ISSN 1906-4373
September 2020

Office of the National Economic and
Social Development Council

THAILAND'S LOGISTICS REPORT 2019

LOGISTICS DEVELOPMENT STRATEGY DIVISION

Logistics Report

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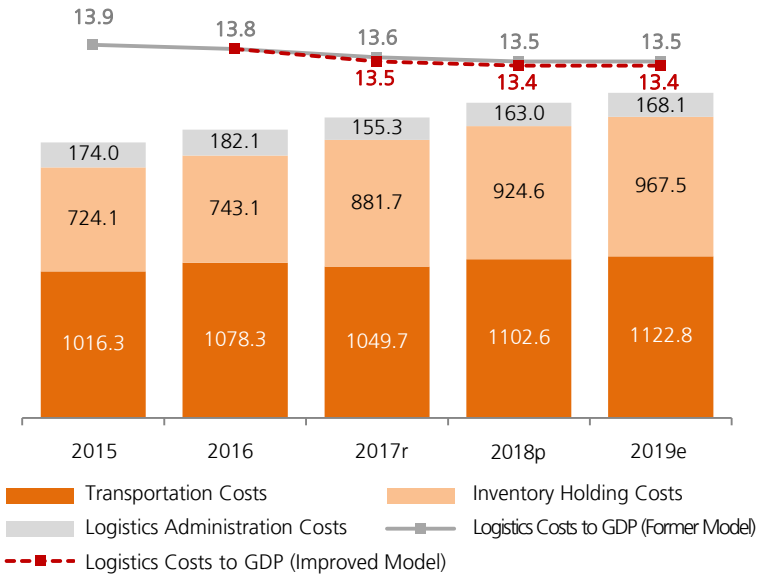
Thailand's Logistics System Development

SNAPSHOT

Logistics Costs to GDP at Current Prices (%)

13.4%

Logistics Costs-to-GDP Ratio in 2019 Remains Unchanged,
Including Transportation Costs (6.7%), Inventory Holding Costs (5.7%) and Logistics Administration Costs (1.0%).

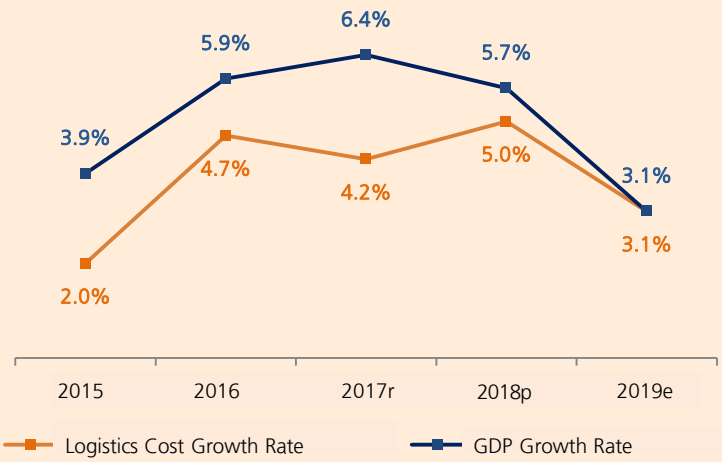


Total Logistics Costs

2.26 Trillion Baht

+ 3.1% ▲

Total Logistics Costs in 2019 Increase at Slow Pace
in Accordance with the National Economic Slowdown.



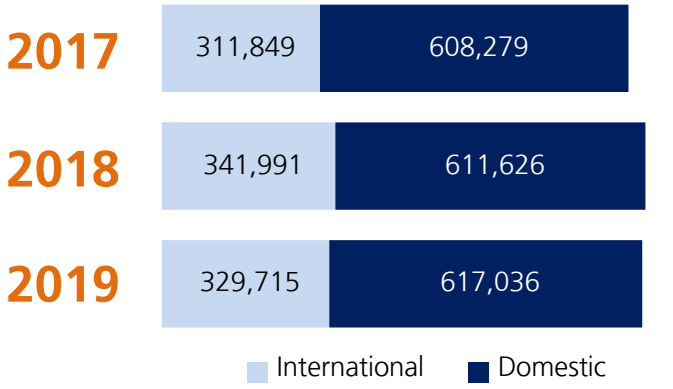
Freight Transport Overview

9.47 Hundred Million Tons

- 0.7%

Total Freight Volumes in 2019 Slightly Decline, Mainly from the Decrease in International Freight Volumes Despite the Scant Increase in the Domestic Ones.

Total Freight Volumes (Thousand Tons)



Factors Affecting Inventory Holdings

Finished Goods Inventory Index

135.5

+ 12.3

Manufacturing Product Index

101.6

- 3.8

MLR

6.00-6.60

Capacity Utilization Rises in 2019 due to the Adjustment of Thai Entrepreneurs Reducing Production Capacity in Response to Economic Volatility and Export Contraction Resulting in Higher Inventory Levels.

MLR is Reduced by the Policy Rate Decisions of Monetary Policy Committee (MPC).

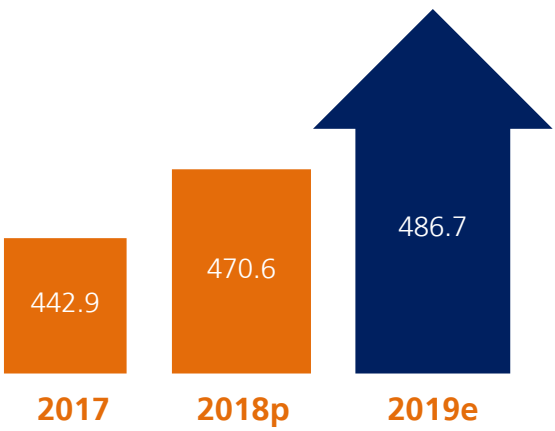
Value Added Logistics

486.7 Billion Baht

+ 3.4%

Value Added Logistics in 2019 Continuously Increases, Amounting to 486.7 Billion Baht, a 3.4% Annual Growth.

Value Added (Billion Baht)



Logistics Report

Executive Summary

Part I The Improvement of Thailand' s Logistics Cost Calculation Model

- **In 2018, Office of the National Economic and Social Development Council (NESDC), a national think tank for driving national development including Thailand's logistics system, collaborated with Thammasat University Research and Consultancy Institute (TU-RAC) to conduct The Improvement of Thailand's Logistics Cost Calculation Model.** The study aims to provide up-to-date logistics costs aligned with changes in Thailand's current logistics development and to measure its development level more efficiently.

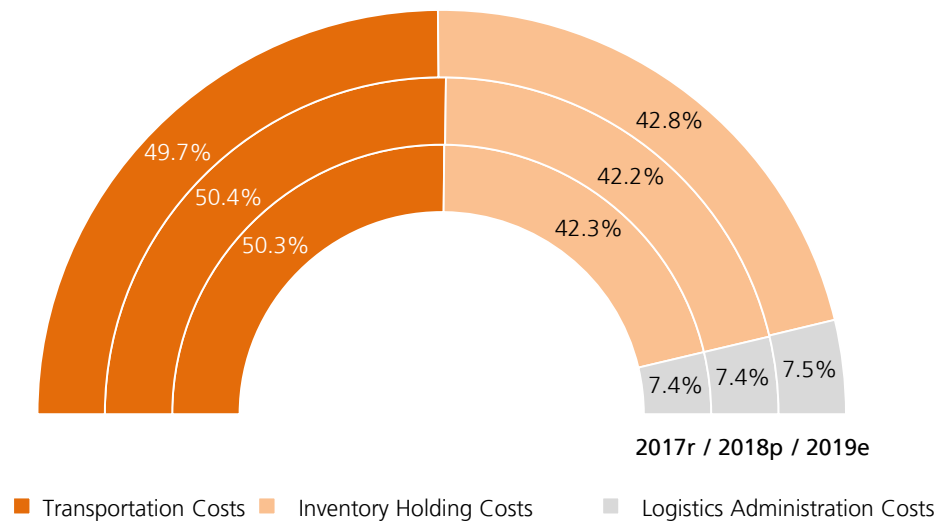
- **The cost calculation improvement results** provide the improved assumptions of van and pick-up: ratio of van and pick-up used (%), average income per trip (THB/trip) and the number of days transported per year (day/year); average inventory expense (β) of 16.63% and warehousing usage ratio of in-house to outsource (92.8% : 7.2%); and logistics administration cost assumption of 8.04%. The improved cost assumptions are applied to revise logistics costs starting from 2017 initially published in this report.

Part II Thailand's Logistics Costs

- **Overview of Thailand's Logistics Costs**
  - **In 2018, total logistics costs were 2,190.2 billion baht, or equivalent to 13.4% of Gross Domestic Product at Current Prices (Nominal GDP),** a 5% annual growth, in accordance with the overall national economic expansion due to a rise in both domestic and foreign demand leading to an increase in private consumption and investment as well as export sectors.
  - **In 2019, total logistics costs are estimated to be valued at 2,258.4 billion baht, or equal to 13.4% of Nominal GDP,** a 3.1% slow annual growth, aligned with the national economic slowdown owing to global economic volatility resulted from the US-China trade war.

- **Logistics Cost Estimates for 2020** are envisioned to be reduced to 12.9% - 13.4% of GDP due to the national economic contraction mainly from the coronavirus pandemic (COVID-19) severely affecting many countries worldwide.

Figure 1 Logistics Cost Structure



Source: Logistics Development Strategy Division, NESDC

- **Value Added Logistics** NESDC and Center of Logistics Excellence, King Mongkut's University of Technology Thonburi jointly conducted The Development of Logistics Information Systems for Thailand's Logistics Competitiveness Assessment and improved value added calculation methodology. In 2019, value added logistics is 486.7 billion baht, increasing from 470.6 baht in 2018 or accounting for a 3.4% increase, through the continuous growth of logistics industry and businesses.

Part III Global Logistics Costs

- **Global Logistics Costs** Armstrong & Associates Inc., a third party-logistics (3PL) and market research consulting expert, reveals that global logistics costs to GDP in 2018 was equal to 10.7% - logistics costs to GDP of North America and Europe were the lowest, equivalent to 8.4% and 8.5% consecutively while Asian Pacific logistics costs to GDP was 12.7%.

- **Agility Emerging Markets Logistics Index (AEMLI)** In 2020, AEMLI reveals that the People's Republic of China (China) and India, the world's largest market, rank first and second consecutively while Thailand ranks ninth from 50 countries worldwide. AEMLI also shows that Asian Pacific countries are among the top ranks and the main foreign investment attraction.

- **US Logistics Costs** In 2019, US logistics costs are 1,629.8 billion USD while logistics costs to GDP equals to 7.6% reduced from 7.9% in 2018 due to the FED (Federal Reserve System) rate cut along with technology utilization in operations management through the continuous growth of e-Commerce.

Part IV Thailand's Logistics System Development Guidelines

1. **Expedite the Utilization of Infrastructure and Facilitation System and Develop Supporting Factors to Enhance Competitiveness.** Promote modal shift and the utilization of multimodal transport system. Develop logistics information system for logistics-related data integration.
2. **Promote the Transformation of Business Operations into Business to Consumer (B2C) via Digitalization.** Support e-Commerce connectivity. Improve law, regulations and government procedures to facilitate entrepreneurs' business operations. Upgrade warehouse management to support e-businesses.
3. **Support Thai Logistics Service Provider (LSP) Network and Promote Regional Partnership.** Empower Thai LSPs' networking support. Promote Thai entrepreneurs in foreign investment and networking. Develop international logistics information service center. Support business operations using sharing economy framework. Promote fiscal and tax incentives for Thai logistics service providers in investing and building network in foreign countries.

Part I The Improvement of Thailand' s Logistics Cost Calculation Model

Office of the National Economic and Social Development Council (NESDC), a national think tank for driving national development including Thailand's logistics system, has produced logistics costs as a percentage of nominal GDP since 2004 and has continuously revised its concept, improved its methodology and collected further data to obtain more complete cost information. Besides, in fiscal year 2018, NESDC and Thammasat University Research and Consultancy Institute (TU-RAC) jointly conducted The Improvement of Thailand's Logistics Cost Calculation Model. The study aims to provide complete and up-to-date cost data of van and pick up, and warehousing as well as to revise the constants used in inventory carrying and logistics administration cost calculation aligning with Thailand's current logistics system development.

1. Thailand's Logistics Cost Calculation Methodology

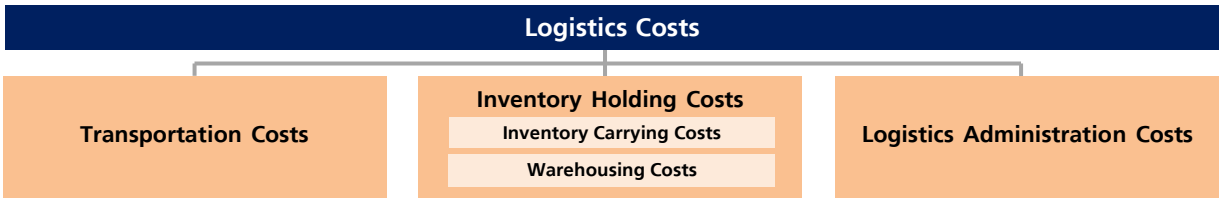
Thailand's logistics cost calculation is mainly referenced from the proposed methodology of Robert V. Delaney of CASS Information System Inc. (CASS), USA that has been employed to estimate US logistics costs since 1973. The calculation is applied to be in line with Thailand's logistics contexts and data source availability, which predominantly uses secondary data from national input-output tables. If the unavailability the secondary data and the difficulty in collecting primary data occur, the cost estimation based on CASS assumptions is then conducted to provide mostly completed results under limited conditions.

Concept and Components of Logistics Costs

Logistics costs are the whole range of costs borne by entrepreneurs exploiting logistics services to serve their business activities related to the movement, storage, collection and distribution of raw materials, components and parts, and services to maximize efficiency and effectiveness and to meet their customer needs.

Thailand's logistics cost components comprise of three main costs: transportation costs, inventory holding costs and logistics administration costs.

Figure 2 Thailand's Logistics Cost Components



Source: Logistics Development Strategy Division, NESDC

1) Transportation Costs

Transportation Costs = Total Expenses of Entrepreneurs or Total Income of Carriers and Transport-Supporting Costs.

Transportation costs are total expenses of entrepreneurs in transporting goods from a production base to a point of destination or to the final consumer – any costs related to passenger transport are excluded. These costs vary not only in cargo volume, weight, origin and destination, but in means and mode of transport, which are classified as follows:

- **Pipeline**

Transportation of goods in a liquid or gas form through pipeline systems such as natural gas, crude oil and petroleum.

- **Rail**

Freight conveyance using rail vehicles guided by railway network.

- **Road**

Motor freight transportation using van and pick up, and farm vehicles owned by either entrepreneurs or carriers; and motor freight transport-related services such as freight charges.

- **Water**

Sea and costal freight transport, inland waterway transport and water transport-related services including port services and etc.

- **Air**

Air freight transport, airport operation and transport facilitation, namely, aeronautical radio station, air traffic control center, and etc.

- **Transport-Related Services**

Freight forwarding services and customs brokerage services

- **Postal Services**

Parcel delivery services, e.g., Thailand Post and DHL.

Table 1 Transportation Cost Data Source

Detail	Source
Pipeline (I-O Code 136)	
- Revenues from Pipeline Systems	- Department of Business Development Processed by NAO, NESDC
Rail (I-O Code 149)	
- Revenues from Rail Transport	- State Railway of Thailand Processed by IPO, NESDC
Road (I-O Code 151 & 152)	
- Revenues from Trucking Services	- Department of Business Development Processed by NAO, NESDC
- Revenues from Van & Pick Up and Farm Vehicle	- Estimated by LSD, NESDC
- Revenues from collecting freight charges	- State Railway of Thailand, Express Authority of Thailand and Don Muang Tollway Public Co,. ltd Processed by IPO and LSD, NESDC
Water (I-O Code 153, 154 & 155)	
- Revenues from Sea Freight Transport	- Department of Business Development Processed by NAO, NESDC
- Revenues from Costal and Inland Waterway Transport	- Department of Business Development Processed by NAO, NESDC.
- Revenues from Public Ports	- Port Authority of Thailand Processed by IPO, NESDC
- Revenues from Private Ports	- Estimated by LSD, NESDC
Air (I-O Code 156)	
- Revenues from Air Freight Transport	- Thai Airways International Public Co,.ltd Analysed by IPO, NESDC
- Revenues from Air Freight Transport Charges	- Department of Business Development Analysed by IPO, NESDC
Transport-Related Services (I-O Code 157)	
- Revenues from 3PL and Customs Broker	- Department of Business Development Processed by NAO, NESDC
Postal Services (I-O Code 159)	
- Revenues from Public Parcel Delivery Services	- Thailand Post Processed by IPO, NESDC
- Revenues from Private Parcel Delivery Services	- Department of Business Development Processed by NAO, NESDC

Remark NAO refers to National Accounts Office
IPO refers to Infrastructure Project Office
LSD refers to Logistics Development Strategy Division

Source: Logistics Development Strategy Division, NESDC

2) Inventory Holding Costs

Inventory holding costs are the sum of inventory carrying and warehousing costs. These following sections describe inventory carrying costs and warehousing costs in detail.

(1) Inventory Carrying Costs

$$\text{Inventory Carrying Costs} = \text{Inventory Value} \times (\beta + i)$$

Inventory carrying costs are expenses associated with inventory management, packaging, repair and damaged stock disposal based on the concept of opportunity costs of capital for inventory investment. The costs vary in the amount of stored inventory and interest rates for business investment loans.

• Inventory Value

Inventory value of 4 sectors: agriculture forestry and fishing, mining and quarrying, manufacturing, and wholesale and retail trade.

• Average Inventory Expense (β)

β is an average inventory expense, namely, taxes, obsolescence, depreciation and insurance.

• Interest Rate (i)

i refers to an average Minimum Lending Rate (MLR) as a proxy for an opportunity cost since it reflects the actual cost of Thai businesses in maintaining inventory.

Table 2 Inventory Carrying Cost Data Source

Detail	Source
- Inventory Value of Each Sector	- National Accounts Office, NESDC
- Average of Inventory Carrying Cost (a constant β of 19%)	- Alford-Bangs Production Handbook Formula (1975)
- Average of Minimum Loan Rate (MLR)	- Bank of Thailand

Source: Logistics Development Strategy Division, NESDC

(2) Warehousing Costs

$$\text{Warehousing Costs} = \text{Total Expenses of Thai Entrepreneurs or Revenues of Warehousing Service Providers}$$

Warehousing costs are a whole range of costs incurred from the service activities within warehouses, namely, plant and warehouse site selection, warehouse maintenance, and warehouse management.

Table 3 Warehousing Cost Data Source

Detail	Source
Warehousing Services (I-O Code 158)	
- Revenues of Warehouse and Silo operators	- Department of Business Development Analysed by NAO, NESDC

Source: Logistics Development Strategy Division, NESDC

3) Logistics Administration Costs

Logistics Administration Costs = A Constant × Total of Transportation Costs and Inventory Carrying Costs

Logistics administration costs are a whole range of costs in term of procurement, demand forecasting, parts and service support, customer service and communication, and reverse logistics.

Table 4 Logistics Administration Cost Data Source

Detail	Source
- A Constant Value of 10%	- CASS Method of Measurement, USA (1990 – 1999)

Source: Logistics Development Strategy Division, NESDC

2. Proposed Logistics Cost Calculation Methodology

The Improvement of Thailand's Logistics Cost Calculation Model aims to provide up-to-date logistics costs aligned with changes in a development context of Thailand's current logistics systems and to efficiently measure national logistics development. The study conducts the survey data collection of 6,020 Thai entrepreneurs nationwide in 6 business sectors based on Thailand Standard Industrial Classification (TSIC), namely, Agriculture, Forestry, Fishing; Mining and Quarrying; Manufacturing; Construction; Wholesale and Retail Trade; and Other Service Activities. The study uses systematically collected statistical data to estimate national logistics costs. The study results are summarized below.

1) Transportation Costs

Improve assumptions of van and pick up including freight transport per year, average income per trip and the number of days transported per year as summarized below.

Table 5 Proposed Van & Pick Up Assumptions

	Category	Previous Assumption	Study Results
Transport Ratio	Agriculture	48%	15%
	Others	52%	85%
Average Income/Trip	Agriculture	1,900 baht	1,275 baht
	Others	2,200 baht	1,578 baht
Days Transported/Year	Agriculture	150 days	217 days
	Others	300 days	278 days

Source: The Improvement of Thailand's Logistics Cost Calculation Model, NESDC

2) Inventory Holding Costs

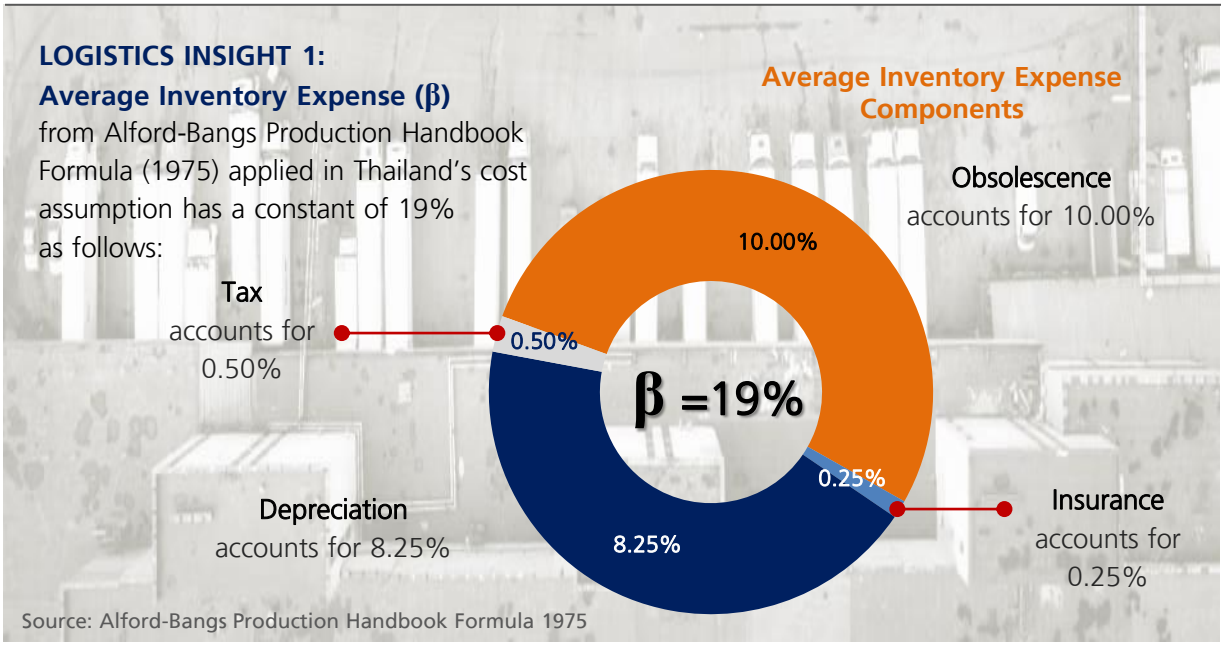
(1) Inventory Carrying Costs

Propose average inventory expense (β) by reducing to 16.63% from 19% (Alford-Bangs Production Handbook Formula, 1975) in order to efficiently reflect inventory carrying costs and to be more aligned with current Thai business operations.

Table 6 Proposed Average of Inventory Carrying Cost (β)

	Previous Assumption	Study Results
β	19%	16.63%

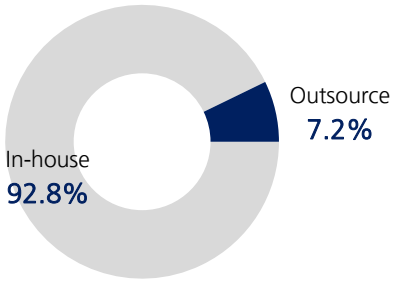
Source: The Improvement of Thailand's Logistics Cost Calculation Model, NESDC



(2) Warehousing Costs

Improve warehousing cost assumptions by employing warehousing usage ratio of in-house to outsource (92.8% : 7.2%), which once estimated only outsourcing services, to efficiently reflect Thai actual business costs.

Figure 3 Warehousing Usage Ratios



Source: The Improvement of Thailand's Logistics Cost Calculation Model, NESDC

3) Logistics Administration Costs

Revise a constant used in logistics administration cost calculation by reducing the constant to 8.04% to suitably align with Thailand's current logistics practices that Thai entrepreneurs acquire knowledge and apply technology to their businesses, leading to more efficient business operations.

Besides, Thailand's previous cost assumption employs the constant of 10% proposed by Robert Delaney to estimate US logistics costs from 1990-1999, which USA has adjusted the constant value of 4% since 2000.

Table 7 The Improvement of a Constant Used in Logistics Administration Cost Calculation

Previous Assumption	Study Results
10%	8.04%

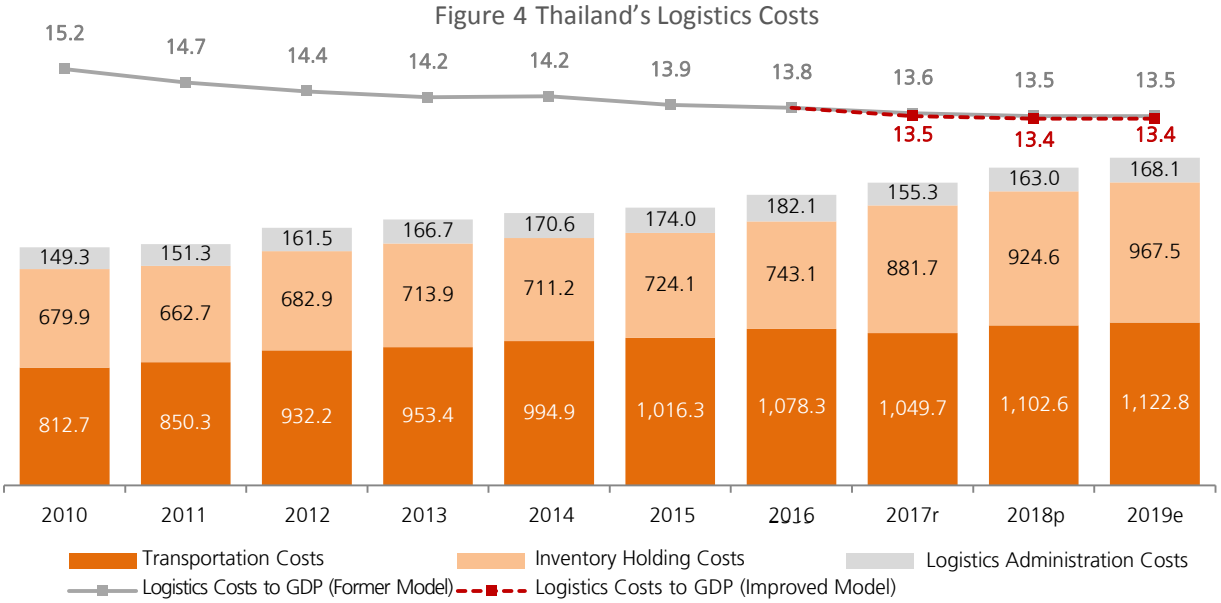
Source: The Improvement of Thailand's Logistics Cost Calculation Model, NESDC

Part II Thailand's Logistics Costs

NESDC has applied the revised cost assumptions based on the study results of The Improvement of Thailand's Logistics Cost Calculation Model to improve Thailand's logistics cost calculation methodology starting from 2017 – present. The results are as follows:

1. Logistics Cost Overview

Figure 4 Thailand's Logistics Costs



Source: Logistics Development Strategy Division, NESDC

In 2018, total logistics costs were 2,190.2 billion baht, increasing from 2,086.7 billion baht in 2017, a 5% annual growth or **equivalent to 13.4% of Gross Domestic Product at Current Prices (Nominal GDP).** The total costs composed of 1,102.6 billion baht of transportation costs (6.7% of GDP), 924.6 billion baht of inventory holding costs (5.7% of GDP), and 163.0 billion baht of logistics administration costs (1.0% of GDP). The costs rose in line with the overall national economic growth due to an increase in both domestic and foreign demand resulted from a rise in private consumption and investment as well as exports sectors.

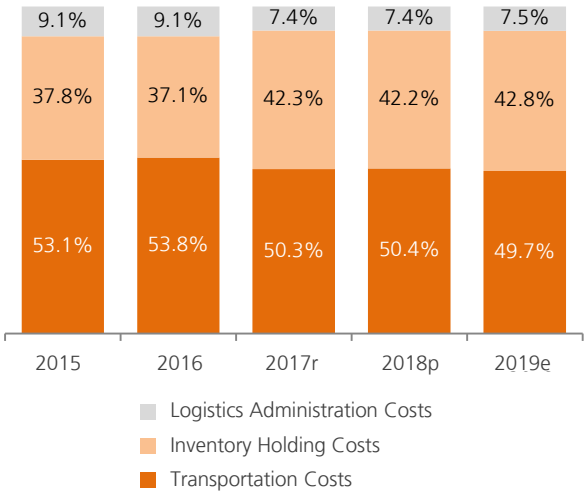
In 2019, total logistics costs are estimated to be valued at 2,258.4 billion baht, a 3.1% annual growth, **or equivalent to 13.4% of GDP** remaining unchanged from the previous year. The total costs comprise of 1,122.8 billion baht of transportation costs (6.7% of GDP), 967.5 billion baht of inventory holding costs (5.7% of GDP), and 168.1 billion baht of logistics administration costs (1.0% of GDP). The costs rise at slow pace in accordance with the national economic slowdown owing to global economic volatility resulted from the US-China trade war.

2. Logistics Cost Structure

Transportation costs are still the largest cost component. In 2019, transportation costs account for 49.7% of total logistics costs, followed by inventory holding costs contributing to 42.8%, while logistics administration costs make up to 7.5%.

Logistics cost structure from 2017-2019 has a slight adjustment. Inventory holding costs are moderately increased due to the improved cost assumptions adding in-house usage to the calculation. Meanwhile, logistics administration costs are slightly decreased owing to the reduction of a constant from 10% to 8.04%. The new constant is applied in the cost calculation to suitably reflect Thailand's current logistics system development.

Figure 5 Logistics Cost Structure



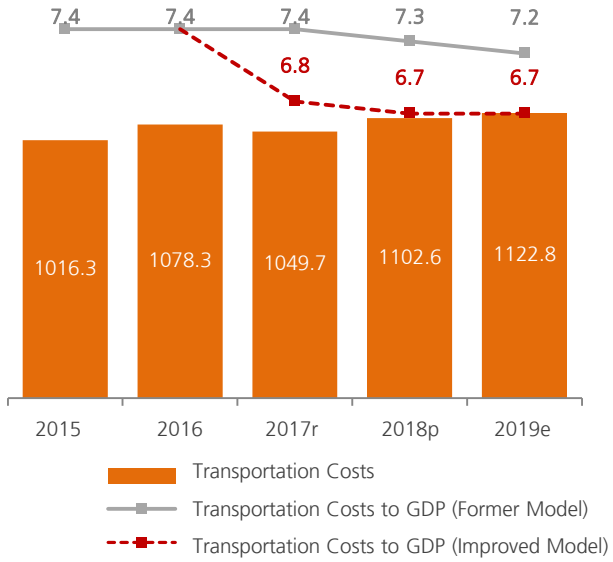
Source: Logistics Development Strategy Division, NESDC

3. Logistics Cost Components

1) Transportation Costs

In 2019, transportation costs are 1,122.8 billion baht, rising from 1,102.6 billion baht in 2018, or equivalent to a 1.8% increase. The costs are equivalent to 6.7% of GDP. Likewise, total freight volumes increase at slow pace while the trends of other transport-related factors are in line with the national economic slowdown. More detail is provided in the following sections.

Figure 6 Transportation Costs (Billion Baht)

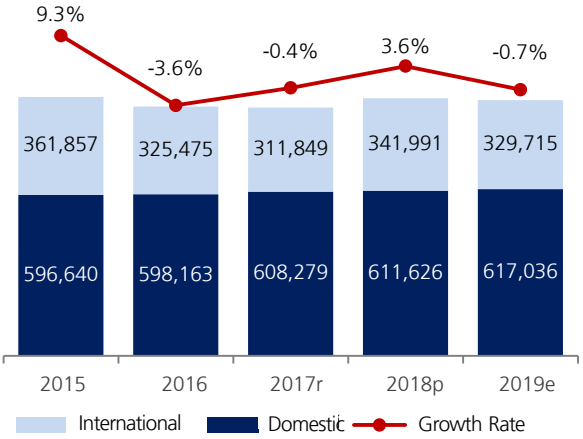


Source: Logistics Development Strategy Division, NESDC

(1) Freight Overview

In 2019, total freight volumes of both domestic and international transport are 946,751 thousand tons, slightly reducing from 953,617 thousand tons in 2018, a 0.7% decrease. In particular, international freight transport volumes decrease at 3.6% while domestic freight volumes moderately rise at 0.9%.

Figure 7 Total Freight Volumes (Thousand Tons)



Source: Information and Communication Technology Center, Ministry of Interior

▪ Domestics Freight

In 2019, the volumes of domestic freight transport are 617,036 thousand tons rising from 611,626 thousand tons in 2018, or equivalent to a 0.9% increase due to the growth of waterway transport – both inland waterway transport and costal transport. Factors affecting domestic freight volumes classified by transport modes are summarized below.

Table 8 Domestic Freight Volumes (Thousand Tons)

Mode	2015	2016	2017	2018	2019
Road[1]	482,358	484,884	482,596	483,760	483,168
Growth Rate (%)	3.7	0.5	-0.5	0.2	-0.1
Rail[2]	11,388	11,937	11,695	10,232	10,262
Growth Rate (%)	5.4	4.8	-2.0	-12.5	0.3
Water[3]	102,779	101,222	113,876	117,537	123,532
Growth Rate (%)	6.2	-1.5	12.5	3.2	5.1
Inland	50,907	50,327	53,026	55,739	57,242
Growth Rate (%)	1.6	-1.1	5.4	5.1	2.7
Coastal	51,872	50,895	60,850	61,798	66,290
Growth Rate (%)	11.1	-1.9	19.6	1.6	7.3
Air[4]	115	120	112	97	74
Growth Rate (%)	0.9	4.3	-6.7	-13.4	-23.7
Total	**596,640**	**598,163**	**608,279**	**611,626**	**617,036**
Growth Rate (%)	4.2	0.3	1.7	0.6	0.9

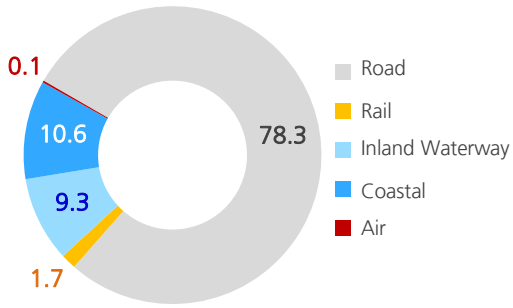
Source: Information and Communication Technology Center, Ministry of Interior

Reference (1) Information and Communication Technology Center, Ministry of Interior
(2) State Railway of Thailand
(3) Marine Department
(4) Department of Airports, Thailand, Civil Aviation Authority of Thailand, and Airports of Thailand (PCL)

• Domestic Transport Mode

In 2019, Thailand still relies greatly on road transportation mode, making up to 78.3% of the total commodity transportation, followed by costal transport (10.6%) and inland waterway transport (9.3%) consecutively while rail (1.7%) and air (0.1%) slightly contribute to the total freight volumes.

Figure 8 Domestic Freight Structure in 2019 (%)



Source: Information and Communication Technology Center, Ministry of Interior

- **Road Freight Transport**

In 2019, road freight volumes are 483,168 thousand tons, dropping from 483,760 thousand tons in 2018, or equivalent to a 0.1% decrease. Likewise, Thai entrepreneurs mainly rely on road transportation mode through an increase in door-to-door delivery demand consistent with the continuous growth of e-Commerce.

- **Rail Freight Transport**

In 2019, rail freight volumes are 10,262 thousand tons, rising from 10,232 thousand tons in 2018, a 0.3% increase. The proportion of volumes transported is relatively low compared to other transport modes. This reflects that Thai entrepreneurs might pay high cost of double handing and depended less on using rail services. Hence, it is important to put an emphasis on freight transport facilitation, price incentives and on time delivery service in order to increase the utilization of rail as the main development of multimodal transport.

- **Water Freight Transport**

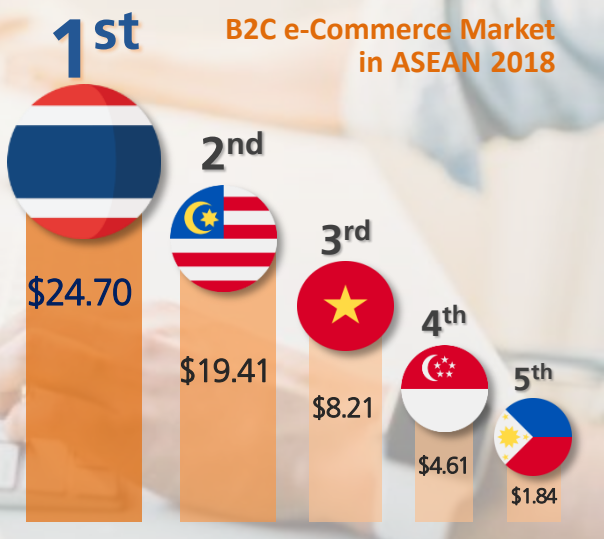
In 2019, water freight volumes are 123,532 thousand tons, a 5.1% rise from 117,537 thousand tons in 2018. **Inland waterway freight volumes** are 57,242 thousand tons, a 2.7% annual growth from 55,739 thousand tons mainly from basic materials for construction (soil, stone, sand and cement) and mineral fuels (petroleum). **Coastal freight volumes** are 66,290 thousand tons, a 7.3% annual growth from 61,798 thousand tons especially from animal feed, cement and chemicals.

- **Air Freight Transport**

In 2019, air freight volumes are 74 thousand tons reducing from 97 thousand tons in 2018, or equivalent to a 23.7% decrease. The number of commodity transported in most of the airports has continuously declined since 2018. This shows that quite a portion of businesses might switch from air to other modes as alternatives due to lower logistics costs.

LOGISTICS INSIGHT 2:
E-Commerce Market

In 2018, Thai e-Commerce market was valued at 3,150.2 billion baht, equivalent to a 14.04% annual growth. By considering the growth of business-to-consumer (B2C) e-Commerce market, it is found that Thailand ranked first in ASEAN accounting for 24.70 billion USD, followed by Malaysia (19.41 billion USD) and Vietnam (8.21 billion USD) consecutively. Major reasons leading to the first rank were the development of e-payment system and delivery service improvement contributing to the continuous growth of e-Commerce demand.



Source: Electronic Transactions Development Agency

• International Freight

Table 9 International Freight Volumes (Thousand Tons)

Modes	2015	2016	2017	2018	2019
Road	33,564	34,172	35,936	35,925	36,569
Growth Rate (%)	-8.8	1.8	5.2	-0.1	1.8
Rail	126	223	324	402	413
Growth Rate (%)	57.5	77.0	45.3	24.1	2.7
Water	327,650	290,570	275,045	305,029	291,948
Growth Rate (%)	22.8	-11.3	-5.3	10.9	-4.3
Air	517	510	544	635	785
Growth Rate (%)	-17.7	-1.4	6.7	16.7	23.6
Total	**361,857**	**325,475**	**311,849**	**341,991**	**329,715**
Growth Rate (%)	18.9	-10.1	-4.2	9.7	-3.6

Source: Information and Communication Technology Center, Ministry of Interior

In 2019, international freight volumes are 329,715 thousand tons, reducing from 341,991 thousand tons in 2018, or equal to a 3.6% decrease through the reduction of water freight volumes, which is consistent with the decline in total value of imports and exports as summarized below.

• Road Freight Transport

In 2019, road freight volumes are 36,569 thousand tons, rising from 35,925 thousand tons in 2018 or equal to a 1.8% increase. The major reasons leading to the volume growth are the continuous growth of freight volumes across border between Southern China and Thailand along with the high demand in Thai products resulted from the urban development expansion of neighboring countries, namely, Myanmar and Cambodia driven by Chinese and foreign investors.

• Rail Freight Transport

In 2019, rail freight volumes are 413 thousand tons, increasing from 402 thousand tons in 2018, or a 2.7% growth. The volume increase is associated with the rail network structure development along Padang Besar, the Malaysia border, to Hat Yai, Thailand; and Thanaleng, Laos Border, to Nong Khai, Thailand opened on March, 2019.

• Water Freight Transport

In 2019, water transport, Thailand's major mode of international transport, has total volumes of 291,948 thousand tons, dropping from 305,029 thousand tons in 2018, or a 4.3% decline. The volume decrease is caused by the import-export contraction owing to global economic uncertainty from the US-China trade war. Moreover, Laem Chabang port in 2019 handles 7.98 million TEU reducing from 8.07 million TEU in 2018, or a 1.2% decrease. And in 2020, the port is expected to handle less containers due to the COVID-19 outbreak.

• Air Freight Transport

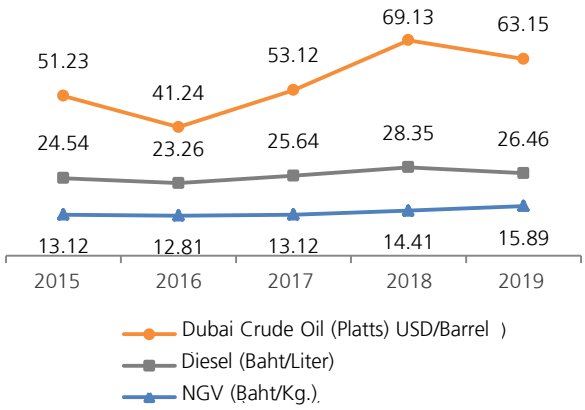
In 2019, air freight volumes are 785 thousand tons, increasing from 635 thousand tons in 2018, or a 23.6% rise. The volume increase is mainly from the ongoing result of bilateral air services agreements between Thailand and contracting parties that builds Thailand's international air transport credibility and supported its competitiveness.

(2) Transport-Related Factors

• Fuel Costs

Retail prices of motor fuels in 2019 Diesel prices is at 26.91 bath/liter declining from 28.35 bath/liter in 2018, or equivalent to a 6.7% drop. The reduction of retail diesel prices is in accordance with the global oil prices while NGV price is at 15.89 baht/kg. increasing from 14.41 baht/kg., or equal to a 10.3% rise. Besides, diesel usage accounts for 55.2% of total fuel usage of land transport while NGV usage is 6.9%.

Figure 9 Retail Prices of Motor Fuels

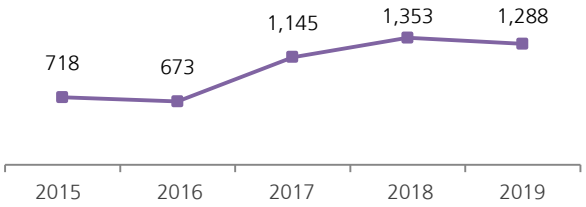


Source: Ministry of Energy, Bank of Thailand and Federal Reserve Economic Data

• Baltic Dry Index (BDI)

Baltic Dry Index (BDI) in 2019 is 1,288 dollars USD dropping from 1,353 dollars USD in 2018, or equivalent to a 4.7% decrease due to the global economic uncertainty.

Figure 10 Baltic Dry Index

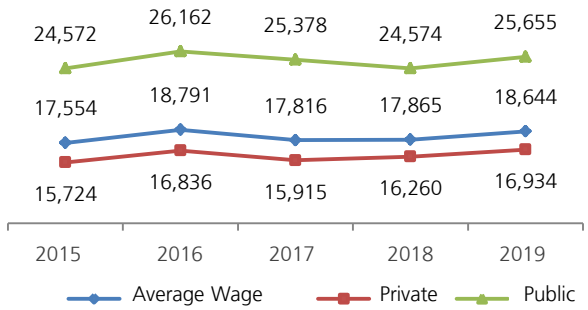


Source: www.investing.com

• Average Wage

In 2019, average wage of transportation and storage is 18,644 baht/month, rising from 17,865 baht/month in 2018, or equal to a 4.4% growth rate.

Figure 11 Average Wage of Transportation and Storage (Baht/Month)



Source: National Statistical Office of Thailand

LOGISTICS INSIGHT 3:
Minimum Wage Rates for Skilled Workers in Logistics Industry

Minimum Wage (Baht/Day)

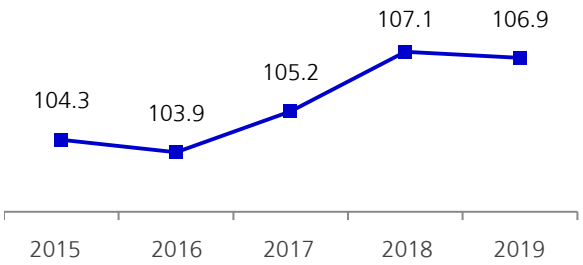
	Road Freight Operator	Forklift Operator	Inventory Controller	Warehouse Operator
Skill Level 1 (Semi-Skilled)	460	400	385	375
Skill Level 2 (Skilled)	550	475	465	455

Source: The National Wage Committee's Notification: Wage Rate According to Skill Standards passed on March 4, 2020 approved by May 1, 2020, Office of the Permanent Secretary, Ministry of Labour

• Road Freight Transport Index (RFTI)

In 2019, Road Freight Transport Index (RFTI) is 106.9, reducing from 107.1 in 2018, or equivalent to a 2.3% decline. A decrease of RFTI occurs in most of the product categories, namely, agriculture, mining, and manufacturing (products related to rubber and plastic).

Figure 12 Road Freight Transport Index

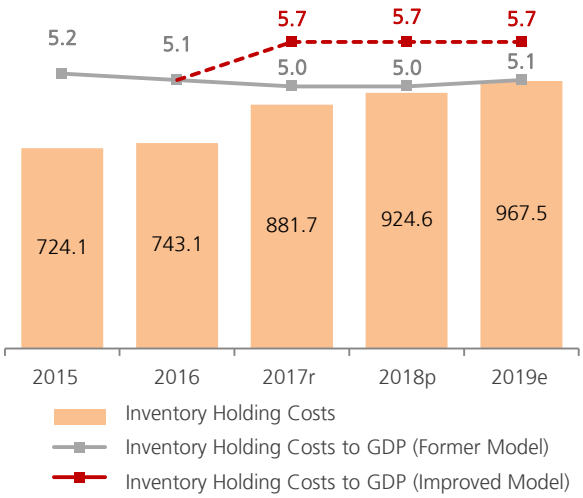


Source: Trade Policy and Strategy Office, Ministry of Commerce

2) Inventory Holding Costs

In 2019, inventory holding costs are 967.4 billion baht, increasing from 924.6 billion baht in 2018, or equal to a 4.6% growth. The costs comprise of 773.4 billion baht of inventory carry costs and 194.0 billion baht of warehousing costs. Factors affecting the inventory holding costs are summarized below.

Figure 13 Inventory Holding Costs

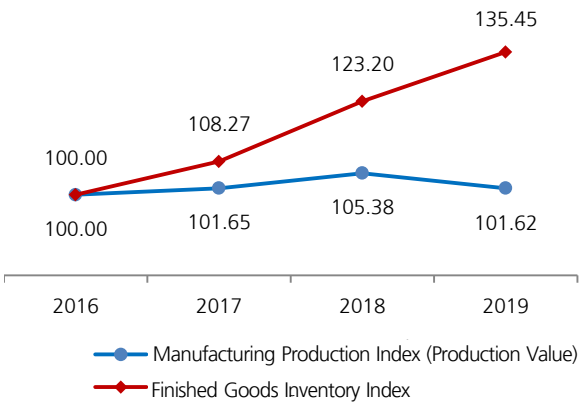


Source: Logistics Development Strategy Division, NESDC

(1) An Increase in Capacity Utilization

In 2019, Finished Goods Inventory Index is 135.5, increasing from 123.2 in 2018. The result reflects that entrepreneurs in all sectors have higher inventory levels owing to the domestic economic slowdown and the import-export reduction. In contrast, **Manufacturing Production Index is 101.6,** reducing from 105.4 in 2018. This result reveals that the entrepreneurs reduce their production capacity due to the global economic volatility resulting in the export contraction.

Figure 14 Manufacturing Production Index & Finished Goods Inventory Index

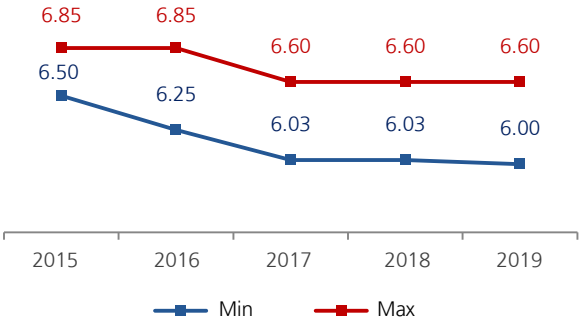


Source: The Office of Industrial Economics, Ministry of Industry

(2) The Decrease in Minimum Lending Rate (MLR)

In 2019, Minimum Lending Rate (MLR) is lower than the previous year, which is reduced to 6.00%-6.60%. This trend is in line with the policy of Monetary Policy Committee (MPC) that intends to utilize expansionary monetary policy to support national economic recovery under global economic and fiscal uncertainty.

Figure 15 Minimum Lending Rate (MLR)

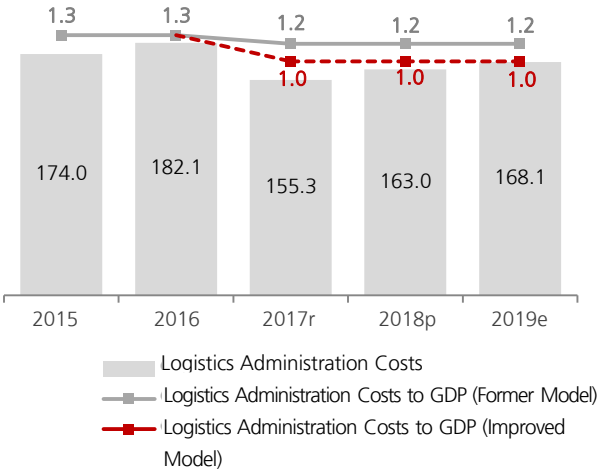


Source: Bank of Thailand

3) Logistics Administration Costs

In 2019, logistics administration costs are 168.1 billion baht, rising from 163.0 billion baht in 2018, or accounting for a 3.1% growth consistent with an increase in transportation costs and inventory holding costs.

Figure 16 Logistics Administration Costs



Source: Logistics Development Strategy Division, NESDC

4. Logistics Cost Estimates for 2020

Identified in late 2019, COVID-19, a global pandemic confirmed by World Health Organization (WHO), has severely impacted global economy including Thai economy. In 2020, Thailand's GDP growth rate is expected to be reduced at (-7.8%) - (-7.3%) due to the national economic contraction resulted from the severe economic downturn, the reduction of international tourism arrivals and the impact of drought on agriculture. Likewise, Thailand's logistics costs in 2020 is envisioned to be declined - logistics costs as a percentage of GDP is forecasted to be 12.9% - 13.4% comprising of transportation costs (6.4% - 6.7%), inventory holding costs (5.5% - 5.7%), and logistics administration costs (1.0%). More detail is summarized below.

1) Transportation Costs

Transportation costs are foreseen to be declined due to the reduction of road transport activities resulted from the decline of the domestic demand, economic activities, tourism sector, and imports and exports directly affecting domestic freight volumes. Likewise, RFTI in 2020 is expected to be reduced along with the decreased fuel costs in line with the continuous reduction of global oil prices. Besides, BDI in 2020 is predicted to be decreased due to the declining foreign demand from the global economic condition.

2) Inventory Holding Costs

Inventory holding costs are anticipated to be declined in the first half of the year (January - June 2020). Manufacturing Product Index, Shipment Index, and Finished Goods Inventory Index are foreseen to be reduced owing to the rapid release of inventory to the market and the production rate reduction in order to search for survival opportunity during the economic volatility. Additionally, MLR is forecasted to be decreased in line with the policy of Monetary Policy Committee which intends to utilize expansionary monetary policy in the first half of the year and maintain the interest rate at the appropriate level to support post-COVID-19 economic recovery in the second half of the year.

3) Logistics Administration Costs

Logistics administration costs are predicted to be reduced in accordance with a decline in both transportation costs and inventory holding costs.

5. Value Added Logistics

In 2019, NESDC and Center of Logistics Excellence, King Mongkut's University of Technology Thonburi jointly studied The Development of Logistics Information Systems for Thailand's Logistics Competitiveness Assessment to gather and collect relevant data in order to estimate value added logistics of Thailand, an indicator of Thailand's Logistics Development Plan. The summary is provided below.

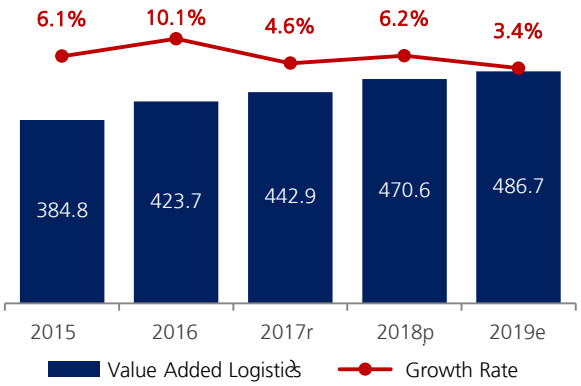
1) The Calculation of Value Added Logistics

VA Logistics = Gross Output – Intermediate Costs

Value added logistics is the economic profit of a business in logistics service industry gained from the exploitation of logistics-related activities incurred within the country.

2) Value Added Logistics Overview Based on the Study Results

Figure 17 Value Added Logistics



Source: Logistics Development Strategy Division, NESDC

Due to the continuous growth of logistics industry and businesses, value added logistics in 2019 is 486.7 billion baht increasing from 470.6 baht in 2018 or accounting for a 3.4% increase. This indicates that the development trend of logistics sectors focuses on inducing more effective responses to customer demand for just-in-time delivery services upon reasonable prices in order to obtain customer satisfaction, to increase sales, and to gain profits leading to the increment of national value added logistics.

LOGISTICS INSIGHT 4:
Pallet Pool System

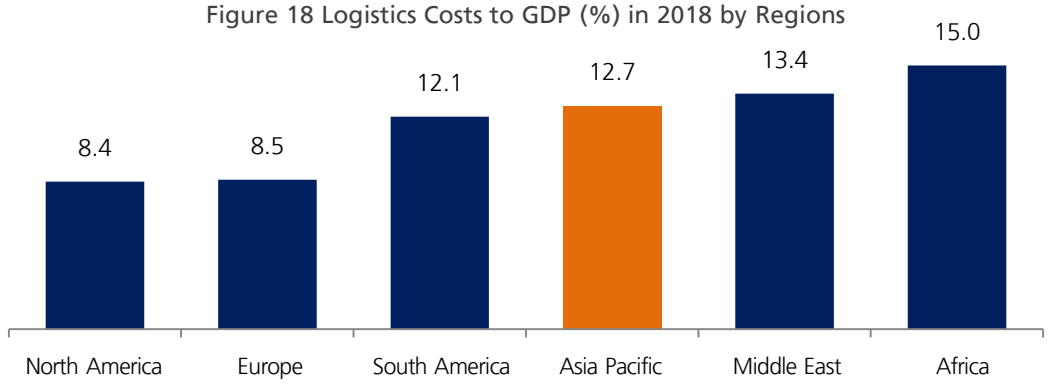
Pallet pool system is the standardized reusable pallets allocation over the supply chain enabling supply chain players to transfer or to switch pallets between each supply chain actor. Nowadays, Thailand mainly employs one-way pallets management systems, or accounting for over 80% of the total pallet usage owing to pallet size differences and a lack of entrepreneurial collaboration. Hence, the development of transport standardization using pallet pool system in transport and warehouse management can help the entrepreneurs reduce logistics administration costs, promote green logistics and enhance Thailand's logistics system efficiency.

Source: Korea Pallet and Container Association

Part III Global Logistics Costs

1. Global Logistics Costs

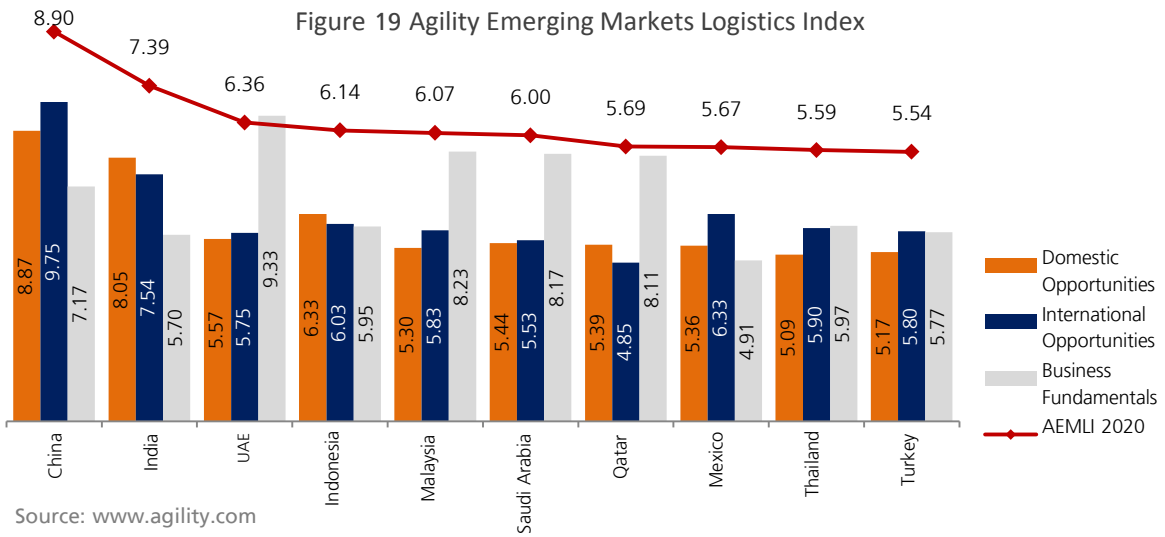
Figure 18 Logistics Costs to GDP (%) in 2018 by Regions



Source: Armstrong & Associates

Armstrong & Associates Inc., a third party-logistics (3PL) and market research consulting expert, reveals that global logistics costs to GDP in 2018 was equivalent to 10.7% - logistics costs to GDP of North America and Europe were the lowest, equivalent to 8.4% and 8.5% consecutively while Asian Pacific logistics costs to GDP was 12.7%.

Figure 19 Agility Emerging Markets Logistics Index



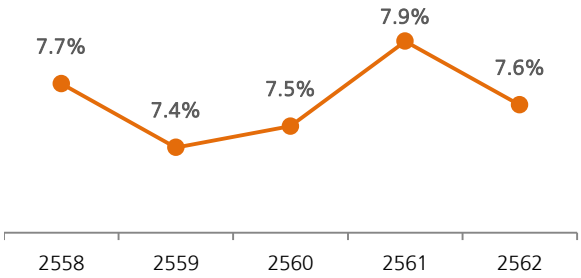
Source: www.agility.com

Agility Emerging Markets Logistics Index (AMELI) is a numerical evaluation assessed from domestic opportunities, international opportunities, and business fundamentals. Agility Co., Ltd., a global leading logistics expert, has created AEMLI based on the concept given by International Finance Corporation (IFC). In 2020, the People's Republic of China (China) and India, the world's largest market, rank first and second consecutively while Thailand ranks ninth from 50 countries worldwide. It is noteworthy that many Middle Eastern countries and Malaysia scored high in business fundamentals and that many Asian Pacific countries are among the top ranks and the main foreign investment attraction.

2. US Logistics Costs

In 2019, US logistics costs are 1,629.7 billion USD, equivalent to 7.6% of GDP, reducing from 7.9% of GDP in 2018. More detail regarding US logistics cost component is summarized below.

Figure 20 Logistics Costs to GDP of The United States of America



Source: CSCMP's 31st Annual State of Logistics Report

1) Transportation Costs

Transportation costs are the largest cost component, undertaking up to 1,059.1 billion USD or equivalent to a 2.5% annual growth, comprising of:

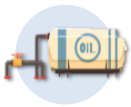
Road rises at 3.0% mainly resulted from freight volume increase.

Postal Services increase at 8.5% due to the continuous growth of e-Commerce business.

Rail slightly rises at 1.4% owing to the utilization of technology in route planning management along with the reduction of coal volumes.

Air reduces at 9.7% due to the reduction of freight transport demand especially in automotive industry.

Water rises at 3.1% owing to higher number of containers flowing through national eastern ports including Houston and Savannah.



Pipeline increases at 9.5% due to production capacity increase in both gas and oil.

2) Inventory Holding Costs

Inventory holding costs are 454.6 billion USD, accounting for a 4.6% annual reduction, due to the FED rate cut and the technology utilization in inventory management as the demand for e-Commerce continuously rises, which then leads to an improvement of on time delivery services.

3) Logistics Administration Costs

Logistics administration costs are 116.1 billion USD, accounting for a 5.0% annual growth in line with an increase in total logistics costs.

Table 10 US Logistics Costs
(Billion USD)

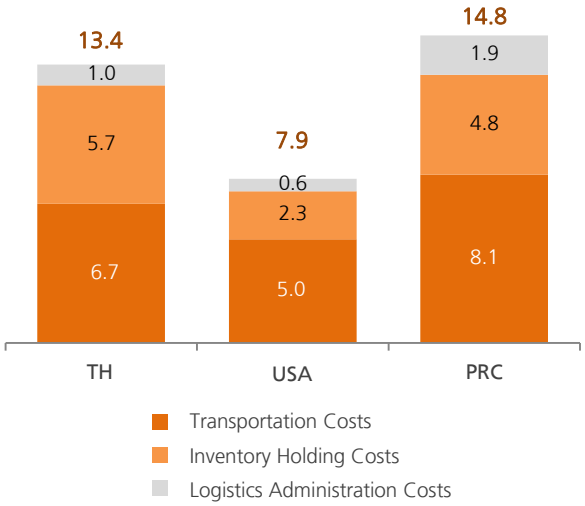
Logistics Costs (Billion USD)	Value 2018r	Value 2019	YoY (%)
Transportation Costs	1,033.2	1,059.1	2.5
Road	660.6	680.4	3.0
Postal Services	105.4	114.4	8.5
Rail	85.1	83.9	-1.4
Air	83.3	75.2	-9.7
Water	46.5	47.9	3.1
Pipeline	52.4	57.4	9.5
Inventory Holding Costs	476.5	454.6	-4.6
Logistics Administration Costs	110.6	116.1	5.0
Total	1,620.3	1,629.8	0.6

Source: CSCMP's 31st Annual State of Logistics Report 2020

3. A Logistics Cost Comparison of Thailand, The United States of America and the People's Republic of China in 2018

Logistics cost structure of Thailand, the United States of America and China were quite similar. **Transportation costs** were the largest costs component since entrepreneurs greatly relied on road transportation mode. However, the United States of America and China were better at utilizing rail transport as a main mode to support multimodal transport than Thailand. Additionally, rail transport cost structure of China and USA were 8.2% of GDP and 5.3% of GDP consecutively whereas Thailand's cost structure was the lowest accounting for 0.1% of GDP.

Figure 21 Logistics Cost Ratio of Thailand, The United States of America and the People's Republic of China in 2018



Source: Logistics Development Strategy Division, NESDC

By considering **inventory holding costs**, it can be seen that United States of America had 29.5%, followed by People's Republic of China (32.4%) while Thailand had 42.2%, the largest cost ratio. This represents the fact that Thailand still has a capacity to potentially improve warehouse and inventory management in order to reduce total logistics costs.

Remark: Due to data unavailability in 2019, the logistics cost comparison is based on 2018 cost data.

Table 11 Logistics Cost Structure of Thailand, The United States of America and the People's Republic of China in 2018

Logistics Costs (%)	TH	USA	PRC
Transportation Costs	50.4	63.6	54.7
Road	26.0	40.7	32.8
Postal Services	8.0	6.5	5.5
Rail	0.1	5.3	8.2
Air	2.1	5.1	2.2
Water	11.1	2.9	4.9
Pipeline	3.1	3.2	1.1
Inventory Holding Costs	42.2	29.5	32.4
Logistics Administration Costs	7.4	6.9	12.9
Total	100.0	100.0	100.0

Source: scmr.uark.edu
CSCMP's 30th Annual State of Logistics Report
and Logistics Development Strategy Division, NESDC

Part IV Thailand's Logistics System Development Guidelines

COVID-19 outbreak has impacted on both economy and a way of life resulting in a transition to a new normal including shifts online consumer behavior, and international travel and export-import controls. The outbreak leads to changes in logistics systems and supply chain that focus on public health and risk management measures. Thus, Thailand's logistics system development guidelines for the next phase should consider these development issues as follows:

1. Expedite the Utilization of Infrastructure and Facilitation System and Develop Supporting Factors to Enhance Competitiveness

1.1 Promote Modal Shift and the Utilization of Multimodal Transport System and develop routes for emergency situations.

Expedite the utilization of rail system as a national transport backbone. Develop feeder shipping networks in strategic routes in order to connect to agricultural and industrial sources, fulfillment and distribution centers, and gateways. Plan and select alternative routes prepared for any emergency situations in order to facilitate Thai entrepreneurs' logistics related activities and to avoid any disruptions affecting overall economic activities. Encourage the entrepreneurs to prepare a business risk management plan especially on the compliance to public health and safety measures to accommodate the transition to a new normal.

1.2 Upgrade Digital Infrastructure of Logistics Industry and Develop Logistics Information System for Logistics-Related Data Integration.

Develop digital infrastructure to facilitate business operations and logistics-related activities via digitalization. Encourage Thai entrepreneurs to use application or online platform in transportation, warehouse management, and logistics-related activities throughout the supply chain. Improve the efficiency of open logistics-related data management systems to enable the entrepreneurs not only to use the data as an analytical tool, follow-up and evaluation, and business optimization planning but also to develop business simulation model to create the adjustment of marketing strategy in response to changes in market trends.

2. Promote the Transformation of Business Operation into B2C (Business to Consumer) via Digitalization

Support Thai entrepreneurs' e-Commerce connectivity in order to expand market opportunities and to align with shifts in consumer behavior using more digital technology. Improve law, regulations and government procedures to facilitate entrepreneurs' business operations. Upgrade warehouse management to support e-Commerce operations including work in process optimization, fulfillment service improvement and regional distribution development to meet door-to-door delivery demand more efficiently.

3. Support Thai Logistics Service Provider Network and Promote Regional Partnership

Empower Thai logistics service providers' networking support. Promote Thai entrepreneurs in foreign investment and networking to expand and to improve business operations. Develop international logistics information service center to exchange information relevant to imports and exports, international freight transportation, international logistics-related activities, and law and regulations of each trading partners that are up to date in order to prepare the entreprenuers for any emergency situations. Support business operations using sharing economy framework to improve resource efficiency and to reduce business operating expenses. Promote fiscal and tax incentives for Thai logistics service providers in investing and building network in foreign countries.

Appendix 1: Thailand's Logistics Cost and Logistics Cost to GDP from 2010-2019e

By Logistics Information Development Working Group

Unit: Billion Baht

Logistics Cost	2010	2011	2012	2013	2014	2015	2016	2017r	2018p	2019e
Transportation Cost	**812.7**	**850.3**	**932.2**	**953.4**	**994.9**	**1,016.3**	**1,078.3**	**1,049.7**	**1,102.6**	**1,122.8**
Pipeline	29.9	36.5	39.4	35.6	49.6	43.6	51.9	62.4	67.2	68.7
Rail	2.1	1.9	2.1	2.1	1.8	1.9	2.1	2.1	2.1	2.0
Road	487.2	511.6	554.5	562.3	577.1	590.9	631.0	562.2	570.6	570.3
Water	167.1	167.8	201.8	203.6	205.0	220.4	224.3	233.2	242.6	246.9
Air	40.0	42.3	41.4	41.1	39.5	36.4	39.7	42.4	46.1	42.5
Transport-Related Services	66.6	70.6	76.1	87.1	97.9	99.8	103.9	113.7	131.3	145.8
Postal Services	19.8	19.6	16.9	21.6	24.0	23.4	25.4	33.7	42.8	46.6
Inventory Holding Cost	**679.9**	**662.7**	**682.9**	**713.9**	**711.2**	**724.1**	**743.1**	**881.7**	**924.6**	**967.5**
Inventory Carrying Cost	667.8	650.6	668.1	696.2	696.8	709.2	730.1	689.0	732.3	773.4
Warehousing Cost	12.1	12.1	14.8	17.7	14.4	14.9	13.0	192.7	192.4	194.0
Logistics Administration Cost	**149.3**	**151.3**	**161.5**	**166.7**	**170.6**	**174.0**	**182.1**	**155.3**	**163.0**	**168.1**
Total Logistics Cost	**1,641.9**	**1,664.3**	**1,776.6**	**1,834.0**	**1,876.7**	**1,914.4**	**2,003.5**	**2,086.7**	**2,190.2**	**2,258.4**
Gross Domestic Product (GDP)	**10,808.1**	**11,306.9**	**12,357.3**	**12,915.2**	**13,230.3**	**13,743.5**	**14,554.6**	**15,486.6**	**16,365.6**	**16,879.0**
Unit: Percent to GDP										
Proportion of Logistics Costs to GDP	**2553**	**2554**	**2555**	**2556**	**2557**	**2558**	**2559**	**2560r**	**2561p**	**2562e**
Transportation Cost to GDP	7.5	7.5	7.6	7.4	7.5	7.4	7.4	6.8	6.7	6.7
Inventory Holding Cost to GDP	6.3	5.9	5.5	5.5	5.4	5.2	5.1	5.7	5.7	5.7
Logistics Administration Cost to GDP	1.4	1.3	1.3	1.3	1.3	1.3	1.3	1.0	1.0	1.0
Logistics Costs to GDP	**15.2**	**14.7**	**14.4**	**14.2**	**14.2**	**13.9**	**13.8**	**13.5**	**13.4**	**13.4**

Source: NESDC

Remark : r refers to revised data.

p refers to preliminary data.

e refers to estimated data.

Besides, 2017-2019 logistics costs are based on the revised cost assumptions from The Improvement of Thailand's Logistics Cost Calculation Model in fical year 2018 jointly conducted by NESDC and TU-RAC.

Appendix 2: Transportation Cost to GDP by Components from 2010-2019e

By Logistics Information Development Working Group

Unit: Percent to GDP

Logistics Cost	Year									
	2010	2011	2012	2013	2014	2015	2016	2017r	2018p	2019e
Transprotation Cost	7.5	7.5	7.6	7.4	7.5	7.4	7.4	6.8	6.7	6.7
Pipeline	0.3	0.3	0.3	0.3	0.4	0.3	0.4	0.4	0.4	0.4
Rail	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Road	4.5	4.5	4.6	4.4	4.4	4.3	4.3	3.7	3.5	3.4
Water	1.5	1.5	1.6	1.6	1.5	1.6	1.5	1.5	1.5	1.5
Air	0.4	0.4	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.2
Transport-Related Services	0.6	0.6	0.6	0.7	0.7	0.7	0.7	0.7	0.8	0.9
Postal Services	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.3

Source: NESDC

Remark : r refers to revised data.

p refers to preliminary data.

e refers to estimated data.

Besides, 2017-2019 logistics costs are based on the revised cost assumptions from the study in fical year 2018 jointly conducted by NESDC and TU-RAC.

Appendix 3: Trends of Logistics Costs Growth and GDP between 2010-2019e

By Logistics Information Development Working Group

Unit: Percent

Logistics Cost	Year									
	2010	2011	2012	2013	2014	2015	2016	2017r	2018p	2019e
Transportation Cost	**15.2**	**4.6**	**9.6**	**2.3**	**4.4**	**2.1**	**6.1**	**1.8**	**5.0**	**1.8**
Pipeline	6.4	22.1	7.9	-9.6	39.3	-12.2	19.1	-8.9	7.5	2.4
Rail	0.0	-9.5	10.5	0.0	-14.3	3.0	13.3	0.7	-3.0	-4.1
Road	12.8	5.0	8.4	1.4	2.6	2.4	6.8	-0.4	1.5	-0.1
Water	13.1	0.4	20.3	0.9	0.7	7.5	1.8	3.9	4.0	1.8
Air	43.9	5.7	-2.1	-0.7	-3.9	-7.9	9.1	9.0	8.7	-7.8
Transport-Related Services	26.6	6.0	7.8	14.5	12.4	1.9	4.1	9.3	15.5	11.0
Postal Services	31.1	-1.0	-13.8	27.8	11.1	-2.5	8.5	16.6	27.1	8.9
Inventory Holding Cost	**9.0**	**-2.5**	**3.0**	**4.5**	**-0.4**	**1.8**	**2.6**	**3.4**	**4.9**	**4.6**
Inventory Carrying Cost	8.6	-2.6	2.7	4.2	0.1	1.8	2.9	4.1	6.3	5.6
Warehousing Cost	30.1	0.0	22.3	19.6	-18.6	3.5	-12.8	1.2	-0.2	0.9
Logistics Administration Cost	**12.3**	**1.3**	**6.7**	**3.2**	**2.3**	**2.0**	**4.6**	**2.5**	**5.0**	**3.1**
Total Logistics Cost	**12.3**	**1.4**	**6.7**	**3.2**	**2.3**	**2.0**	**4.7**	**2.5**	**5.0**	**3.1**
Gross Domestic Product (GDP)	**11.9**	**4.6**	**9.3**	**4.5**	**2.4**	**3.9**	**5.9**	**6.1**	**5.7**	**3.1**

Source: NESDC

Remark : r refers to revised data.

p refers to preliminary data.

e refers to estimated data.

Besides, 2017-2019 logistics costs are based on the revised cost assumptions from The Improvement of Thailand's Logistics Cost Calculation Model in fical year 2018 jointly conducted by NESDC and TU-RAC.

Appendix 4: Thailand's Economics Value Added from Logistics activities between 2010-2019e

By Logistics Information Development Working Group

Unit: Billion Baht

Economic Value Added	Year									
	2010	2011	2012	2013	2014	2015	2016	2017	2018p	2019e
Pipeline	30.0	32.4	29.0	25.5	36.1	31.4	52.5	48.3	52.1	53.3
Rail	0.7	0.6	0.3	0.2	0.6	0.4	0.8	0.8	1.2	1.1
Road	103.2	106.3	117.9	118.0	119.0	135.9	139.4	146.8	149.1	152.7
Water	83.2	83.1	93.4	97.5	98.9	105.5	107.8	110.9	114.7	117.5
Air	25.7	26.1	28.5	29.1	28.7	30.2	35.9	39.9	43.0	41.0
Transport-related Services	38.1	40.4	45.8	49.6	55.6	56.6	59.2	64.8	74.9	83.1
Parcel Services	13.7	12.3	12.9	13.6	14.8	15.7	19.7	22.9	27.2	29.4
Warehousing	7.5	7.5	9.0	10.8	8.8	9.1	8.4	8.5	8.5	8.6
Total Economics Value Added	**302.1**	**308.7**	**336.8**	**344.3**	**362.5**	**384.8**	**423.7**	**442.9**	**470.6**	**486.7**
Gross Domestic Product (GDP)	**10,808.1**	**11,306.9**	**12,357.3**	**12,915.2**	**13,230.3**	**13,743.5**	**14,554.6**	**15,486.6**	**16,365.6**	**16,879.0**

Source: NESDC

Remark : p refers to preliminary data.

e refers to estimated data.

Appendix 5: Trends of Economics Value Added from Logistics activities between 2010-2019e

By Logistics Information Development Working Group

Unit: Billion Baht

Economic Value Added	Year									
	2010	2011	2012	2013	2014	2015	2016	2017	2018p	2019e
Pipeline	22.6	8.2	-10.5	-12.3	42.0	-13.0	67.2	-8.1	7.9	2.4
Rail	-15.6	-24.2	-39.0	-29.3	131.5	-30.5	97.2	8.5	42.5	-8.1
Road	1.5	3.0	10.9	0.1	0.8	14.2	2.6	5.3	1.5	2.4
Water	10.1	-0.1	12.4	4.4	1.4	6.7	2.2	2.9	3.5	2.5
Air	5.8	1.7	8.9	2.2	-1.2	4.9	18.9	11.3	7.8	-4.5
Transport-related Services	26.8	5.9	13.2	8.4	12.2	1.8	4.6	9.4	15.6	11.1
Parcel Services	32.1	-10.5	5.3	5.4	8.5	6.2	25.2	16.4	18.5	8.1
Warehousing	31.4	-0.6	20.9	19.8	-18.9	3.6	-7.6	1.7	0.0	0.9
Total Economics Value Added	**10.7**	**2.2**	**9.1**	**2.2**	**5.3**	**6.1**	**10.1**	**4.5**	**6.2**	**3.4**
Gross Domestic Product (GDP)	**11.9**	**4.6**	**9.3**	**4.5**	**2.4**	**3.9**	**5.9**	**6.1**	**5.7**	**3.1**

Source: NESDC

Remark : p refers to preliminary data.

e refers to estimated data.

Logistics Information Development Working Group

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