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EVALUATING THE IMPACT OF THE LOGISTICS INDUSTRY TO GDP: THE THAI EXPERIENCE

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ABSTRACT

Thailand has experienced steady growth and structural changes in its economy in the last four decades. However, the emergence of global production networks and increased trade among nations has created a high demand for an efficient logistic industry that is able to provide cost and time effective transportation service and other value added services such as packing, warehousing or distribution. The purpose of this paper is to propose an overall methodology that can assess the contribution of the logistics industry to the national GDP. Thailand is chosen as an illustrative case study

The paper provides the rationale behind the methodology utilised to measure the logistics industry's share of the GDP. Calculation is then made for the logistics industry's ratio of contribution to national GDP, which is based on a des-aggregation of the national Input-Output table where a number of logistics related sectors are identified.

The results are further analysed in order to examine how to increase the logistics industry's contribution to GDP growth and provide guidelines for the direction of government policies related to logistics and transport-related sectors.

INTRODUCTION

The emergence of global production networks with an increased dependency on efficient inter and intra firm relationship has given modern logistics a crucial role in connecting customers with suppliers. This process has created increased trade among nations as firms search for efficiency gains as a consequence of national and regional competitive advantage. Extract of these gains are dependent upon high performing logistics industry capable of adding value through the whole production process (Rushton & Croucher, 2000). The scope and elements of logistics services provided are experiencing change in the same pace as economic activities demand better co-ordination of information and input of goods in order to manage the global market and external factors influencing local, national and international business climate.

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Economic factors affecting rate of exchange and interest rates, regulatory frameworks are influenced by deregulations for example in the transport sector (Banister & Berechman, 2001), technological progress and innovation contributing to higher productivity and faster exchange and transfer of information and input goods are all factors affecting the logistic industry (Ballou, 1999). This change imposes pressure on the logistics industry to be flexible and dynamic in order to follow and adapt to constraints and demands within the environment it serves. The purpose of this paper is to describe an overall methodology to assess the contribution of the Thai logistics industry to the Thai national GDP. Thailand as a developing country believes that having strong logistics capabilities as well as an efficient logistics industry will improve the competitiveness of the country as a whole (NESDB, 2004).

METHODOLOGY

Assessing the contribution of a logistics industry to any country's GDP can be quite a daunting task. Traditionally most studies related to the logistics industry are mostly focused on their market size and the types of logistics services provided (Wilson, 2004) not on their impact on national GDP or their value added. GDP figures themselves cannot be easily separated to provide the precise value added that is derived from the logistics industry as data has been aggregated beforehand (Bronzini, 2001). It was therefore decided to use the input-output table of Thailand for this study. The main reason for using the input-output table of Thailand is because of the level of details in the table can theoretically help better identify the value added created by the Thai logistics industry as value added in industrial or service sectors are represented. The input-output table is one of the ways in which the national economy of a country can be represented by grouping activities into branches of industry: agriculture, manufacturing, transportation, etc. For simplicity, each industry is assumed to produce only one good with only one process of production. To produce any given good or service, an industry will have to buy raw materials from other industries as well as using inputs such as labour and capital equipment, which can be considered "primary inputs". The produced goods or service can then sold to other industries to be used as inputs, or to households, governments, or to foreign countries. Sales to other industries are called "intermediate demand" while sale to consumers are called "final demand". These inter-industrial transactions can be shown in the following table 1 hereunder.

Table 1: Example of input-output table inter-industrial transactions

Output distribution →

Input Structure ↓	Intermediate transactions (xij)	Final Demand (F)	Total Output (X)
	Primary Input (V)		
	Total Input (X)		

Source: NESDB (1989)

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The above table shows how the output of each industry is distributed among other industries of the economy (along each row). At the same time, it shows the inputs to each industry from other industries (along each column). The row thus represents the structure of distribution (or sales) of output while the column represents the structure of production (or costs). The table is called the input-output table.

Currently in the input-output table of Thailand there are 180 sectors that represent the Thai economy as a whole. Each sector covers a number of activities. The activities are designed to ensure consistency of the commodity base as well as to keep the homogeneity of the activity in accordance with the scale of production. In the case of Thailand, the "informal" sectors are quite significant. This sometime does pose a problem in terms of how to classify an activity to a sector. In the input-output table, services such as transportation or logistics are valued at the prices paid by the sectors receiving such services. Table 2 illustrates the close relationship between Thai GDP and input-output table of Thailand as the final results must be related to GDP.

As shown in the table 2 hereunder, there is a very close relationship between GDP and input-output table. Even though the input-output table is used as the main source of data the results can be reconciled with national GDP.

Another issue that must be dealt with is the composition of the logistics industry that will be studied. Logistics and logistics industry has many definitions and in this paper the classification provided by the West London Skills Council seemed appropriate. Table 3 provides a proposed classification for the logistics industry.

However, when analysing the input-output table of Thailand it was discovered that there was no logistics industry sector or codification per se. It was therefore necessary to find which sector or codes where the most closely related to logistics. In the input-output table of Thailand, there exist codes related to transportation and warehousing. Hereunder are the related Input/Output codes.

- Code 136: Distribution of Natural Gas
- Code 149: Railways
- Code 151: Road Freight Transport
- Code 152: Land transport support services
- Code 153: Ocean Transport
- Code 154: Coastal and inland transport
- Code 155: Water transport services
- Code 156: Air transport
- Code 157: Other transport services
- Code 158: Storage and warehousing

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Table 2: linkages between Thai GDP & input-output table

Economic Activities (GDP)	I-O (001-180)
Agriculture	
Agriculture, Hunting and Forestry	001 – 027
Fishing	028 – 029
Non-Agriculture	
Mining and Quarrying	030 – 041
Manufacturing	042 – 126, 128 – 134
Electricity, Gas and Water Supply	135 – 137
Construction	138 – 144
Wholesale and Retail Trade; Repair of motor Vehicle, Motorcycles and Personal and Household Goods	145 – 146,127, 177
Hotels and Restaurants	147 – 148
Transport, Storage and Communications	149 – 159
Financial Intermediation	160 – 162
Real Estates, Renting and Business Activities	163 – 164
Public Administration and Defense; Compulsory Social Security	165
Education	167 – 168
Health and Social Work	169
Other Community, Social and Personal Service Activities	166, 170 – 176
Private Households with Employed Persons	178, 180

Source: The Author

Table3: Tentative logistics industry classification

Standard Industrial Classification (SIC) codes for logistics.

60.10: Transport via railways
60.21: Other scheduled passenger land transport
60.22: Taxi operation
60.23: Other passenger land transport
60.24: Freight transport by road
60.30: Transport via pipelines
61.10: Sea and coastal water transport
61.20: Inland water transport
62.10: Scheduled air transport
62.20: Non-scheduled air transport
62.30: Space transport
63.11: Cargo handling
63.12: Storage and warehousing
63.21: Other supporting land transport activities
63.22: Other supporting water transport activities
63.23: Other supporting air transport activities
63.40: Activities of other transport agencies
64.11: National post activities
64.12: Courier activities

Source: www.westlondon.com/researchcentre/sectorbriefings

Even though the input-output table of Thailand may not have all the logistics sectors, there is at least a good starting point with the transport and warehousing codes. Transport and warehousing are key activities within logistics management and are usually the most easily understood type of logistics activities. Sectors such

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as freight forwarding, customs brokerage or third party logistics service providers do not have an input-output codification and are therefore not presently represented in the current input-output table of Thailand. This lack of coverage related to the codification of the logistics industry is a limitation that cannot be ignored. This limitation can only be rectified by introducing new sectors into the input-output table to reflect the changes in national economic structures but this may take quite a long time. For the purpose of this paper, it is proposed that all the codes related to transport and warehousing be used as a proxy for the Thai logistics industry[1]. The calculation method to find the value added of each sector is relatively straightforward. Code 210 or Control Total for each sector (from code 136 to 158) must first be selected. Code 210 is the sum of total intermediate transactions and value added. The total intermediate transaction or Code 190 will then be subtracted. Code 190 is the sum of codes 001 to 180. This value added is considered as the contribution that is directly derived from a sector.

Code 210 (Control Total) – Code 190 (Total Intermediate Transactions) = Value-added (VA)

In order to find the ratio of the total contribution of the Thai logistics industry to national GDP, the contribution of each individual code 136; 149; 151; 152; 153; 154; 155; 156, 157 & 158 must be added up and then divided by GDP value.

(VA136+VA149+VA151+VA152+VA153+VA154+VA155+VA156+VA157+VA158)/GDP

FINDINGS

Table 4 describes the contribution of the Thai logistics industry to national GDP as per the calculation explained in the methodology.

Table 4: Contribution of the Thai logistics industry to national GDP (million of Baht)

Logistics industry sector	**2001**	**2002**	**2003**	**2004**	**2005**
Distribution of natural gas	22,433	24,652	30,935	38,822	48,717
Railways	1,087	1,084	1,662	2,391	3,463
Road freight transport	73,230	74,444	76,093	83,334	102,486
Road freight support services	17,380	19,753	21,828	23,104	23,459
Ocean Transport	9,041	9,726	10,843	12,088	13,476
Coastal & IWT	10,412	10,130	9,940	10,004	11,586
Water transport services	4,130	4,597	4,844	5,271	5,609
Air transport	6,185	6,905	7,047	7,051	7,997
Other transport services	13,642	14,755	16,467	19,873	16,365
Storage & Warehousing	6,373	6,242	8,482	10,528	9,606
Total Value Added	163,913	172,288	188,141	212,466	242,764
GDP	5,443,812	5,770,095	6,288,841	6,974,391	7,533,655
Logistics industry value added per GDP	**3.01%**	**2.98%**	**2.99%**	**3.04%**	**3.22%**

Source: The Author

[1] Even though it is incomplete.

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Ratios can be somewhat misleading as in terms of value, the contribution has gradually increased but Thailand's GDP has also increased. In fact Thailand's GDP has increased a lot quicker that the contribution of the Thai logistics industry and that is the reason why the ratios in table 4 must be utilised and interpreted with great care. The value or the ratios themselves also provides clues about the level of value added services provided by each of the sectors in the input-output table. This means that operators in sectors such as road freight transport or storage and warehousing are offering very little value added services. This would mean that these sectors as defined in the input-output table mostly provide basic service and minimal value added.

CONCLUSIONS

This paper has tried to present a methodology to estimate the contribution of the Thai logistics industry to national GDP. This methodology is based on using data from the input-output table of Thailand and then identifying the value added of each logistics related sectors. There is no logistics sector classification in the input-output table but a proxy was created by selecting sectors related to transport and storage and warehousing. Even though this is a major limitation, the results are interesting in the sense that there is very little value added or contribution by these sectors to national GDP. This means that these sectors mostly provide their core services with very little value added. This creates an opportunity for the Thai government if it wants to increase the contribution of the Thai logistics industry to national GDP by helping each of the related sectors in providing more logistics value added activities.

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