | 2,333.30 (73.80) |
| Staff turnover rate (%) | 3.7 | 3.7 | 3.7 |
| Absenteeism rate (%) | 7.3 | 7.3 | 7.3 |

Companies organized both internal and external training courses for employees in the areas of company regulations, specific responsibilities (e.g., forklift driving, cold storage work, rules and regulations for bonded storage, customs laws, specialized technical and machinery knowledge, safety, ISO 9001, GMP, HACCP, HALAL, Food Safety, MSDS chemicals, etc.). For OJT, new employees were trained by supervisors and experienced employees in the real work environment.

Companies paid overtime allowances, diligence allowances, medical insurance, annual bonuses, and special payments as well as commissions paid according to the number of containers that could be exported. During the research, it was noted that the most important aspect of human resources management was the need to manage employees effectively and allocate the right jobs to the right persons. Employees used multiple skills and expertise to perform their work and equipment repair and maintenance. In daily operations, employees must communicate, discuss issues, strive for continuous improvement, and maintain positive attitudes and loyalty to the organization.

## ANALYSIS OF THE PERFORMANCE OF THE LOGISTICS SECTOR (WAREHOUSING SUBSECTOR) IN THAILAND

### Financial Perspective

The general warehousing subsector was found to have the highest productivity, followed by the refrigerated and the other subsectors based on both value added and the value added-to-sales ratios of up to 0.27 to 0.36. General warehousing was also more profitable compared with the other two types due to competitive labor wages. Refrigerated warehouses managed working capital better than the others based on the data showing that current assets exceeded current liabilities.

### Customer Perspective

All the warehousing subsectors received information from customers by phone because it was the basic channel with the lowest cost as well as from e-mail messages and meetings with customers. Modern channels such as websites were less used due to the small size of the companies and lack of resources to manage their own websites. Except in the other warehousing subsector, postal mail was used infrequently.

More than half of warehouses had formal systems for obtaining customer feedback; the figure was 75% in the refrigerated subsector. Almost all monitored customer complaints, and the general warehousing subsector received the most complaints. Only one company ignored customer complaints. Few companies recorded customer compliments. More companies in refrigerated warehousing collected and recorded data on deliveries to customers and wrong deliveries than in the other subsectors.

The refrigerated warehousing subsector performed well by maintaining good customer relationships and retaining existing customers better (customer loyalty of 100%) and therefore received a minimal number of complaints. Those companies obtained customer feedback using various channels such e-mail, the phone, and direct contacts. They met customers face to face more often than the other two subsectors and strived to understand customer needs to improve services quickly. This group also monitored all customer complaints and resolved the problems identified, which resulted in better customer retention. However, sales per employee were not as high as in the general warehousing group. General warehousing received the most complaints, and customer loyalty was relatively low.

## Operational Perspective

Few companies collected data on operational measures such as inventory turnover, order-picking accuracy, receiving lead time, and warehouse utilization. The most important success factors in doing business were thought to be good service, followed by value for money. In the case of the other warehousing subsector, low operational costs were the second most important factor. The general and refrigerated warehousing subsectors rated value for money as the second most important success factor in doing business. More than half of companies used technology in management, except for those in general warehousing. The most common technology used was warehouse management systems, followed by inventory and financial management systems.

General warehousing was the most efficient in utilizing warehouse space and maximizing sales to warehouse space. However, companies in that subsector reported inventory accuracy rates of between 96% to 98% due to fewer IT applications compared with the other subsectors, which had inventory accuracy of 98–100%. All the warehousing subsectors had high order-picking accuracy rates. For the KPI of receiving lead time, the refrigerated and the other warehousing subsectors managed to receive and maintain inventories in shorter times. The processing lead time was relatively longer in the refrigerated warehousing subsector.

## Human Resources Perspective

In general, the warehousing subsectors did not emphasize training, as reflected by numbers of training hours and training costs. The refrigerated subsector had higher staff turnover rates of 14% to 18% compared with the other groups, which had only 3% to 4% rates. The higher turnover rates affected service provision. Companies need to train new employees to be competent and prompt in service through either internal or external training. Employees must also be willing to take the time to learn and improve the ability to do their jobs.

Companies in the general warehousing subsector had lower staff turnover rates than in the other subsectors. They emphasized that staff must have clear divisions of responsibilities. In addition to skills and knowledge, employees must be disciplined, honest, and loyal to the company. Companies must retain staff as long as possible. Moreover, this group also used technology, which may lower wages, resulting in higher labor productivity. The major problem of the refrigerated warehousing subsector was a very high turnover rate, which may affect operations due to the loss of knowledge, skills, and expertise in the companies.

# KEY FINDINGS ON THE LOGISTICS SECTOR (WAREHOUSING SUBSECTOR) IN VIETNAM

## INTRODUCTION

Vietnam's economy is heavily dependent on both import and export activities. According to the World Development Indicators by The World Bank, the value of imports and exports of goods and services was 83.1% and 86.4% of Vietnam's GDP in 2014, respectively [3]. The key advantages of Vietnam's economy over past 20 years were its rapidly expanding labor force and shift of economic activity from agriculture to the higher-productivity sectors of manufacturing and services. However, these drivers o f economic growth are diminishing and in need of substitutes by within-sector productivity improvement. Improvement in the logistics system and increased capacity are possible. As the logistics system develops, transaction costs will decrease, in turn leading to greater competitiveness within the country.

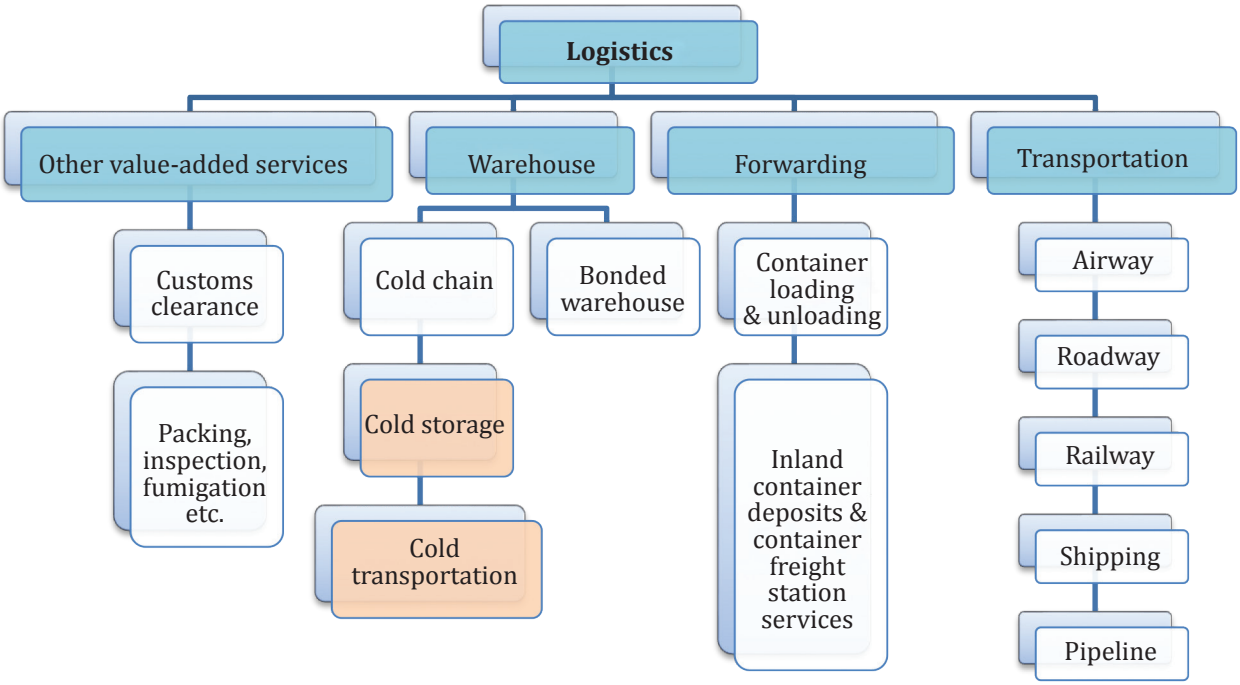



Figure 22. Types of logistics services in Vietnam

Source: Decree No. 140/2007/ND-CP issued on 5 September 2007

The logistics and transportation sector plays an important role in the development of the Vietnamese economy. Figure 22 shows the types of logistics services available. Tables 70 and 71 show the classification of the logistics sector and warehousing subsector, respectively, under the Vietnam Standard Industrial Classification (VSIC). Based on The World Bank's Logistics Performance Index 2014, Vietnam was ranked 53th among the 166 countries [3]. Although 80% of the market was dominated by 25 multinational companies, the opportunities for SMEs in the logistics sector are increasing, especially after the ASEAN Economic Community was officially formed on 31 December 2015.

Table 70. Classification of the logistics sector (transportation and storage)

| VSIC | Sector |
|---|---|
| **491** | Transportation by railway |
| **492** | Transportation by bus |
| **493** | Other transportation on roads |
| **494** | Transportation by pipeline |
| **50** | Transportation on water |
| **501** | Transportation on oceans |
| **502** | Transportation on rivers |
| **51** | Transportation by air |
| **511** | Passenger transportation by air |
| **512** | Goods transportation by air |
| **52** | Warehousing & transportation supporting activities |
| **521** | Warehousing & storage of goods |
| **522** | Transportation supporting activities |

Source: Vietnam Standard Industrial Classification 2007, GSO

Table 71. Classification of the warehousing and storage subsector

| VSIC | Sector |
|---|---|
| **52** | Warehousing & transportation supporting activities |
| **5210** | Warehousing & storage |
| **52101** | Container freight station warehousing & storage |
| **52102** | Cold warehousing & storage |
| **52109** | General warehousing & storage |

Source: Vietnam Standard Industrial Classification 2007, GSO

According to the Vietnam Logistics Association's Vietnam Logistics Review [13], the sector is still in its early development stage with more than 1,200 companies. Except for a state-owned enterprise, most of the enterprises are very small and they contributed capital from VND4 billion (USD187,000) to VND6 billion (USD281,000). There are about 25 multinational logistics companies in Vietnam (e.g., DHL, UPS, FedEx, etc.) that account for 70% to 80% of the market share. Meanwhile, most of Vietnam's logistics companies only serve as subcontractors or agencies for foreign companies. The logistics outsourcing ratio of Vietnamese corporations is still low at 25% to 30%, which is much lower than in PR China (63%) and Japan (40%).

Currently, there are about 40 logistics companies listed on Vietnam's stock exchanges. According to Vietnam's Schedule of Specific Commitments in Services to the World Trade Organization, which states that warehouse services and freight-forwarding and other services (such as checking bills of lading, checking of goods, sampling and weight determination, receiving and accepting goods, and preparing transportation documents)

were to be fully open to foreign companies from January 2014 [15]. The Vietnamese logistics market is expected to be more intensively competitive among domestic players.

There are many challenges for the logistics industry in Vietnam. One of them is the lack of indices, such as key performance indicators (KPIs), to measure the efficiency of enterprises, both at the sectoral and subsectoral levels.

## PROFILES OF THE PARTICIPATING LOGISTICS SMES

Thirty SMEs participated in this benchmarking research study, all of which were from the general warehousing subsector. Most were from Ho Chi Minh City, the most dynamic economic development hub of Vietnam. They were located in the following large cities: Ho Chi Minh City, 12; Binh Duong, two; Da Nang, two; Khanh Hoa, one; Dong Nai, two; Binh Dinh, two; An Giang, two; Hai Phong, five; and Hanoi, two.

The characteristics of these 30 research participants can be summarized as follows. Staff size ranged from 20 to 1,300 employees, and the number of warehouses ranged from one to 13 located in different cities. By company type, they comprised state-owned, privately owned, and joint-venture companies. Warehouse size ranged from 1,000 to 30,000 $m^2$. Work shifts ranged from one to three per day. Working time varied among the companies and was flexible according to customers' requests, e.g., 7:30 to 17:30, 8:00 to 17:00, and 8:00 to 16:00, 16:00 to 24:00, and 24:00 to 8:00.

*Subsector 1: General Warehousing*

Although warehousing is one subsector of logistics, among the 1,200 logistics companies in Vietnam, very few specialize in warehousing alone. Their services include warehousing and transportation, or warehousing and customs brokerage, warehousing and freight forwarding, etc. The financial results were calculated from the overall business results of the SMEs and do not indicate the productivity performance of warehousing services in Vietnam.

All 30 companies that participated in this research were engaged in general warehousing and some in both general warehousing and cold storage facilities. The data gathered could not be broken down into general warehousing and cold storage. Some observations from this study were:

- Almost all the participants in this research operated general warehouses, although some had both general and cold storage warehouses.
- Vietnamese logistics companies have the advantage of being able to own warehouses. Foreign companies must rent warehouses or form joint ventures with local companies.
- Local companies have the advantage of understanding the local customers' behavior and business culture.
- Some local companies hired foreign employees to cope with strong competition from multinational competitors.
- Some local companies had developed strategies to enter new markets. They hired foreign employees to perform marketing activities to help them connect better with customers such as the Japanese.

## Subsector 2: Refrigerated Warehousing (Cold Storage)

In this research project, data and information could not be collected from the refrigerated and cold storage warehousing subsector.

## KPIS OF PARTICIPATING COMPANIES FROM VIETNAM

### Financial Perspective

The data collected showed that there was a decreasing trend in value added from 2012 to 2014. Table 72 shows the financial perspective results for the general warehousing subsector. The minimum salary was adjusted two times in 2013 and 2014, which decreased the labor cost competitiveness ratio despite a slight increase in sales volume from 2013 to 2014.

Table 72. Results of the financial perspective for the general warehousing subsector in Vietnam

| KPI | 2012 | 2013 | 2014 |
|---|---|---|---|
| VA (USD) | 2,701,889.90 | 2,091,361.37 | 2,524,878.55 |
| VA-to-sales ratio | 0.23 | 0.20 | 0.20 |
| Labor cost competitiveness | 2.6 | 2.5 | 1.8 |
| Working capital ratio | 9.67 | 6.0 | 7.8 |
| Profit margin (%) | 24 | 20 | 30 |

VA, value added

### Customer Perspective

Table 73 gives the customer perspective results for the general warehousing subsector. Almost all of the respondents had customer feedback systems in place through hotlines and e-mail systems. Records of customer complaints and feedback were received verbally and in written form. Only 20% of the participating SMEs conducted customer satisfaction surveys.

Table 73. Results of the customer perspective for the general warehousing subsector in Vietnam

| KPI | 2012 | 2013 | 2014 |
|---|---|---|---|
| Customer loyalty (%) | — | — | — |
| No. of complaints | — | — | — |
| Sales per employee (FTE) (USD) | 152,523.0 | 175,894.0 | 158,378.0 |

FTE, full-time equivalents

## Operational Perspective

The common types of services offered by the general warehousing subsector were shared and/or dedicated modern warehousing services, receipt/put-away/pick/pack/ship services, inventory management services (on a first-in-first-out or last-in-first-out basis), and value-added services such as repackaging, co-packaging, labeling, etc. Table 74 shows the operational perspective results for the general warehousing subsector.

Table 74. Results of the operational perspective for the general warehousing subsector in Vietnam

| KPI | 2012 | 2013 | 2014 |
|---|---|---|---|
| Annual inventory turnover rate | — | — | — |
| Inventory accuracy (%) | 94.75 | 94.75 | 94.75 |
| Sales to warehouse space ($m^2$) (USD) | — | — | — |
| Receiving lead time (hours) | — | — | — |
| Order-processing lead time (hours) | — | — | — |
| Order-picking accuracy (%) | — | — | — |
| Warehouse utilization (%) | 89.5 | 89.5 | 89.5 |

## Human Resources Perspective

Details of the training provided for employees by the participating logistics companies were as follows: on-the-job training, 80.26%; external training, e.g., seminars, 23.6%; in-house training conducted by foreign experts, 6.9%; and overseas training, 3.9%. Most of the training conducted focused on internal regulations, operations, and safety.

Table 75 shows the human resources perspective results for the general warehousing subsector. All the participating companies confirmed that they had recorded employees' absenteeism rates, which varied from 5% to 10% each year. This had impacts on their business performance such as the quality of service and on-time deliveries.

Table 75. Results of the human resources perspective for the general warehousing subsector in Vietnam

| KPI | 2012 | 2013 | 2014 |
|---|---|---|---|
| Training hours per staff | — | — | 36 |
| Training expenditure per staff (USD) | — | — | 250 |
| Staff turnover rate (%) | 5.5 | 5 | 4.5 |
| Absenteeism rate (%) | 2 | 2 | 2 |

# ANALYSIS OF PERFORMANCE OF THE LOGISTICS SECTOR (WAREHOUSING SUBSECTOR) IN VIETNAM

## Financial Perspective

While analyzing the sales per product and service, the logistics companies noted the growth trend in warehousing services and decided to invest in IT, human resources, and management systems to improve the operation and profitability of their businesses. After analyzing the costs, they recognized that manual picking and packing operations were labor intensive, costly, and primary sources of errors in warehouse operations. Therefore some companies adopted IT and automation systems to improve business operations.

## Customer Perspective

Companies adopted the ISO 9001:2008 Quality Management System under which customer complaints were evaluated periodically at management review meetings. Sales managers and/or customer service department managers were also responsible for the handling of customer feedback. Based on the results of this research, customer compliments were rare and not recorded by the participating companies.

## Operational Perspective

There were four key success factors highlighted by participating companies as important for their warehouse businesses: good customer service; strong brand; price; and ability to satisfy customers' requirements. The average warehouse in Vietnam receives, counts, and inspects thousands of items of varying shapes and sizes from hundreds of vendors whose picking, packing, and shipping practices are all different. Receiving is one of the most complicated functions and warehouse processes. Errors in receiving have a ripple effect. Some companies focused on improving the receiving process (e.g., working with suppliers to make good labels including sufficient information such as company name, telephone number, purchase order number, pallet label and quantity, case label and quantity, product number and description, package count).

## Human Resources Perspective

Four key findings were observed during the research. First, a system for professional education and training in the logistics industry is lacking in Vietnam. Second, logistics companies must develop their own training programs. Third, fierce competition and high staff turnover rates mean that competitors attract competent staff instead of training their own employees. Finally, budgets for training had increased over the years from an average USD50 to USD200.

## BEST PRACTICES

Based on the data and findings collected by the national experts who participated in this research project, countries with the key best practices in the logistics sector (warehousing subsector) from the four perspectives (financial, customers, operational, and human resources) are summarized in Table 76. In the charts, the industry subsectors are added in parentheses after the country name.

Expectedly, the ROK and Singapore, being developed economies, performed relatively better on many of the sub-aspects in the refrigerated warehouse category, whereas India being an emerging economy scored high in the general warehouse category. A good deal of India's performance likely came from the labor arbitrage it offers because a large pool of its population is in the working age groups.

On the flip side, India happened to spend the highest amount of time on training its staff, especially in the general warehousing category, at a cost that was second only to Singapore and Vietnam among all the featured five countries. Incidentally, Singapore's remarkably high spend of USD1,328 per staff (as against much lower spends of USD270 in Vietnam and USD230 in India), got handsomely rewarded in the form of a consistent 100% customer loyalty in the general warehousing category.

Table 76. Data labels used in figures for key best practices

| Data series | Data label used in figures |
|---|---|
| India (general warehousing) | India (G) |
| India (refrigerated warehousing) | India (R) |
| Republic of Korea (general warehousing) | Republic of Korea (G) |
| Republic of Korea (refrigerated warehousing) | Republic of Korea (R) |
| Republic of Korea (other) | Republic of Korea (O) |
| Singapore (general warehousing) | Singapore (G) |
| Singapore (refrigerated warehousing) | Singapore (R) |
| Thailand (general warehousing) | Thailand (G) |
| Thailand (refrigerated warehousing) | Thailand (R) |
| Thailand (other) | Thailand (O) |
| Vietnam (general warehousing) | Vietnam (G) |

## FINANCIAL PERSPECTIVE

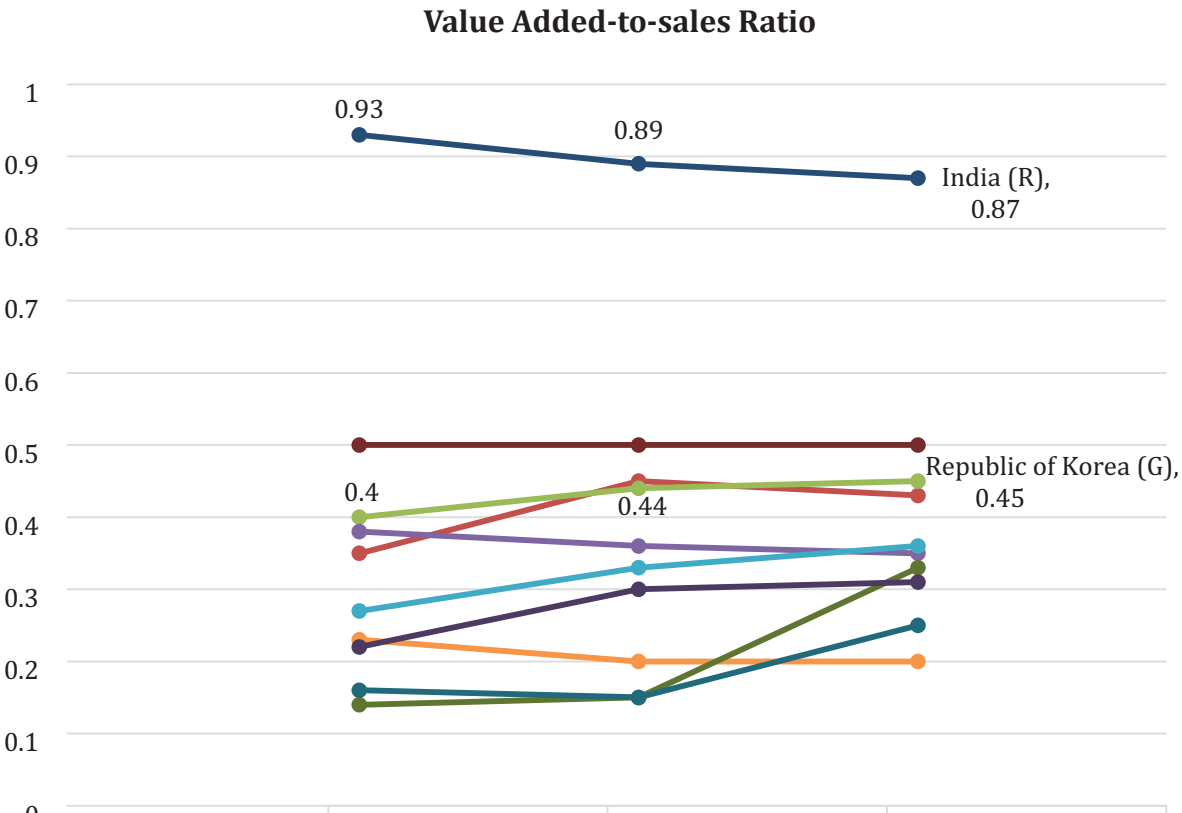
### Value Added

The best-in-class performers for general warehousing and refrigerated warehousing in terms of value added were India and Singapore, respectively. They generated greater wealth through either higher sales values or optimal cost of bought-in materials and services in their operations. These higher value-added results enabled sustainability of their warehousing operations and business growth.


| | 2012 | 2013 | 2014 |
|---|---|---|---|
| India (G) | $9,285,371.01 | $9,759,230.75 | $11,329,098.97 |
| Republic of Korea (G) | $980,000.00 | $560,000.00 | $660,000.00 |
| Singapore (G) | $8,589,353.00 | $8,021,923.00 | $7,629,655.00 |
| Thailand (G) | $805,067.00 | $792,527.00 | $846,493.00 |
| Vietnam (G) | $2,701,889.90 | $2,091,361.37 | $2,524,878.55 |
| India (R) | $111,973.01 | $83,960.30 | $118,510.49 |
| Singapore (R) | $10,065,223.00 | $12,078,267.00 | $16,104,356.00 |
| Thailand (R) | $751,159.00 | $975,351.00 | $876,675.00 |
| Republic of Korea (O) | $280,000.00 | $390,000.00 | $390,000.00 |
| Vietnam (O) | $112,213.00 | $159,392.00 | $220,042.00 |

## Value Added-to-sales Ratio

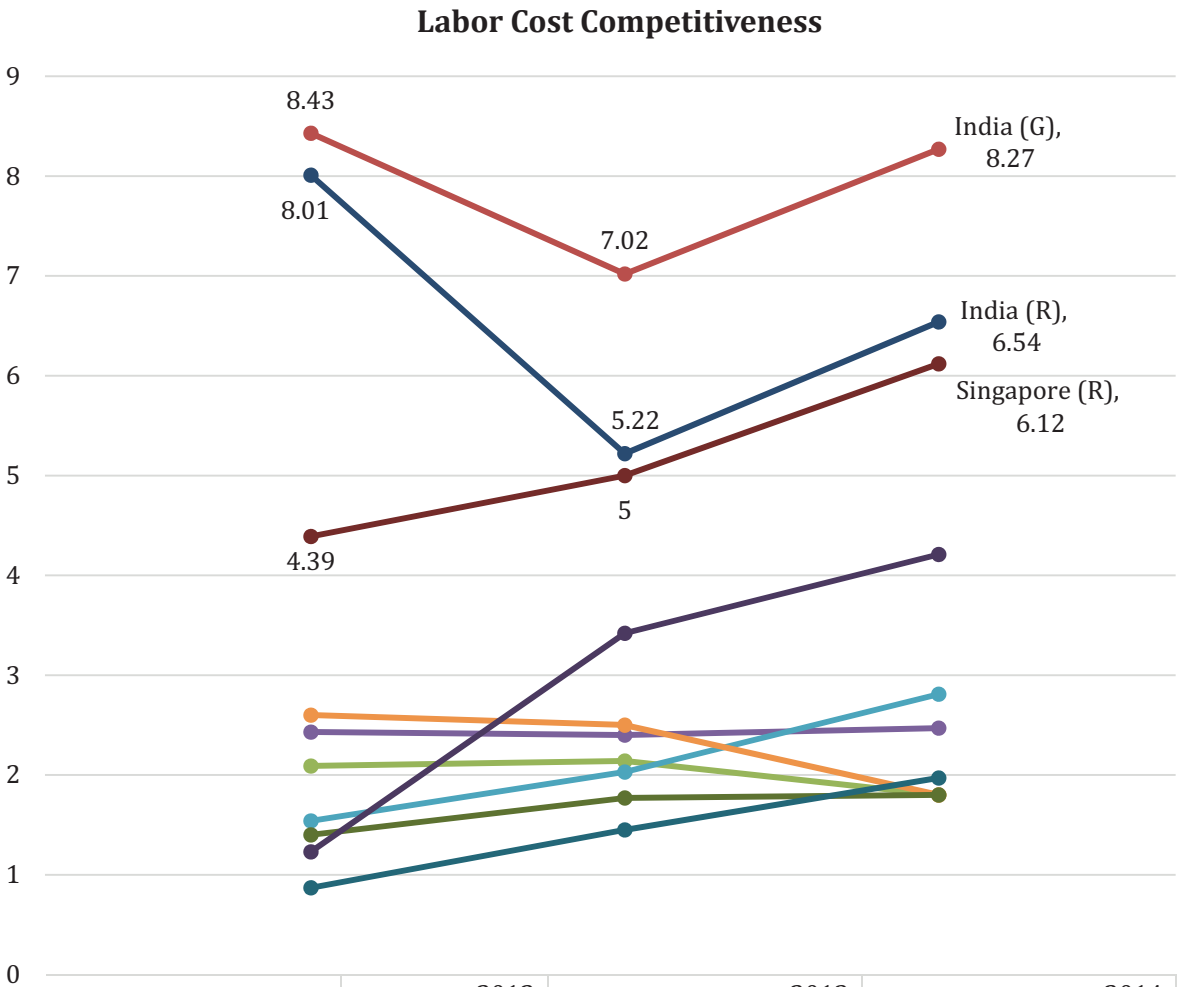
The best-in-class performers for general warehousing and refrigerated warehousing in terms of value added-to-sales ratios were the ROK and India, respectively. They generated higher levels of wealth  over sales, which signifies greater efficiency in the use of bought-in materials and services, favorable price differentials between services offered, and good control of stock.




| | 2012 | 2013 | 2014 |
|---|---|---|---|
| India (G) | 0.35 | 0.45 | 0.43 |
| Republic of Korea (G) | 0.4 | 0.44 | 0.45 |
| Singapore (G) | 0.38 | 0.36 | 0.35 |
| Thailand (G) | 0.27 | 0.33 | 0.36 |
| Vietnam (G) | 0.23 | 0.2 | 0.2 |
| India (R) | 0.93 | 0.89 | 0.87 |
| Singapore (R) | 0.5 | 0.5 | 0.5 |
| Thailand (R) | 0.14 | 0.15 | 0.33 |
| Republic of Korea (O) | 0.22 | 0.3 | 0.31 |
| Vietnam (O) | 0.16 | 0.15 | 0.25 |

## Labor Cost Competitiveness

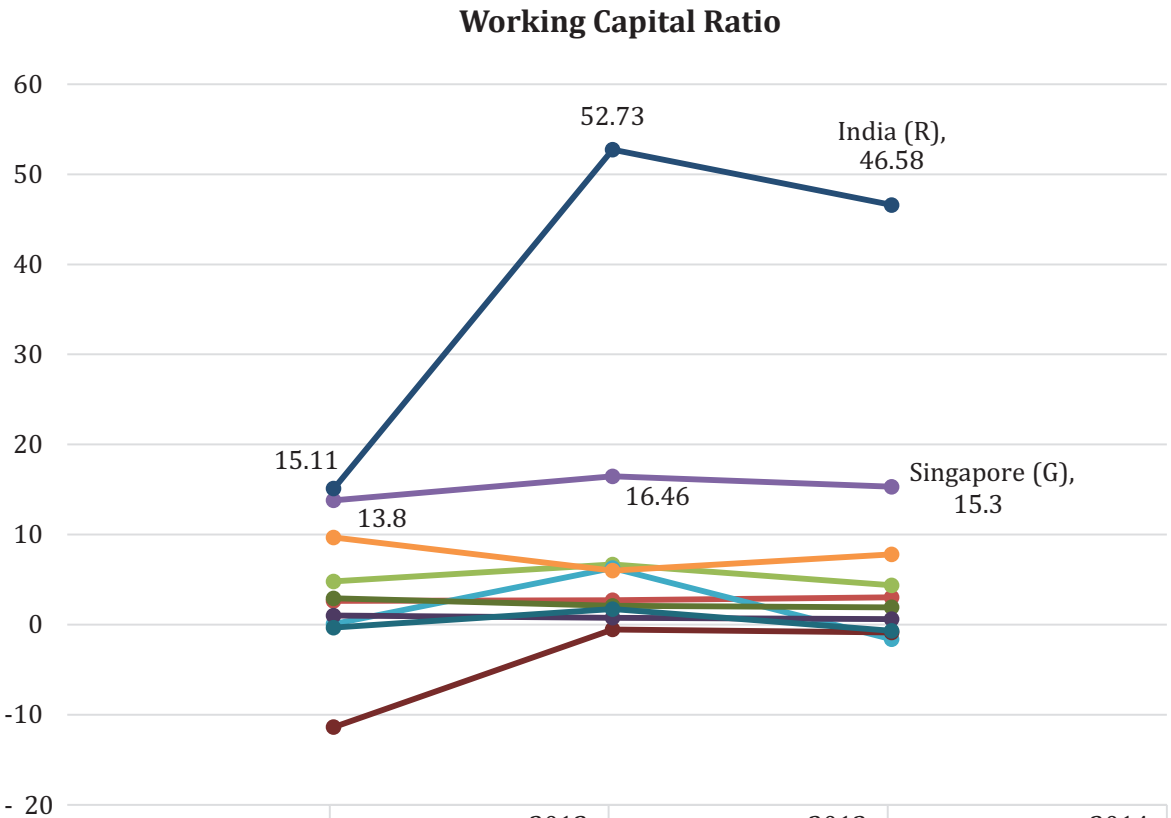
The best-in-class performers for general warehousing and refrigerated warehousing in terms of labor cost competitiveness were India and Singapore, respectively. They managed to achieve higher efficiency and effectiveness of their labor force, accompanied by reasonable wage rates.




| | 2012 | 2013 | 2014 |
|---|---|---|---|
| India (G) | 8.43 | 7.02 | 8.27 |
| Republic of Korea (G) | 2.09 | 2.14 | 1.8 |
| Singapore (G) | 2.43 | 2.4 | 2.47 |
| Thailand (G) | 1.54 | 2.03 | 2.81 |
| Vietnam (G) | 2.6 | 2.5 | 1.8 |
| India (R) | 8.01 | 5.22 | 6.54 |
| Singapore (R) | 4.39 | 5 | 6.12 |
| Thailand (R) | 1.4 | 1.77 | 1.8 |
| Republic of Korea (O) | 1.23 | 3.42 | 4.21 |
| Vietnam (O) | 0.87 | 1.45 | 1.97 |

## Working Capital Ratio

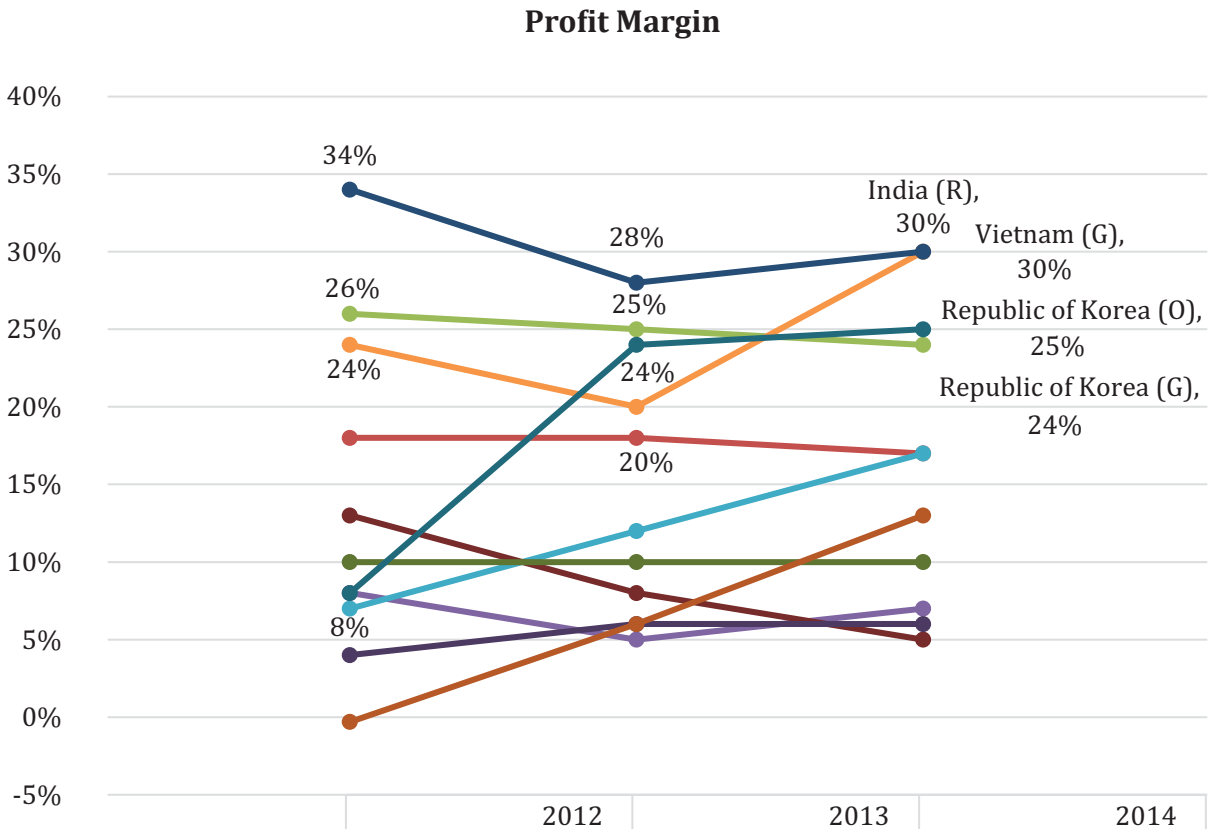
The best-in-class performers for general warehousing and refrigerated warehousing in terms of the working capital ratio were Singapore and India, respectively. This demonstrated the operating liquidity and short-term financial health of the businesses, which are key to sustaining operations and for business growth.




| | 2012 | 2013 | 2014 |
|---|---|---|---|
| India (G) | 2.63 | 2.71 | 3.03 |
| Republic of Korea (G) | 4.79 | 6.67 | 4.36 |
| Singapore (G) | 13.8 | 16.46 | 15.3 |
| Thailand (G) | 0.08 | 6.28 | - 1.62 |
| Vietnam (G) | 9.67 | 6 | 7.8 |
| India (R) | 15.11 | 52.73 | 46.58 |
| Republic of Korea (R) | -11.37 | - 0.53 | - 0.87 |
| Thailand (R) | 2.91 | 2.08 | 1.93 |
| Republic of Korea (O) | 1 | 0.77 | 0.61 |
| Vietnam (O) | - 0.34 | 1.72 | - 0.69 |

## Profit Margin

The best-in-class performers for general, refrigerated, and other warehousing in terms of profit margin were Vietnam, India, and the ROK, respectively. These good results were achieved based on the proportion of sales left to the business after deducting all costs. The significance of this higher indicator demonstrated the ability of the businesses to generate high returns from a given amount of sales.

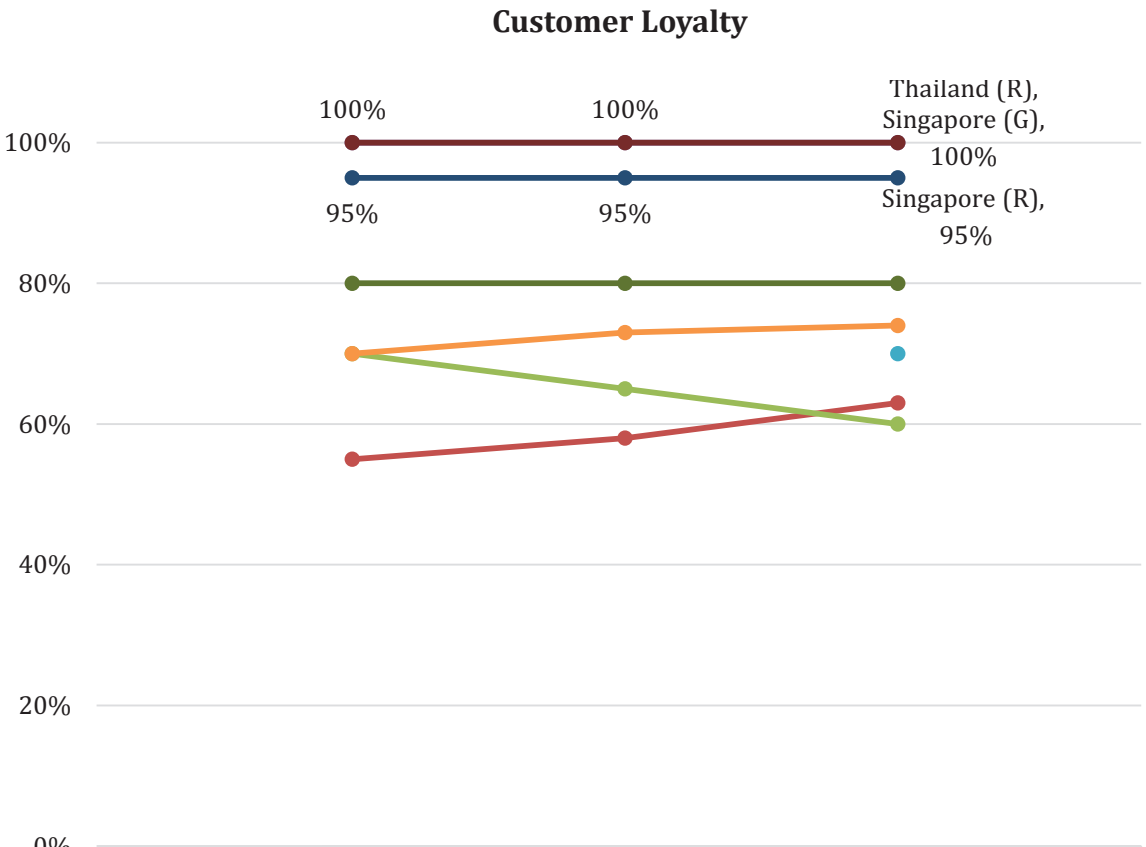



| | 2012 | 2013 | 2014 |
|---|---|---|---|
| India (G) | 18% | 18% | 17% |
| Republic of Korea (G) | 26% | 25% | 24% |
| Singapore (G) | 8% | 5% | 7% |
| Thailand (G) | 7% | 12% | 17% |
| Vietnam (G) | 24% | 20% | 30% |
| India (R) | 34% | 28% | 30% |
| Republic of Korea (R) | 13% | 8% | 5% |
| Singapore (G) | 10% | 10% | 10% |
| Thailand (R) | 4% | 6% | 6% |
| Republic of Korea (O) | 8% | 24% | 25% |
| Vietnam (O) | 0% | 6% | 13% |

# CUSTOMER PERSPECTIVE

## Customer Loyalty

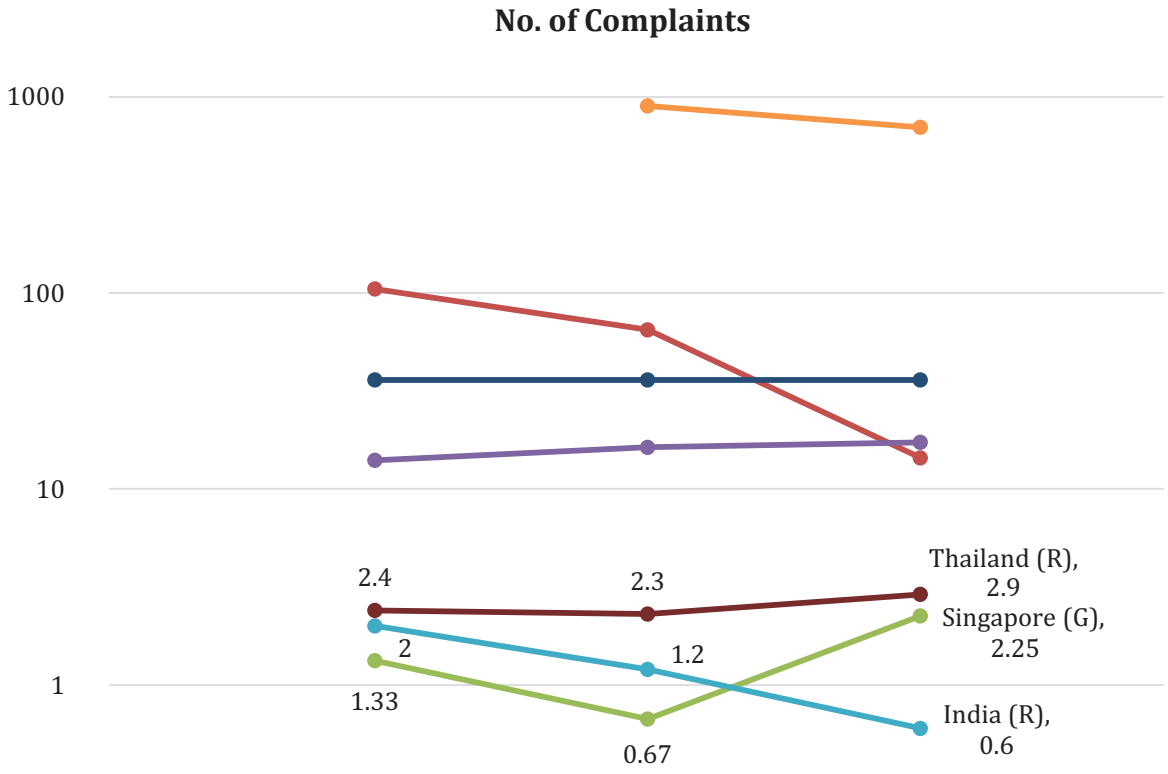
The best-in-class performers for general and refrigerated warehousing in terms of customer loyalty were Singapore and Thailand, respectively. They both achieved 100% customer loyalty. This signified that they were able to provide good customer service and satisfaction levels, which led to repeated business and retention of customers over the years.




| | 2012 | 2013 | 2014 |
|---|---|---|---|
| India (G) | 55% | 58% | 63% |
| Republic of Korea (G) | 70% | 65% | 60% |
| Singapore (G) | 100% | 100% | 100% |
| Thailand (G) | | | 70% |
| India (R) | 70% | 73% | 74% |
| Singapore (R) | 95% | 95% | 95% |
| Thailand (R) | 100% | 100% | 100% |
| Vietnam (O) | 80% | 80% | 80% |

## Number of Complaints

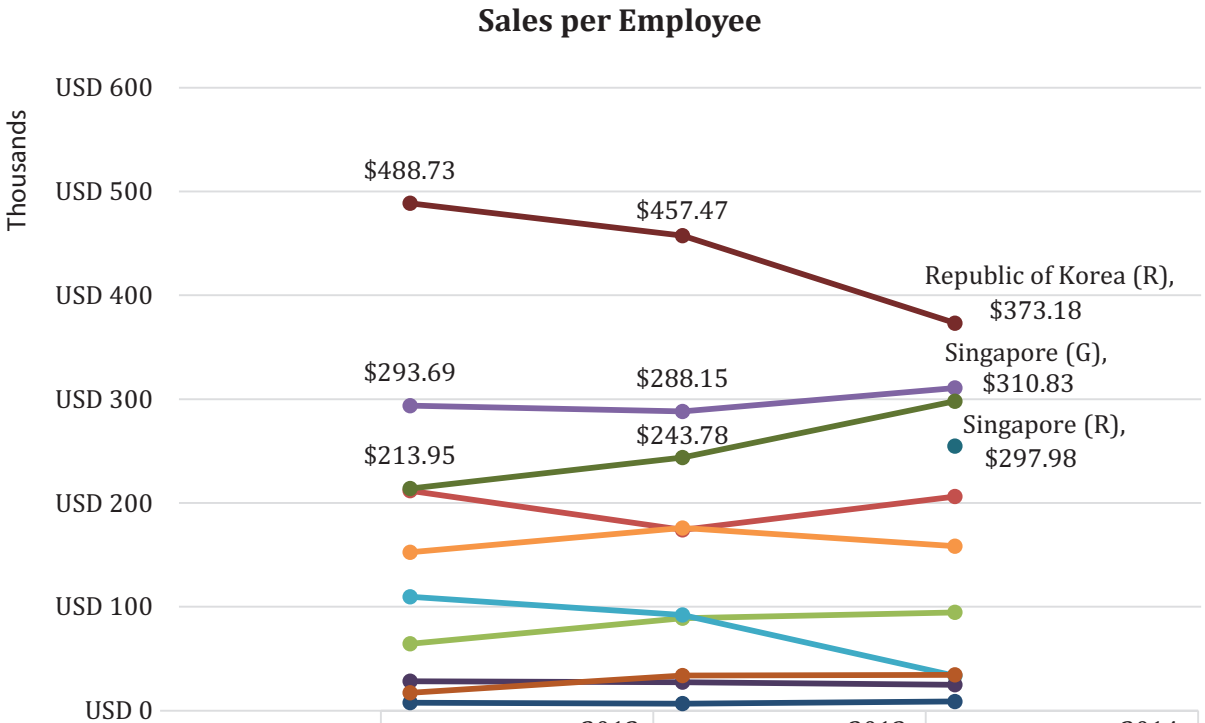
The best-in-class performers for general and refrigerated warehousing in terms of the fewest complaints were Singapore and India, respectively. They were thus able to fulfill customers' requirements and expectations.




| | 2012 | 2013 | 2014 |
|---|---|---|---|
| India (G) | 104.8 | 64.8 | 14.4 |
| Singapore (G) | 1.33 | 0.67 | 2.25 |
| Thailand (G) | 14 | 16.3 | 17.3 |
| India (R) | 2 | 1.2 | 0.6 |
| Republic of Korea (R) | | 900 | 700 |
| Singapore (R) | 36 | 36 | 36 |
| Thailand (R) | 2.4 | 2.3 | 2.9 |

## Sales per Employee

The best-in-class performers for general warehousing and refrigerated warehousing in terms of sales per employee were Singapore and the ROK, respectively. They achieved a good level of efficiency and effectiveness in their marketing strategies.

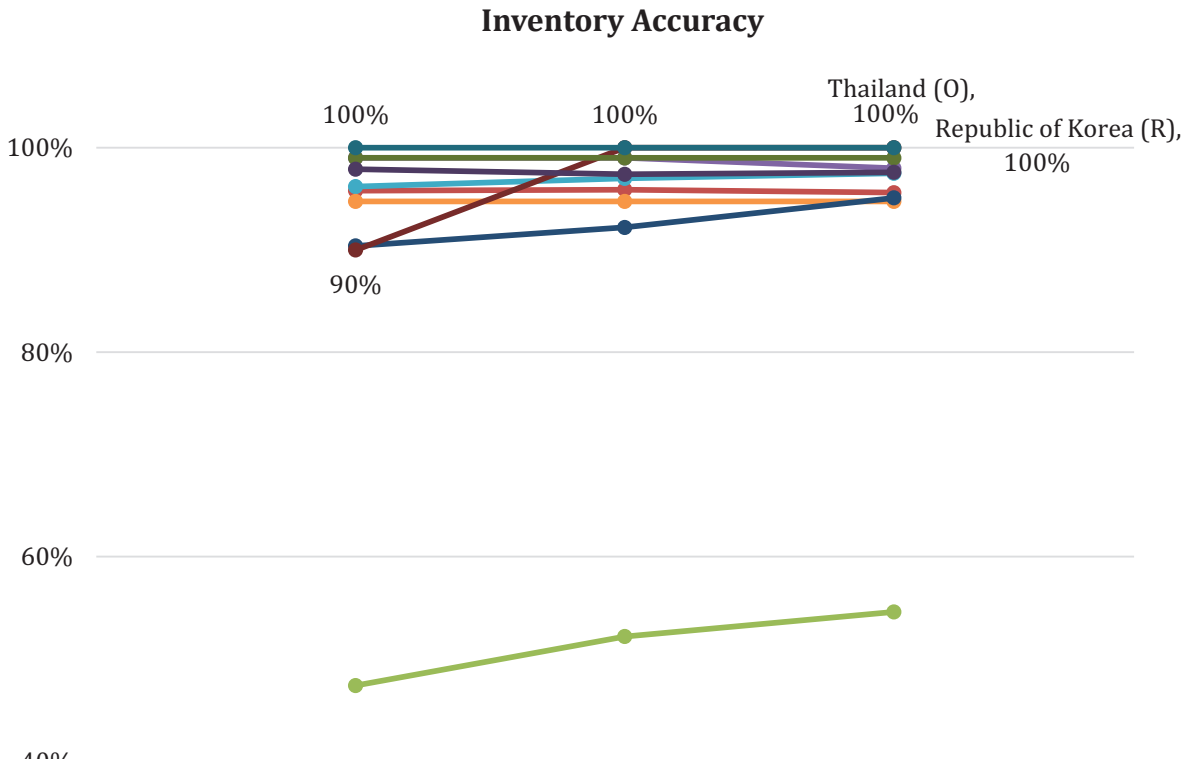



| | 2012 | 2013 | 2014 |
|---|---|---|---|
| India (G) | $211,892.67 | $174,124.11 | $206,256.09 |
| Republic of Korea (G) | $64,406.00 | $89,032.00 | $94,714.00 |
| Singapore (G) | $293,690.00 | $288,153.00 | $310,833.00 |
| Thailand (G) | $109,641.00 | $92,178.00 | $33,597.00 |
| Vietnam (G) | $152,523.00 | $175,894.00 | $158,378.00 |
| India (R) | $7,721.81 | $6,813.16 | $8,766.09 |
| Republic of Korea (R) | $488,729.00 | $457,473.00 | $373,177.00 |
| Singapore (R) | $213,946.00 | $243,781.00 | $297,977.00 |
| Thailand (R) | $28,375.00 | $27,459.00 | $24,966.00 |
| Republic of Korea (O) | | | $254,783.00 |
| Vietnam (O) | $17,215.00 | $33,797.00 | $34,490.00 |

# OPERATIONAL PERSPECTIVE

## Inventory Accuracy

The best-in-class performers for refrigerated warehousing and other warehousing in terms of inventory accuracy were the ROK and Thailand, respectively, which achieved 100% accuracy. For general warehousing, Singapore and Thailand were both best-in-class performers in inventory accuracy, at 98%. High inventory accuracy leads to customer confidence in the business, resulting in turn in greater customer satisfaction and loyalty.

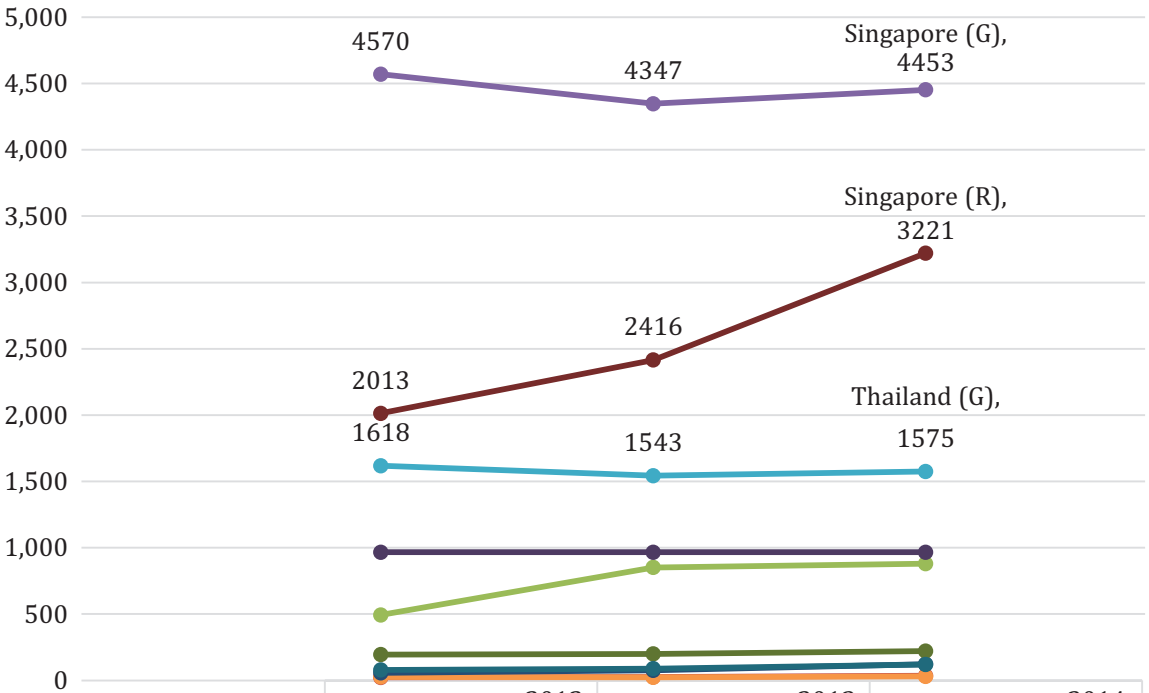



| | 2012 | 2013 | 2014 |
|---|---|---|---|
| India (G) | 96% | 96% | 96% |
| Republic of Korea (G) | 47% | 52% | 55% |
| Singapore (G) | 99% | 99% | 98% |
| Thailand (G) | 96% | 97% | 98% |
| Vietnam (G) | 95% | 95% | 95% |
| India (R) | 90% | 92% | 95% |
| Republic of Korea (R) | 90% | 100% | 100% |
| Singapore (R) | 99% | 99% | 99% |
| Thailand (R) | 98% | 97% | 98% |
| Thailand (O) | 100% | 100% | 100% |

## Sales to Warehousing Space

The best-in-class performer for general and refrigerated warehousing in term of sales to warehousing space was Singapore. This demonstrated the effectiveness of the utilization of warehouse space and productivity levels. Higher sales to warehousing space enhance the profitability and competitiveness of organizations.

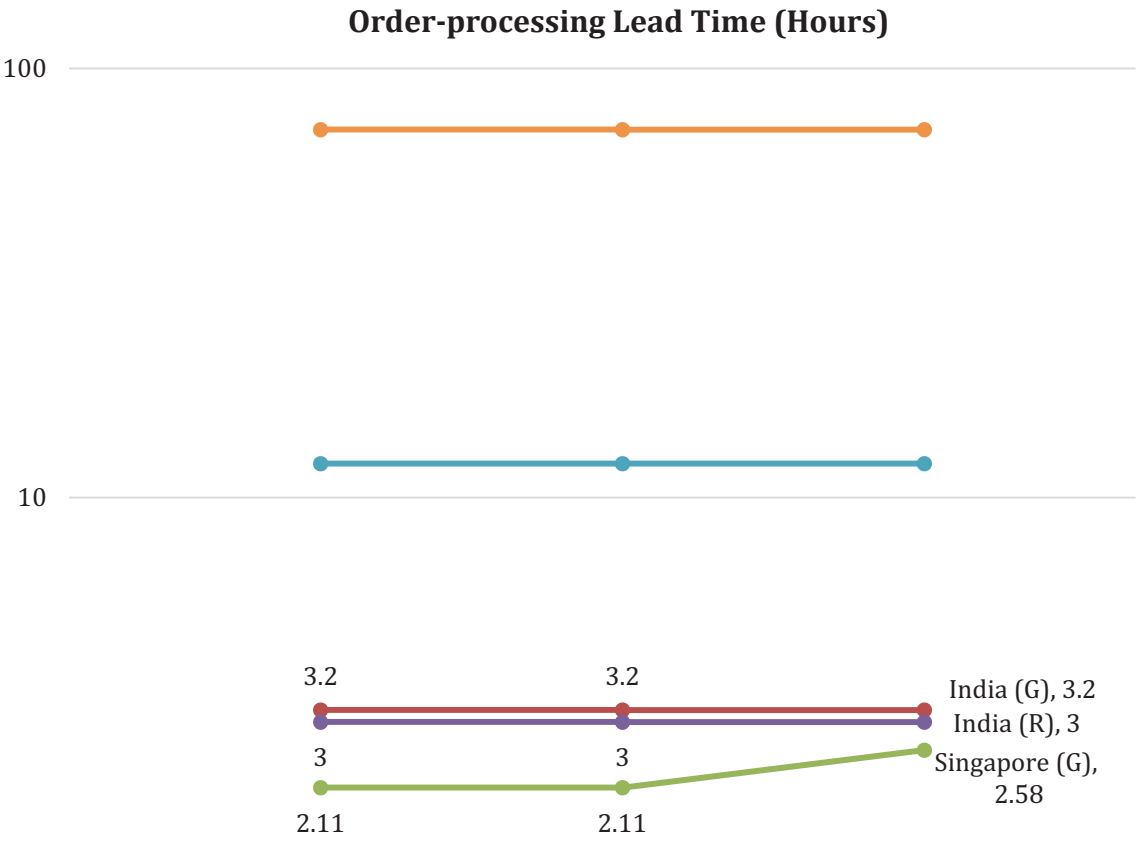
**Sales to Warehousing Space (USD/m²)**




| | 2012 | 2013 | 2014 |
|---|---|---|---|
| India (G) | 22 | 26 | 35 |
| Republic of Korea (G) | 493 | 852 | 880 |
| Singapore (G) | 4570 | 4347 | 4453 |
| Thailand (G) | 1618 | 1543 | 1575 |
| India (R) | 26 | 23 | 30 |
| Republic of Korea (R) | 56.8 | 75.8 | 123.1 |
| Singapore (R) | 2013 | 2416 | 3221 |
| Thailand (R) | 195 | 200 | 221 |
| Republic of Korea (O) | 966 | 966 | 966 |
| Thailand (O) | 79 | 89 | 120 |

## Order-processing Lead Time

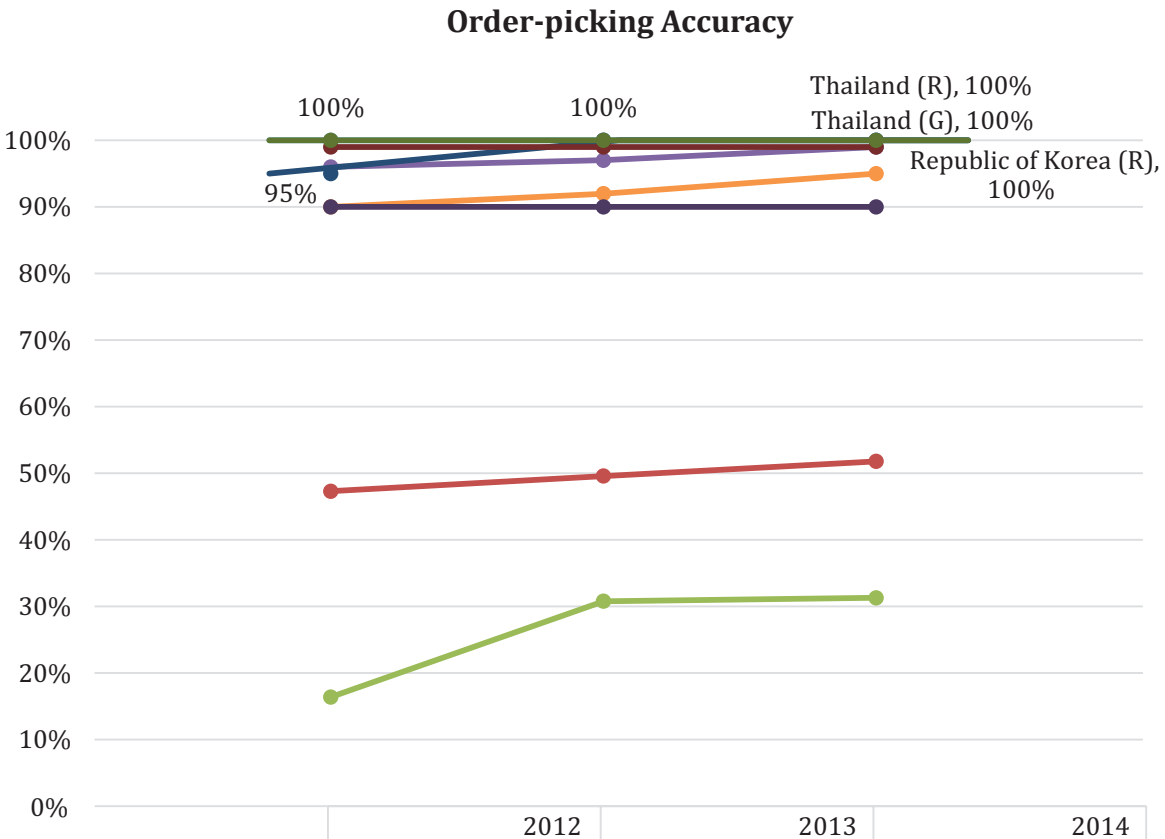
The best-in-class performers for general warehousing and refrigerated warehousing in terms of order-processing lead time were Singapore and India, respectively. Shorter processing times lead to better, more responsive deliveries to customers and lower operation costs in warehouses.




| | 2012 | 2013 | 2014 |
|---|---|---|---|
| India (G) | 3.2 | 3.2 | 3.2 |
| Singapore (G) | 2.11 | 2.11 | 2.58 |
| India (R) | 3 | 3 | 3 |
| Singapore (R) | 12 | 12 | 12 |
| Thailand (R) | 72 | 72 | 72 |

## Order-picking Accuracy

The best-in-class performers for general warehousing and refrigerated warehousing in terms of order-picking accuracy were Thailand and the ROK, respectively. The higher accuracy levels reduce operational costs and result in the reliability of supplies and deliveries to customers, which leads to greater customer satisfaction and profitability.




| | 2012 | 2013 | 2014 |
|---|---|---|---|
| India (G) | 47% | 50% | 52% |
| Republic of Korea (G) | 16% | 31% | 31% |
| Singapore (G) | 96% | 97% | 99% |
| Thailand (G) | 100% | 100% | 100% |
| India (R) | 90% | 92% | 95% |
| Republic of Korea (R) | 95% | 100% | 100% |
| Singapore (R) | 99% | 99% | 99% |
| Thailand (R) | 100% | 100% | 100% |
| Thailand (O) | 90% | 90% | 90% |

## Warehouse Utilization

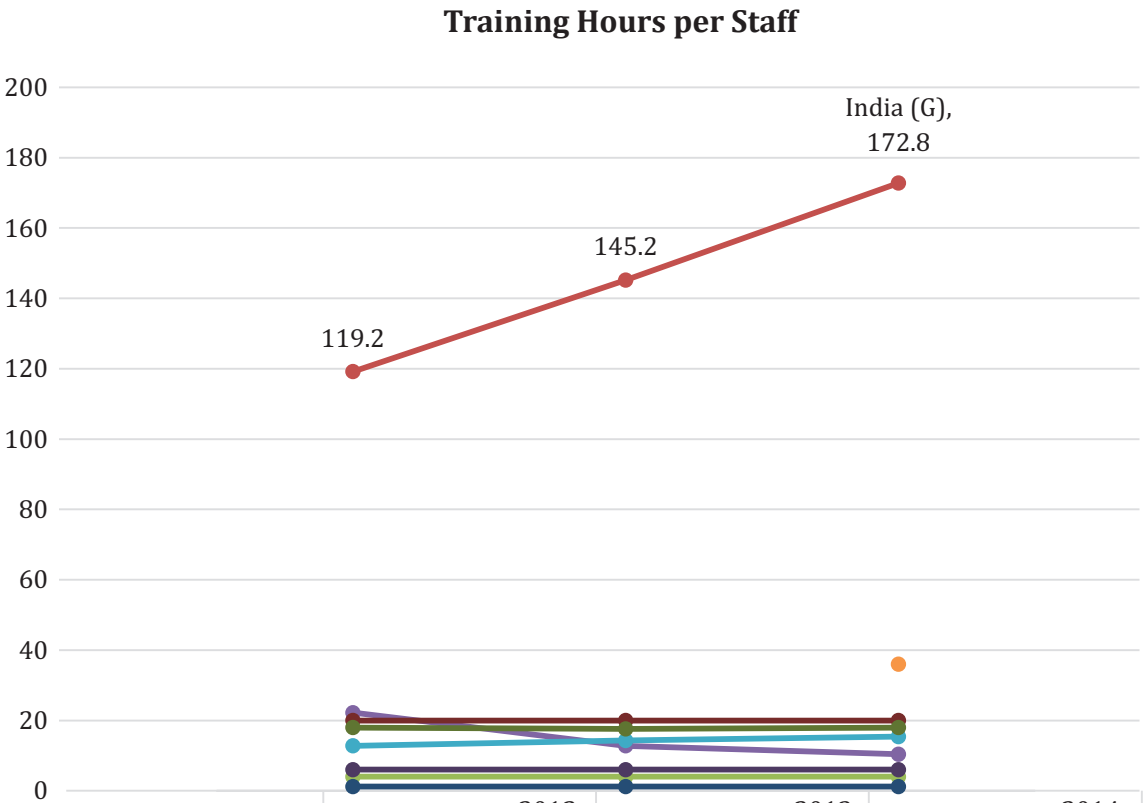
The best-in-class performer for all warehousing subsectors in terms of warehouse utilization was Thailand. This signified effective, efficient use of the warehouse space and assets, leading to lower operating costs and more value creation.


| | 2012 | 2013 | 2014 |
|---|---|---|---|
| India (G) | 80% | 83% | 84% |
| Republic of Korea (G) | 15% | 24% | 27% |
| Singapore (G) | 90% | 90% | 72% |
| Thailand (G) | 93% | 98% | 103% |
| Vietnam (G) | 90% | 90% | 90% |
| India (R) | 84% | 85% | 86% |
| Republic of Korea (R) | 100% | 100% | 100% |
| Singapore (R) | 50% | 60% | 70% |
| Thailand (R) | 93% | 96% | 89% |
| Thailand (O) | 100% | 100% | 100% |

# HUMAN RESOURCES PERSPECTIVE

## Training Hours per Staff

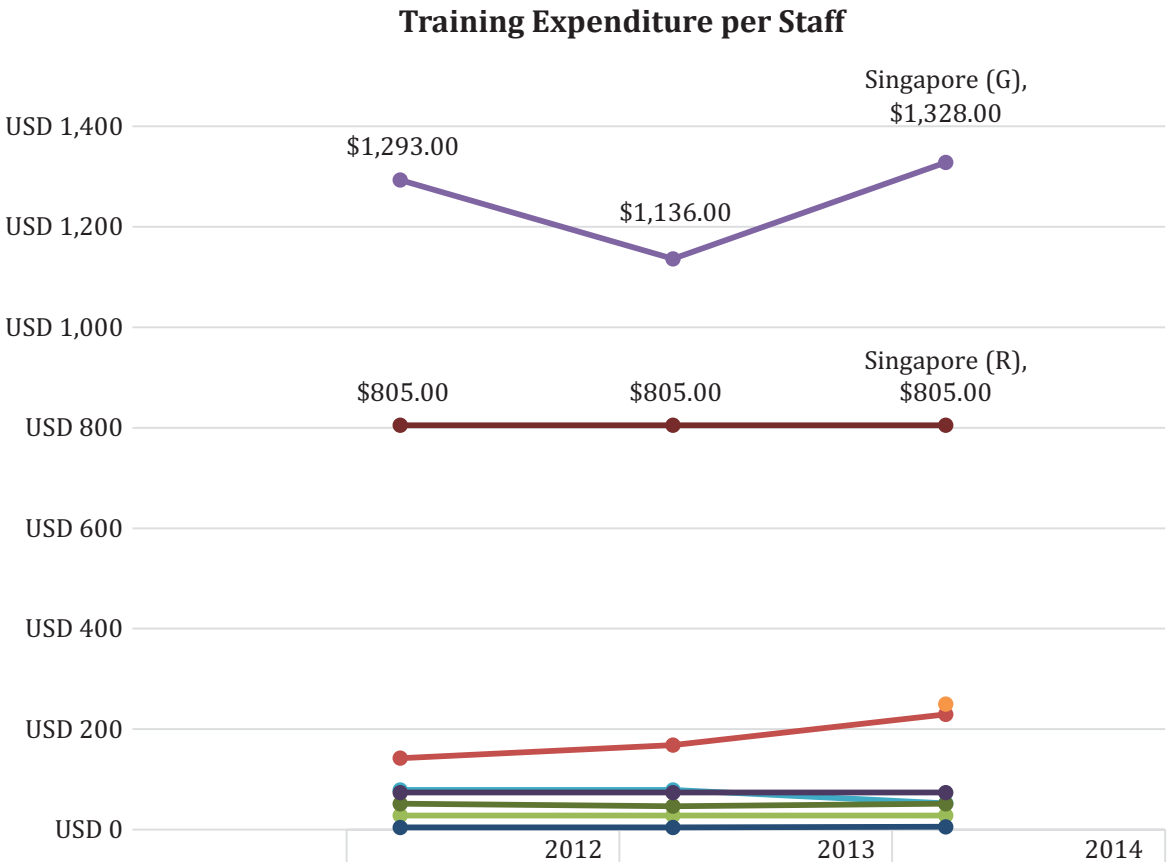
The best-in-class performer for the general warehousing subsector in terms of training hours per staff was India. More training hours lead to increased competency of staff in performing their roles and responsibilities in warehouse operations. This results in better customer service, higher productivity levels, and business growth.




| | 2012 | 2013 | 2014 |
|---|---|---|---|
| India (G) | 119.2 | 145.2 | 172.8 |
| Republic of Korea (G) | 4 | 4 | 4 |
| Singapore (G) | 22.2 | 12.8 | 10.4 |
| Thailand (G) | 12.8 | 14.3 | 15.4 |
| Vietnam (G) | | | 36 |
| India (R) | 1.2 | 1.2 | 1.2 |
| Singapore (R) | 20 | 20 | 20 |
| Thailand (R) | 18 | 17.6 | 18 |
| Thailand (O) | 6 | 6 | 6 |

## Training Expenditure per Staff

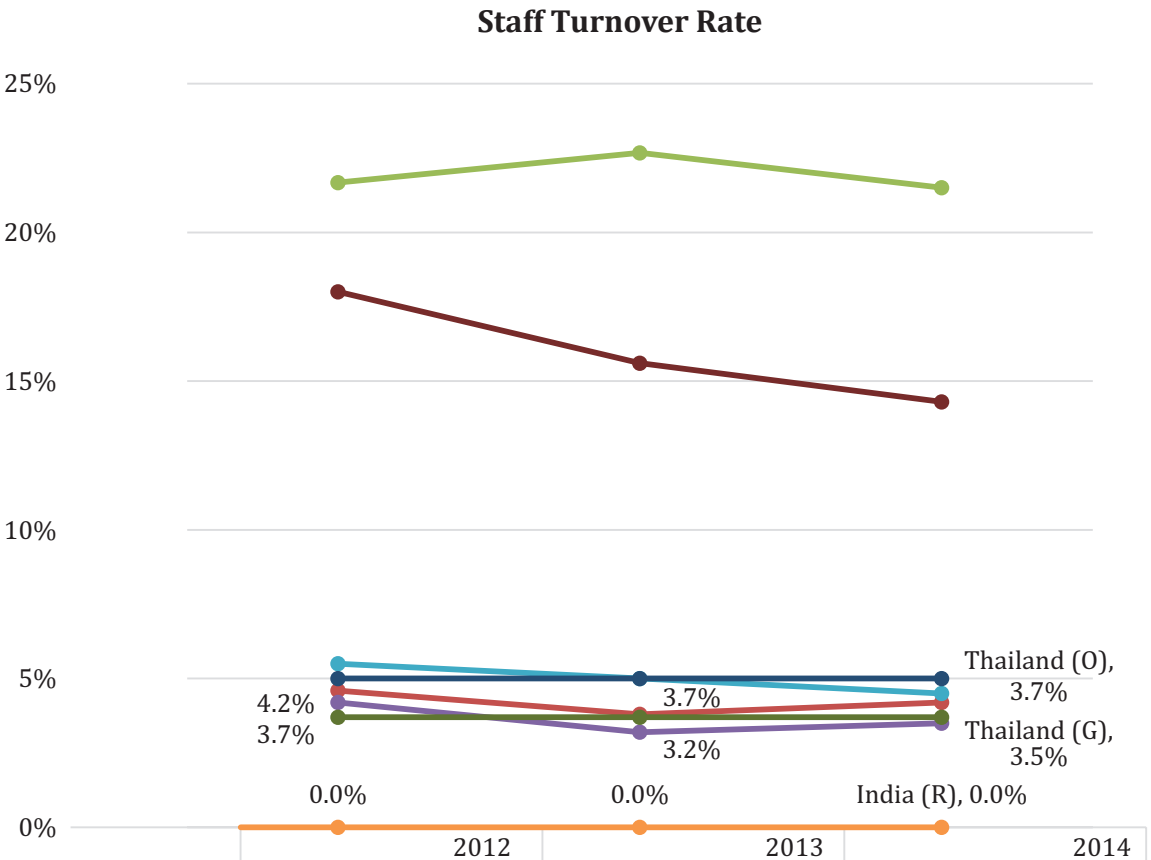
The best-in-class performer for both general and refrigerated warehousing in terms of training expenditure per staff member was Singapore. This demonstrated management's emphasis on staff competency to enhance service levels. This maintains a motivated, talented workforce and allows warehousing businesses to meet the requirements of customers.




| | 2012 | 2013 | 2014 |
|---|---|---|---|
| India (G) | $142.48 | $168.41 | $229.52 |
| Republic of Korea (G) | $28.40 | $28.40 | $28.40 |
| Singapore (G) | $1,293.00 | $1,136.00 | $1,328.00 |
| Thailand (G) | $79.08 | $79.08 | $52.72 |
| Vietnam (G) | | | $250.00 |
| India (R) | $4.36 | $4.41 | $5.64 |
| Singapore (R) | $805.00 | $805.00 | $805.00 |
| Thailand (R) | $51.51 | $46.99 | $51.51 |
| Thailand (O) | $73.80 | $73.80 | $73.80 |

## Staff Turnover Rate

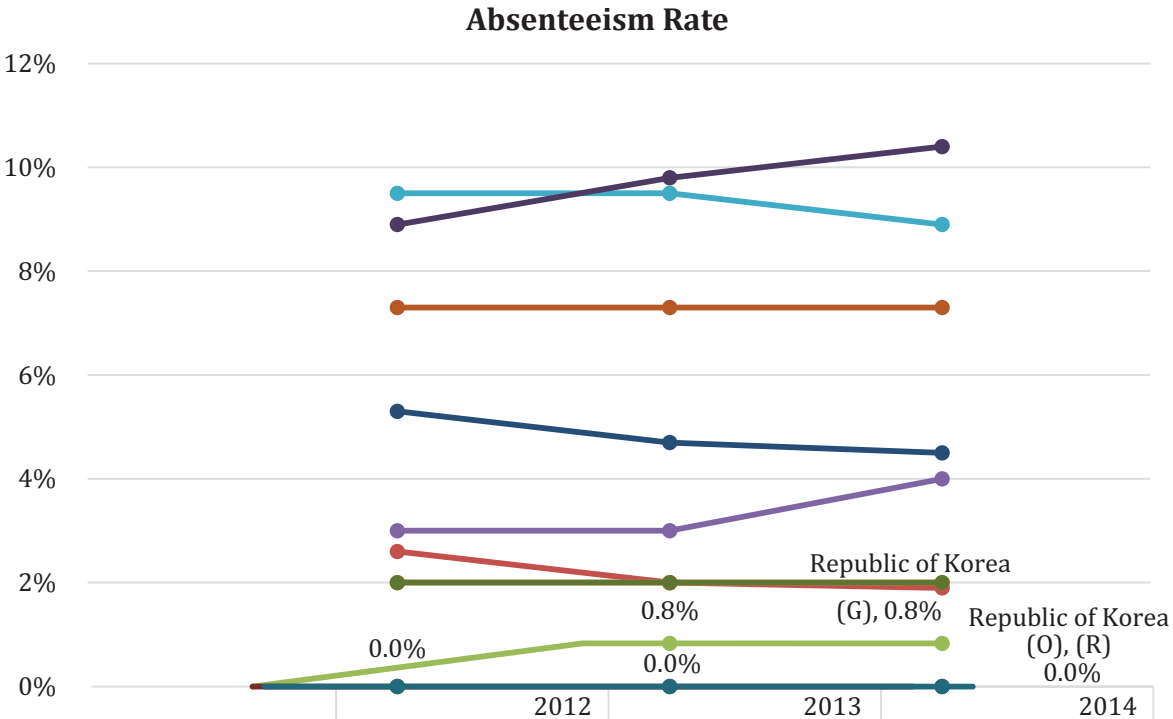
The best-in-class performers for general warehousing, refrigerated warehousing, and other warehousing in terms of staff turnover rate were Thailand, India, and Thailand, respectively. The lower rates demonstrated the higher morale and satisfaction of staff in their daily work. This results in greater staff engagement, leading to higher productivity, steady growth, and improved service levels of warehousing companies.




| | 2012 | 2013 | 2014 |
|---|---|---|---|
| India (G) | 4.6% | 3.8% | 4.2% |
| Singapore (G) | 21.7% | 22.7% | 21.5% |
| Thailand (G) | 4.2% | 3.2% | 3.5% |
| Vietnam (G) | 5.5% | 5.0% | 4.5% |
| India (R) | 0.0% | 0.0% | 0.0% |
| Singapore (R) | 5.0% | 5.0% | 5.0% |
| Thailand (R) | 18.0% | 15.6% | 14.3% |
| Thailand (O) | 3.7% | 3.7% | 3.7% |

## Absenteeism Rate

The best-in-class performer for all warehousing subsectors in term of the absenteeism rate was the ROK. The lower absenteeism rates demonstrated the high morale and engagement of the staff in fulfilling their roles and responsibilities. The significance of this indicator is the reliability of service levels, operational effectiveness, and productivity levels that will greatly affect the sustainability and survival of the companies.




| | 2012 | 2013 | 2014 |
|---|---|---|---|
| India (G) | 2.6% | 2.0% | 1.9% |
| Republic of Korea (G) | 0.0% | 0.8% | 0.8% |
| Singapore (G) | 3.0% | 3.0% | 4.0% |
| Thailand (G) | 9.5% | 9.5% | 8.9% |
| Vietnam (G) | 2.0% | 2.0% | 2.0% |
| India (R) | 5.3% | 4.7% | 4.5% |
| Republic of Korea (R) | 0.0% | 0.0% | 0.0% |
| Singapore (R) | 2.0% | 2.0% | 2.0% |
| Thailand (R) | 8.9% | 9.8% | 10.4% |
| Republic of Korea (O) | 0.0% | 0.0% | 0.0% |
| Thailand (O) | 7.3% | 7.3% | 7.3% |

# RECOMMENDATIONS

Based on this research, the team noted that numerous approaches could be adopted by SMEs in the logistics sector (warehousing subsector) to improve their business performance (financial, customer results, operational results, and human resources results), as summarized below.

## RECOMMENDATIONS FOR SMES IN THE WAREHOUSING SUBSECTOR

SMEs could consider implementing productivity measurement systems (value added and logistics productivity indicators) in addition to relying on their financial statements. By measuring productivity systematically, SMEs could manage their business performance holistically. With a productivity measurement system in place, SMEs could then objectively review and reward the productivity performance of their workers through the adoption of an appropriate productivity gain-sharing scheme.

As the focus on customer service is critical to business operations, communication channels (surveys, customer visits, etc.) to receive feedback and understand customers' requirements need to be established. Customer requirements and expectations should be segmented to understand and fulfill specific needs.

To be responsive and agile, the locations of warehouses are important for SMEs to serve customers better. The design and layout of a warehouse is important to be efficient and effective in the storage and retrieval of goods. Ensuring a good flow will enhance warehouse productivity and competitiveness.

To achieve cost competitiveness and enhance logistics productivity, it is important to invest in appropriate technologies, such as smart warehousing concepts based on the Internet of Things platform, software, radio-frequency identification tagging, pick-to-light system, voice-picking system, warehousing flow simulation tools, etc. SMEs could consider their requirements and priorities and adopt technologies based on their specific needs. SMEs' warehouse productivity could be improved through the integration of information on inventory and order management into their management information systems. SMEs could adopt good cold storage practices to ensure that specific standards and requirements for perishable items as well as the safety of goods are met and maintained.

SMEs could gain greater customer trust in service quality through the adoption of a 5S housekeeping philosophy and visual control management, as they help to enhance work safety, quality, and productivity. Human resources policies and initiatives, which are in line with SMEs' visions and missions, could be implemented. Examples are flexible working times, performance appraisal and reward systems, etc.

## RECOMMENDATIONS TO SUPPORT SMES IN THE WAREHOUSING SUBSECTOR

Transport and shipping infrastructure networks are essential for the growth of the logistics and warehousing industry. Improvements to infrastructure, such as road and transportation connectivity, will be an added advantage to the warehousing and cold chain subsectors.

National agencies and trade associations could promote greater awareness and encourage the adoption of new warehousing technologies and management systems for automated operations, tracking of real-time information and movement of goods, and customer service to enhance productivity and competitiveness in the subsector. To improve service offerings and promote warehousing competitiveness, national agencies could consider offering attractive fiscal incentives and grants to companies in the form of tax holidays, and such incentives may also attract private-equity players to the industry.

Tie-ups between tertiary institutions and SMEs could expose students to the sector and cultivate interest in future careers in logistics. This could ensure a constant labor force for the logistics sector.

As one of the challenges for the industry is technical skill competencies, training requirements and standards for warehouse personnel could be established. Competency-based warehousing skill training could be provided by industrial skills development centers, and such training could be supported under skill development schemes.

# CONCLUSION

Warehousing forms a crucial link in the overall logistics value chain as it has been evolving rapidly from being traditional "godowns" to modern setups with cold storage and handling systems. This research showed that changing business and the entry of global third-party logistics players have led to the remodeling of supply chains, including transportation, logistics, warehousing services, pledge loaning, etc. The growing competition and demand for better services at lower cost have resulted in a need to review and improve the present warehousing models.

Logistics SMEs generally want to improve their productivity levels, yet the common practice of reducing operational costs and improving sales is not making headway. Operationally, costs have been rising due to wages and the need to acquire equipment such as IT software and hardware as well as material-handling equipment. As a result, warehousing businesses are now stressing efficient inventory management systems with greater value-added services such as insurance, customs clearance, labeling, packaging and repackaging, bar-coding, distribution to customers, and reverse logistics. It is also important to pay attention to the investment in the Internet of Things, especially as related to the entire supply chain of firms, to optimize logistics costs.

Most SMEs do not have large warehouses to offer economy of scale to customers. While SMEs are agile enough to customize service offerings to increase revenues, the lack of a critical mass means that workers must multitask. This creates pressure on SMEs to train and retain their workers. The lack of structured approaches to developing staff shows that the human resources strategy remains the biggest challenge for warehousing SMEs in providing quality service to their customers.

Finally, there is a need to respond to new paradigms such as green logistics for sustainable economic growth.

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# Annex

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**APO Research Project on Cross-country Assessment of Productivity Performance of SMEs in the Logistics Sector - Warehousing Subsector**

## Survey Questionaire

### Introduction and Background of this APO Research Project

The objective of this questionnaire is to identify the productivity level and best practices adopted by SMEs in the Logistics Sector - Warehousing Subsector among 5 Asian countries comprising India, Republic of Korea, Singapore, Thailand and Vietnam. The compilation of the data and information will help generate the pertinent research publication/report and to provide best practice cases.

The small and medium enterprises (SMEs) in the Logistics Sector - Warehousing Subsector continue to play an increasingly important role in the Asian economies in terms of contributions to gross domestic product (GDP) and employment. Hence, they are the core engines for productivity and economic growth. The APO recognizes the importance of monitoring the progress of SME performance in the Logistics Sector - Warehousing Subsector in the region and sharing the best practices of high business performers to the various SMEs in APO member economies.

Benchmarking is a continuous process of self-assessment and initiating actions to close gaps, surpass the best performers, and retain a competitive edge. To pursue continuous improvement, it is essential that SMEs not only have a relevant basis for comparison but also learn from the achievements and results obtained from the benchmarking exercise, as well as sharing useful reference data and information to compare their performance.

In March 2015, a study meeting was held to discuss on how to make cross-country comparison of productivity performance of SMEs in the Logistics Sector - Warehousing Subsector. The meeting has identified a set of comparable indicators for the pertinent SME business performance assessment amongst countries. Based on the set of indicators identified and the methodology agreed in the study meeting, this research project will collect data, information and best practices by 5 National Experts under the direction and instruction of the Chief Expert.

# Annex

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**APO Research Project on Cross-country Assessment of Productivity Performance of SMEs in the Logistics Sector - Warehousing Subsector**

## Survey Questionaire

### Company Background/Outline

*Please complete the boxes/check off the appropriate choices.*

1. **Name of Company**

2. **Correspondence Address**

3. **Contact Person & Designation**

4. **Contact Telephone Number**

5. **Email Address**

6. **Name of Chief Executive Officer**

7. **Year Incorporated**

8. **Type of Business**
   - ☐ Sole Proprietor
   - ☐ Partnership
   - ☐ Private Limited
   - ☐ Public Listed

9. **Number of Warehouse(s)**

10. **Area of Warehouse(s) (square metres)**

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**11. Mode of Operations**

☐ Single Shift

*Please specify timing of shift (From-To):*

☐ 2 Shifts

*Please specify timing of each shift (From-To):*

☐ 3 Shifts

*Please specify timing of each shift (From-To):*

☐ Others, please specify:

**10. Type of Warehousing**

☐ General Warehousing

☐ Refrigerated Warehousing (Cold Storage)

☐ Others (Please Specify)

Next ...

# Annex

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**APO Research Project on Cross-country Assessment of Productivity Performance of SMEs in the Logistics Sector - Warehousing Subsector**

## Survey Questionaire

### Financial Perspective Information (for the past 3 years)

| | | 2012 | 2013 | 2014 |
|---|---|---|---|---|
| 1. | What were your Annual Sales Turnover (Revenues) over the past years? | | | |
| 2. | What was your cost of "Bought-In Materials and Services (BIMS)" over the past years? | | | |
| 3. | What were your total Labour Costs? | | | |
| 4. | What were the Fixed Assets at Net Book Value? | | | |
| 5. | What was the Operating Profit/Loss after Tax? | | | |
| 6. | What were the Interest Incurred from Loans and Hire Purchase? | | | |
| 7. | What were the Depreciations from Buildings, Equipment and Machinery, etc.? | | | |
| 8. | What were your Corporate Taxes (excluding Income Tax)? | | | |
| 9. | What were your Earnings Before Interest, Tax, Depreciation & Amortization (EBITDA)? | | | |
| 10. | What was your Current Asset? | | | |
| 11. | What was your Current Liability? | | | |

12. What other performance indicators have you used in the area of Financial Management?

| | 2012 | 2013 | 2014 |
|---|---|---|---|
| | | | |
| | | | |
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**APO Research Project on Cross-country Assessment of Productivity Performance of SMEs in the Logistics Sector - Warehousing Subsector**

## Survey Questionaire

### Customer Perspective Information (for the past 3 years)

1. **How do you gather feedback from your customers?**
   - ☐ By Telephone
   - ☐ By Letters
   - ☐ By Email
   - ☐ Through Website's feedback page
   - ☐ In Person
   - ☐ Never
   - ☐ By Other Channels: Please specify

2. **Is there a formalised system in your organization that keeps the management informed of customer feedback (e.g. complaints, suggestions and compliments)?**
   - ☐ Yes
   - ☐ No

   **If Yes,**

   a. Briefly describe your formalised system.

3. **Do you collect and record number of customer complaints?**
   - ☐ Yes
   - ☐ No

   **If Yes,**

   a. What were the numbers of customer complaints received over the past years?

| *2012* | *2013* | *2014* |
|---|---|---|
| | | |

4. **Do you collect and record number of compliments from your customers?**
   - ☐ Yes
   - ☐ No

   **If Yes,**

   a. Describe the system you are using to record and track compliments from customers

   b. What were the numbers of compliments received from customers over the past years?

| *2012* | *2013* | *2014* |
|---|---|---|
| | | |

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5. **Do you monitor all customer complaints and ensure that follow-up actions are taken.**
   - ☐ Yes
   - ☐ No

6. **Do you collect and record number of wrong deliveries?**
   - ☐ Yes
   - ☐ No

**If Yes,**

a. What were the wrong deliveries rate (%) over the past years?

| 2012 | 2013 | 2014 |
|---|---|---|
| | | |

7. **Do you collect and record number of on-time deliveries?**
   - ☐ Yes
   - ☐ No

**If Yes,**

a. What were the on-time delivery rate (%) over the past years?

| 2012 | 2013 | 2014 |
|---|---|---|
| | | |

8. **Do you measure customer loyalty?**
   - ☐ Yes
   - ☐ No

**If Yes,**

a. What were the customer loyalty level over the past years?
Formula: (*# customers this year - # customers last year)/# customers last year * 100%*

| 2012 | 2013 | 2014 |
|---|---|---|
| | | |

9. **What other performance indicators do you used in the area of Customer Management?**

| | 2012 | 2013 | 2014 |
|---|---|---|---|
| | | | |
| | | | |
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**APO Research Project on Cross-country Assessment of Productivity Performance of SMEs in the Logistics Sector - Warehousing Subsector**

## Survey Questionaire

### Operational Perspective Information (for the past 3 years)

**1. Do you measure Annual Inventory Turn?**

☐ Yes
☐ No

**If Yes,**

a. What were the Annual Inventory Turn over the past years?

| 2012 | 2013 | 2014 |
|---|---|---|
| | | |

**2. Do you measure inventory accuracy?**

☐ Yes
☐ No

**If Yes,**

a. What were the inventory accuracy rates (%) over the past years?

| 2012 | 2013 | 2014 |
|---|---|---|
| | | |

**3. Do you measure receiving leadtime?**

☐ Yes
☐ No

**If Yes,**

a. What were the receiving leadtime (hrs) over the past years?

| 2012 | 2013 | 2014 |
|---|---|---|
| | | |

**4. Do you measure order processing leadtime?**

☐ Yes
☐ No

**If Yes,**

a. What were the order processing leadtime (hrs) over the past years?

| 2012 | 2013 | 2014 |
|---|---|---|
| | | |

**5. Do you measure order picking accuracy?**

☐ Yes
☐ No

**If Yes,**

a. What were the order picking accuracy rates (%) over the past years?

| 2012 | 2013 | 2014 |
|---|---|---|
| | | |

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6. **Do you measure warehouse utilisation?**
   - ☐ Yes
   - ☐ No

**If Yes,**

a. What were the warehouse utilisation rates (%) over the past years?

| 2012 | 2013 | 2014 |
|---|---|---|
| | | |

7. **What are the Key Success Factors for your business?** **Please tick all applicable options*
   - ☐ Value for money
   - ☐ Strong reputation/brand name
   - ☐ Low operating cost
   - ☐ Good customer service
   - ☐ Others (Please specify)

8. **Do you use technology (automation, IT systems, etc) to increase productivity?**
   - ☐ Yes
   - ☐ No

**If Yes,**

a. Please indicate the type of system used **Please tick all applicable options*
   - ☐ Warehouse Management System (WMS)
   - ☐ Human Resource Management System
   - ☐ E-commerce as a channel for business
   - ☐ Inventory Management System
   - ☐ Enterprise Resource Planning (ERP)
   - ☐ Customer Relationship Management
   - ☐ Purchasing/Requisition System
   - ☐ Financial Management System
   - ☐ Others: Please specify

| | 2012 | 2013 | 2014 |
|---|---|---|---|
| b. How much total investment did you spend over the past years? | | | |
| c. How much did you invest on IT over the past years? | | | |

9. **What other performance indicators do you used in the area of Operational Management?**

| | 2012 | 2013 | 2014 |
|---|---|---|---|
| | | | |
| | | | |
| | | | |

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**APO Research Project on Cross-country Assessment of Productivity Performance of SMEs in the Logistics Sector - Warehousing Subsector**

## Survey Questionaire

### Human Resource Perspective Information (for the past 3 years)

| | | 2012 | 2013 | 2014 |
|---|---|---|---|---|
| 1. | **What was the average number of full-time employees you have over the past years?** | | | |
| 2. | **On average, how many hours do full-time employees work a week?** | | | |

3. **Do you employ part-time employees?**
   - ☐ Yes
   - ☐ No

**If Yes,**

| | | 2012 | 2013 | 2014 |
|---|---|---|---|---|
| a. | What was the average number of part-time employees you have? | | | |
| b. | On average, how many hours do part-time employees work a week? | | | |

4. **Do you track Staff Turnover Rate?**
   - ☐ Yes
   - ☐ No

**If Yes,**

| | | 2012 | 2013 | 2014 |
|---|---|---|---|---|
| a. | What was the average number of full-time staff who had left the company? | | | |
| b. | What was the average number of part-time staff who had left the company? | | | |

5. **Do you provide training to your employees?**
   - ☐ Yes
   - ☐ No

**If Yes,**

a. What are the types of training do you provide to your employees?

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| | | 2012 | 2013 | 2014 |
|---|---|---|---|---|
| b. | What was the average number of training hours for each employee per year? | | | |
| c. | What was the average training expenditure for each employee per year? | | | |

**6. Is there any form of On-the-Job (OJT) training programmes for employees?**

☐ Yes
☐ No

**If Yes,**

a. What are the OJT programmes? *Please state if OJT programmes are structured or informal

**7. Do you have a performance-based incentive system (in addition to basic salary and wages)?**

☐ Yes
☐ No

**If Yes,**

a. Please indicate the types of incentive system you used?

| | | 2012 | 2013 | 2014 |
|---|---|---|---|---|
| b. | On average, what percentage of a full-time employee's compensation is variable? | | | |

**8. Do you track absenteeism rate?**

☐ Yes
☐ No

| **If Yes,** | | 2012 | 2013 | 2014 |
|---|---|---|---|---|
| a. | What was the absenteeism rate for the past years? | | | |

**9. What were the important aspects of human resource management in your business?**

**10. What other performance indicators do you used in the area of Human Resource Management?**

| | 2012 | 2013 | 2014 |
|---|---|---|---|
| | | | |
| | | | |
| | | | |

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**APO Research Project on Cross-country Assessment of Productivity Performance of SMEs in the Logistics Sector - Warehouse Subsector**

## Survey Questionaire

**Thank You for your participation in this APO Research Project**

Thank you for agreeing to participate in our survey.

Your inputs will be very valuable to us in our efforts to help enhance the productivity performance of SMEs in the Logistics Sector - Warehousing Subsector in Asia.

Thank you for your participation.


ASIAN PRODUCTIVITY ORGANIZATION