

## Chapter 1

### Introduction

#### 1.1 Background

At present, the increase in oil price effects the operation of all businesses and industries around the world. Diesel fuel is one of the most widely used fuels that is used by the transport sector, thus, the future of businesses and industries that have high percentage in transportation cost are depended on diesel price. The diesel price is now increasing and trend to going up (Figure 1-1) accordingly the transportation cost is going in the same way. Thailand is one of many affected countries in the transport cost issue by the rising of fuels cost (The World Bank, 2009). Thailand logistics cost per Gross Domestic Product (GDP) was fluctuating around 17% in 2001-2011, it was not significantly different for the past 10 years, as shown in figure 1-2. Transportation cost (47% in figure 1-3) has always been the highest cost in all types of logistics cost; consisting of administration cost, warehousing and inventory cost, and transportation cost. If fuel price is still rising, without an appropriate immediate solution to an alternative source of energy then transportation cost will be the one of the most important cost type that would require careful planning to ensure that it is minimized as much as possible.

High Speed Diesel Price during 2005 - 2012 (Thailand)

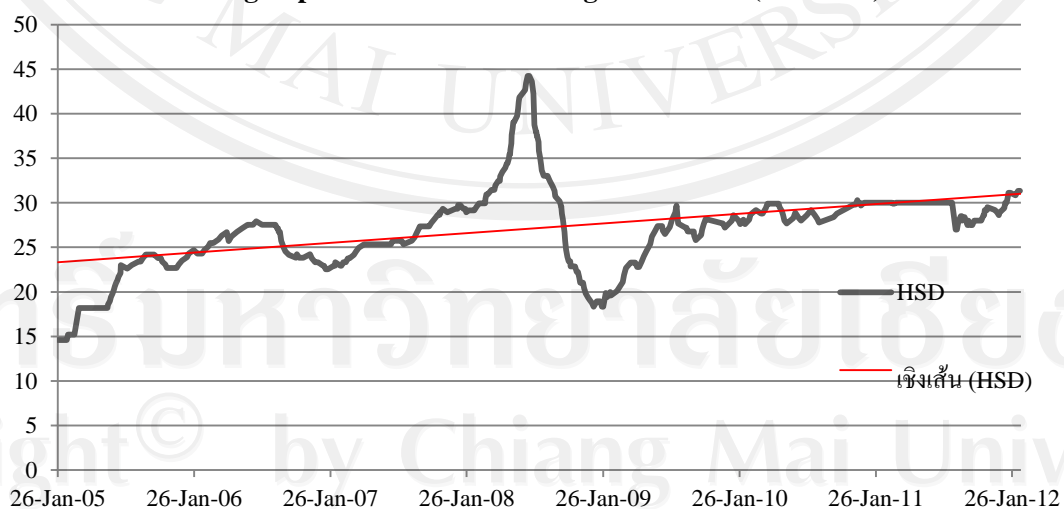


Figure 1-1: High speed diesel price 2005-2012 with trend line

Source: Energy Policy and Planning Office (EPPO), Ministry of Energy, Thailand.

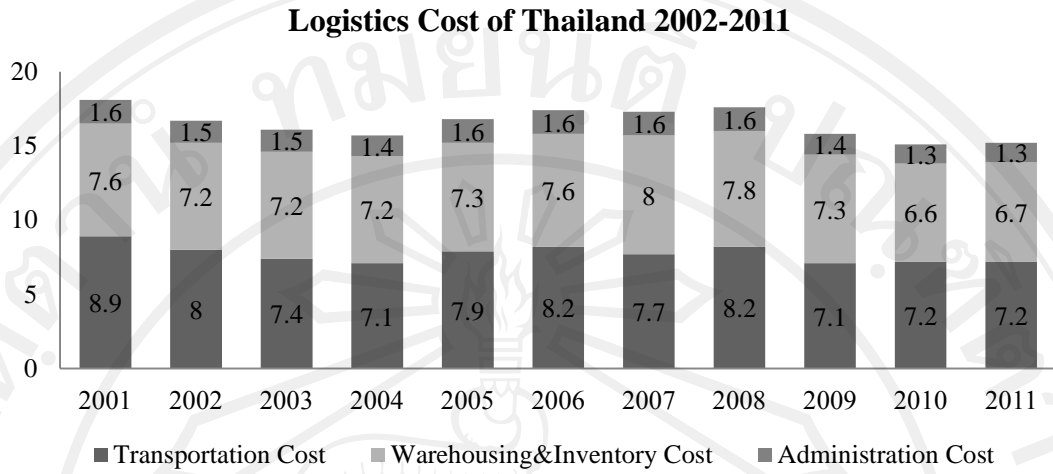


Figure 1-2: Logistics Cost of Thailand during 2001-2011 by Logistics Cost Type  
**Source:** Thailand Logistics Report 2011, Office of the National Economic and Social Development Board

### Proportional of 3 types of Thailand Logistics Cost per GDP within 2001-2011

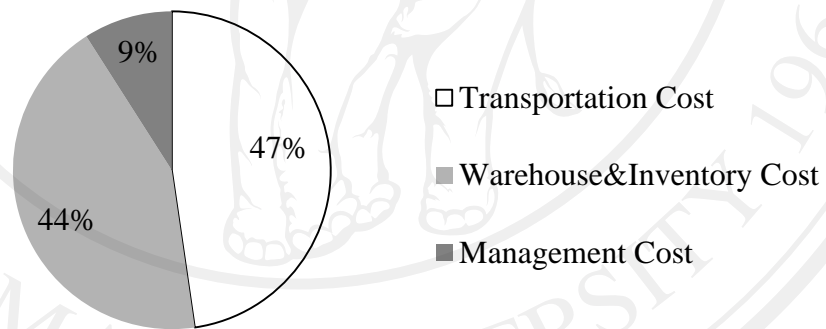


Figure 1-3: Proportional of 3 types of Thailand Logistics Cost per GDP within 2001-2011  
**Source:** Thailand Logistics Report 2011, Office of the National Economic and Social Development Board

The highest logistics cost of Thailand is transportation cost due to the most widespread transportation mode is road transport. In figure 1-4 displayed the proportional of Thailand transportation mode in 2011, road mode was 83% of all mode and distance that truck (road mode) can make with fuel 5 liters per ton is 100 kilometers less than rail and ship, 230% and 400% respectively (Figure 1-5) this is the answer of why the highest logistics cost is transportation cost. The root cause is road mode is the easiest way to deliver. To develop another Thailand's transportation mode such as create new rail route with high speed train and 2-way rail but for short term solution is reduce fuel consumption of road mode.

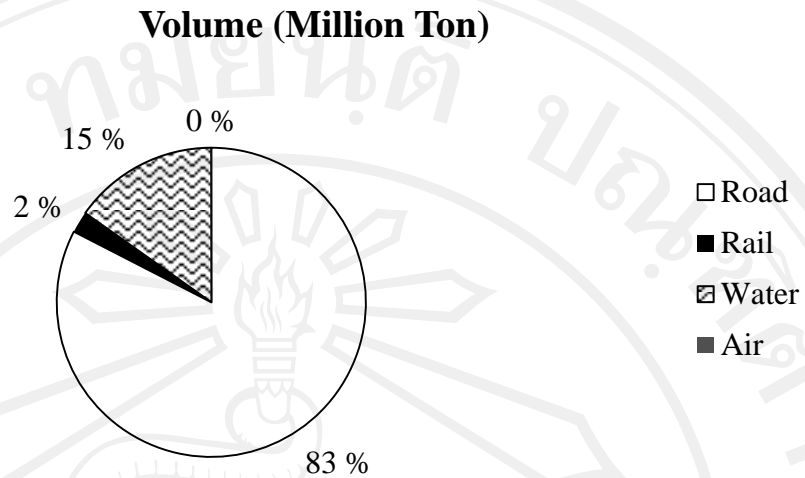


Figure 1-4: Proportional of Thailand domestic transportation mode 2011

Source: (NESDB, 2012)

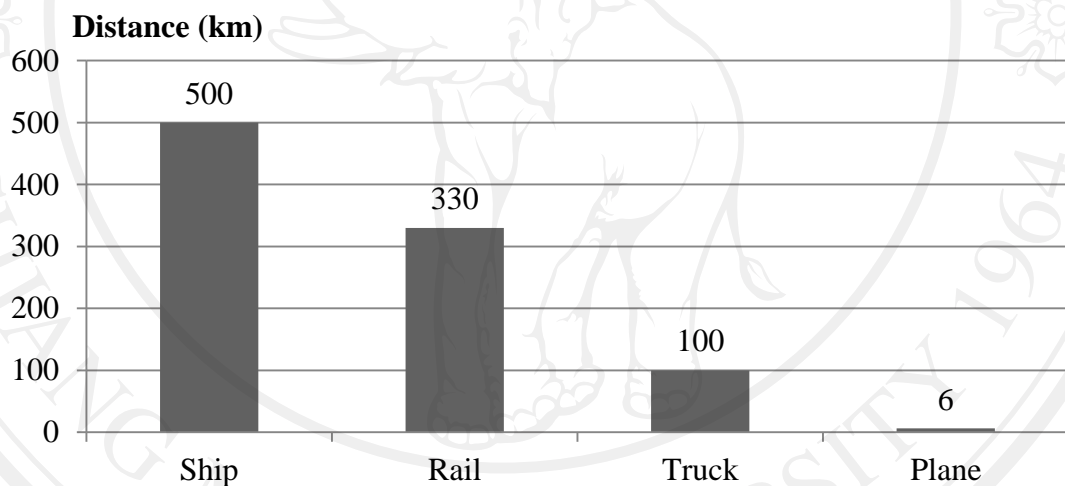


Figure 1-5: Total distance of each mode by fuel 5 liters per ton

Source: (World Bank, 2012)

Modern life style has turned the Thais to eat bakery instead of Thai dishes. Nowadays, bakery is not only an easy choice for breakfast but also becoming a choice for all types of meals i.e. lunch, dinner, snacks and desserts because it is easier to eat, save time during rush hours and provide sufficient nutrients. These factors affected the growth of bakery business. Moreover, the new competitors trying to steal the market share. In franchise marketing the survey results of interest in franchise business investment for 2010 by NC Group Consultants, have been found that the most popular business was bakery (Manager Online ASTV, 2011). In the national perspective, imported bakery mixes and doughs for the preparation of bread, pastry, cakes, and biscuits in Thailand 2011 was THB 87 million and exporting THB 217 million (Parker, 2011). In the Thai domestic market bakery business has a market value about THB 4,000 - 5,000 million. It can be classified into 3 segments by

production and sales i.e. restaurant and bakery business, SMEs or Retail Bakery, and Wholesale Bakery (Prapapun, 2011). In sector of food industry the amount of SMEs accounted 99% of all businesses. A business report said baked product sector ranked in sixth and accounted 4% of all the amount of sub-sectors of food industry (Kenan Institute Asia, 2010). In an international article from business wire website “Research and Markets: Thailand Food and Drink Report Q1 2011” talked about domestic consumer sector of Thailand had high growth potential over 5 years forecast horizon, food consumption up 7% in 2010 and 2015 forecast is up 48% from 2009 (Wood, 2011). The news reports from Thailand expressed about domestic bakery industry in positive. President Bakery Company reported about the 2 billion baht investment for the next 3<sup>rd</sup> bakery manufacture factory to serve the expected market; 5-6 % increased from 2011 (Thanonline, 2012). Likewise, CPRAM Company said their baking product market growth more than 15-17% annually; market value was 7 billion baht (2011), forecast revenue in 2012 is 10 billion baht and in next 5 years will be 20 billion baht (Naewna Online News, 2012).

Small and Medium Enterprises or SMEs in Thailand was playing an important role in the economic system, for example in 2002 contribution of SMEs to GDP is 41%. However, the portion of SMEs contribution to the economy has been declining in 2009 is significant at 38% these revealed that SMEs are having problems adapting with the growth of Thailand’s economic. The most common problem of SMEs in Thailand is the management, using trial and error methods to run their own business (Business Opportunity Center, 2009) (Ecart, 2010).

The bakery SMEs is sensitive to market mechanism, invade easily by foreign bakery/fast food franchise companies or new trendy competitors (Positioning Magazine, 2009). If they want to survive in this situation, they must have continuous improvement of business operations. Not only competitors but also new customers requirement and expectation that come up every day; more convenience, fresh, safety, healthy and reasonable priced. To meet customers satisfaction or “5 Rights” Right Product, Right Place, Right Time, Right Condition and the last vital thing is “Right Cost” (Thiengburanathum, 2010) that should be keep in mind. As mentioned above, 3 types of logistics cost, transportation cost is the most valuable that need to be carefully considered.

From the preliminary study this case was in the second segment “SMEs”, this local brand bakery company had 25 branches, 78 retail customers (October 2011) and 58 drop points. Current fleet of case study had 3 types of truck, 7 of pick-up trucks (Figure 1-6), 8 of medium trucks (Figure 1-7) and 2 large trucks (Figure 1-8). The delivery of 58 drop points was distributed by the previous fleet above with one depot (at manufacturing plant in Chiang Mai). The routing schedule was decided by personal judgment of senior driver without historical data, assessment or results evaluation. This routing schedule method cannot be identified current status performance such as total delivery distance.



Figure 1-6: Pick-up truck



Figure 1-7: Small truck



Figure 1-8: Large truck

The study was also found that the transportation cost took up about 4% of product cost (Calculation based on diesel price at 32.33 Baht per liter). Moreover, the low efficiency transportation system caused hidden costs (maintenance cost, opportunity cost, and damages cost by accidents) that was found from observation and interviewing were delivery schedule unsynchronized with the production line and maintenance team, fatigue of drivers from working overtime, vehicles breakdown, late delivery and high fuel consumption. In order to the delivery of consumer product should be as fast as possible because the fresher the product the better taste. If the routing schedule was low efficiency and make delivery distance and time too long, it forced a driver to drive faster, more stress and fatigue, increased fuel consumption rate, higher risk in an accident, and also caused more chance of vehicle breakdown. While studying this research (3 months), there were 2 accidents happened. The first accident caused from careless driver drove over limit to delivery on-time. The second one consisted from tire blew out.

Finally, after the vehicle routing was completed, the delivery time would be calculated or evaluated and these data could be utilized to synchronized delivery schedules together with production and maintenance scheduling. The preliminary study in related researches were showed that the effective routing schedule and transportation management system can reduce total distance and time of delivery, and can calculate an optimum number of vehicles. More details about literature reviews were in the next chapter. If the transportation system of this case was improved, it will greatly reduce logistics cost, create more opportunities to increase service level, market share, quality of products, and company's reputation. Additionally, other companies within the baked product sectors or any other businesses that have similar business model or transportation system can study and apply these methodologies to their own business and if they are successful in implementation Thailand's logistics cost per GDP would reduce.

## **1.2 Objective**

- 1.2.1 Improving transportation system by optimizing vehicle routing problem in case of with and without crossdocking system.
- 1.2.2 To propose of transportation system plans for transportation cost and time reduction.

## **1.3 Scope**

- 1.3.1 Study and research in Phung Noi Bakery Company Limited.
- 1.3.2 Study and gather data from Department of Information Technology, Transportation, Maintenance, Production, Sales and Purchasing and Business Planning.
- 1.3.3 Optimizing vehicle routing problems of 58 delivery nodes and location selection of crossdocks by Genetic Algorithm.
- 1.3.4 Evaluate the new transportation systems by economic cost benefits analysis.

## **1.4 Expected Benefits**

- 1.4.1 The case study improved competitiveness reputation and reliability by reduction cost and time of transportation.
- 1.4.2 Experience of applying knowledge and skills from classroom to the real case.
- 1.4.3 SMEs in baked product sector that have similar business model can use this framework to apply new transportation system model to their own business to increase delivery efficiencies and effectiveness.