CUSTOMER SATISFACTION WITH PRODUCT TRANSPORTATION: A CASE STUDY OF A THAI DIARY PRODUCT COMPANY

By
DUJLADA SUCHARITKUL

A Final Report of the Six-Credit Course
SCM 2202 Graduate Project

Submitted in Partial Fulfillment of the Requirements for the degree of
MASTER OF SCIENCE IN SUPPLY CHAIN MANAGEMENT

Martin de Tours School of Management
Assumption University
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Martin de Tours School of Management
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Bangkok, Thailand

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and hereby certify that the verbiage, spelling and format is commensurate with the quality of internationally acceptable writing standards for a master degree in supply chain management.

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declare that this thesis/project and the work presented in it are my own and has been generated by me as the result of my own original research.

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CUSTOMER SATISFACTION WITH PRODUCT TRANSPORTATION: A CASE STUDY OF A THAI DIARY PRODUCT COMPANY

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ABSTRACT

While the sweetened condensed milk market grows every year, competition among companies also grows. This study aims to find out how a sweetened condensed milk company brings about the highest customer satisfaction in order to maintain current customers and snatch new customers from the others. This goal consists of three objectives: To analyze the relationship between the transportation efficiency factor and customer satisfaction in the sweetened condensed milk market, to identify the most important factor of transportation efficiency that affects customer satisfaction, and to know the current level of customer satisfaction on product delivery services as well as the customer's perception of the transportation efficiency factors.

To meet the study's requirements, a questionnaire survey was designed. Samples were randomly selected from customers of The Thai Dairy Industry Co., Ltd. The questionnaires were distributed and collected by salespersons of the company. Regression analyses as well as other statistical techniques were performed using the Statistical Package for the Social Sciences program.

The results indicate a significant impact of transportation service quality and information on customer satisfaction. Responsiveness of the transportation service shows the highest impact on customer satisfaction. Furthermore, product transformation information, assurance, empathy, and reliability of the transportation service also provide a significant impact on customer satisfaction. However, the administration factor was found to have no significant relationship with customer satisfaction.

Finally, The Thai Dairy Industry Co., Ltd. can use these results to manage the budget for improving customer satisfaction by giving greater importance to the product transportation factor and following these recommendations. The Thai Dairy Industry Co., Ltd. should make a decision to improve the responsiveness of its transportation service by training its salespeople about the importance of paying attention to

customers and increasing their ability to be ready to react in a suitable or positive way. The information technology related to product transportation should be improved. Such improvements could involve varied ordering channels, a product monitoring system, and an emergency notification system. The company should ensure that its salespersons have adequate product knowledge to be able to give advice to customers and persuade customers to trust and have confidence in the company in order to improve the assurance of transportation. The Thai Dairy Industry Co., Ltd. should train its salespersons to ensure that they empathize with the transportation service, give customers individual attention, and try to understand the needs of their customers.

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DUJLADA SUCHARITKUL

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CHAPTER I

GENERALITIES OF THE STUDY

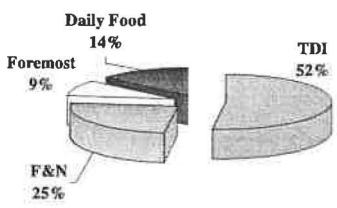
This chapter consists of nine generalities of this study such as background of the study, statement of problem, and research objectives. These generalities explain the importance of the study in both the researcher's and company's views. Furthermore, objectives and definition terms are written in this chapter as well.

1.1 Background of the Study

Sweetened condensed milk has been a part of the Thai life style for a long time. It is produced from fresh milk, sugar and vegetable oil. There are several ways to consume the product in various places such as in the household, bakery shop, restaurant, and so forth. Some beverage vendors use it as a key ingredient to make coffee, cocoa, tea and also other beverages. The wide use of sweetened condensed milk makes its distribution important. The countrywide distribution of the product to many kinds of customers is usually done. The success of distribution significantly affects company's market share as this is a highly competitive industry. And poor distribution of the product would affect customer satisfaction and tend to lower the competitive advantage of the firm.

Currently, there are four major competitors in sweetened condensed milk industry: Daily Foods, F&N Dairies, Foremost, and The Thai Dairy Industry Co., Ltd (TDI). The Thai Dairy Industry Co., Ltd. has the biggest share of fifty two percent which is about three thousand million baht. The market share of this business is illustrated in Figure 1.1.

Figure 1.1 Market share of sweetened condensed milk



Source: Disyawanawat, 2009

There are fourteen famous brands of sweetened condensed milk in Thailand, shown in Table 1.1. These brands are sold in all store types such as supermarkets, hypermarkets, convenient stores and even traditional grocery stores. Some brands are recognized by most customers because of their TV advertising. However, some brands are known only in some local areas based on word of mouth.

Table 1.1: Sweetened condensed milk brands

Company	Brand
The Thai Dairy Industry Co., Ltd.	Mali Sweetened, Orchid Sweetened, Birdwings Sweetened
F&N Dairies	Bear Brand Sweetened, Carnation Sweetened, Tea Pot Sweetened
Foremost	Falcon Sweetened, My Boy Sweetened, Ship Sweetened
Dairy Food	Palace Sweetened, Khom Kha (Tesco Lotus), Tesco (Tesco Lotus), Aro (Makro), Leader Price (Big C)

Source: Disyawanawat, 2009

1.2 Statement of the Problem

Not only does the sweetened condensed milk market grow every year, competition among the companies also grows. Since the number of customers is limited, all companies have to compete with each other to earn as much market share as they can. As such, customer satisfaction is very important in this business. The company generating the highest satisfaction of customers would be able to maintain existing customers and also snatch new customers away from the others. As the nature of this product is not really different across brands, product substitution across brands can occur at any time. Thus, to satisfy customers, not only is product qualification needed but qualified product delivery should also be given greater focus. With several product choices, customers would prefer the right product with the right quality and quantity at the right time.

Many dairy companies face the problem of customer dissatisfaction and lose their customers because of their poor transportation quality. Improvement of product transportation has to become a main concern. The best way to use a limited budget efficiently is to focus on the factors that significantly influence the satisfaction of the customers. As such, the question: "How does transportation factors affect customer satisfaction with the product delivery process?" should be clarified.

1.3 Research Objectives

In order to improve the dairy company's customer satisfaction, an analysis of the relationship between the transportation factor and customer satisfaction is required. The results of this research will achieve the following objectives:

1 To analyze the relationship between the transportation efficiency factor and customer satisfaction in the sweetened condensed milk market.

2 To identify the most important factor of transportation efficiency that affects customer satisfaction.

3 To know the current level of customer satisfaction with the product delivery service as well as the customer perception of the transportation efficiency factors.

1.4 Scope of the Research

There are four major dairy companies in the Thai dairy product market. In this research, The Thai Dairy Industry Co., Ltd. Co., Ltd. or TD has been selected to be a case study because this company holds the biggest market share at about 52% of the sweetened condensed milk market. Samples of this study will be sampled from TDI's customers. Questionnaire has been selected as the research instrument. Data from the questionnaire survey will be analyzed using a statistical process to identify the

relationship between transportation efficiency factors and customer satisfaction in the sweetened condensed milk market.

1.5 Limitations of the Research

In business, there are many factors affecting customer satisfaction. Some factors are directly related to each customer such as gender, age, and occupation. Some are environmental factors such as competitive goods, economics, and weather. However, some factors concern the responsibility of industries themselves such as quality of goods, promotion, price, convenience, and advertisement. However, this study focuses on industry factors which can be improved by the industry and relate to customer satisfaction only. As there are many unpredictable factors affecting customer satisfaction, some factors which are not included in this research may cause errors and imperfection in the results.

As each manufacturer has its own unique characteristics, the data obtained from the customers of only one manufacturer may be not able to represent the whole industry and might be inaccurate to generalize to other industries.

The variation of customer satisfaction may not reflect reality since only the factors of transportation efficiency are considered as the determinants of the satisfaction.

1.6 Significance of the Study

TDI would benefit from results of this study. It can augment its customers' satisfaction in order to maintain its market share and expand its customer numbers. These results are the benefits of improving product transportation which is delivered by TDI salespersons as agents of the company. It is important for TDI salespersons to communicate with customers to know what the customers are concerned about when they purchase the products. This information will help TDI to generate the highest customer satisfaction.

1.7 Case Study Background

In 1962, THE THAI DAIRY INDUSTRY CO., LTD. (TDI) was set up. This company is a joint venture between Malaysian and Thai investors with the Australian Dairy Corporation and was granted investment promotion by the Board of Investment (BOI). The goal of this company was to produce dairy products which would meet international standards to improve the health of Thai consumers.

In 1965, the first factory in Thailand to manufacture sweetened condensed milk was launched by the company's factory in Samutprakarn province. The "Mali" brand name was introduced to the dairy market for the first time. "Mali" has become a part of the Thai daily life style subsequently. The brand extension of "Mali" achieved through the launch of new products into the market was successful. A new, larger and more advanced plant has been constructed to take the company into the next century with a steady growth in demand through the years.

TDI's first production plant in Samutprakarn province had reached its full capacity after several modifications and expansions. At this point, the Company decided to construct a new, fully-equipped factory worth over THB 1.3 Billion, which was granted investment promotion privileges by the BOI. The new plant is built at a strategic location in the Bang Pa-in Industrial Estate in Ayutthaya province on a 115,200-square-meter plot. Opened at the end of 1997, to meet high consumer demand and to supply products of the highest possible quality, the company employs the latest technologies for milk product processing in its new factory.

The TDI factory is one of the largest fully integrated dairy processing facilities in Asia. The company ranks as the biggest producer of sweetened condensed milk, both in terms of production volume and sales in Southeast Asia. At the heart of the Bang Pa-in plant is an integrated production system with a Process Line Control (PLC) and a comprehensive fully automated production system for the various products of the company. The production process is carefully monitored by nutrition experts and food

scientists to ensure that exacting standards are followed and the packaged end products are of supreme quality.

The TDI continues to invest in new technology, equipment and human resources in its unceasing drive to develop new ones for the ultimate benefit of the children, cooks and everyone that rely on TDI for delicious and healthy as a part of Thai life style.

Figure 1.2 Product transporting vehicle

For product delivery, TDI uses a single distribution center at its factory. Each TDI salesperson visits his customers with their ordered products. The period of time a salesperson takes to complete his trip is up to the number of products because he has to go back to TDI when he runs out of products. The average trip is about twenty days except within Bangkok and suburban areas where the trip is shorter. However, each salesperson makes use of outsourced transportation in cases where the product order is large. Figure 1.2 shows TDI's product transporting vehicle.

1.8 Definitions of Terms

Company administration is the performance or management of company operations.

Customer satisfaction is a measure of how products and services supplied by a company meet or surpass customer expectation. It is seen as a key performance indicator within business.

Information Technology is the scientific knowledge of computer systems for collecting, storing and sending out all kinds of information.

Product information is knowledge or facts about the product.

Service quality is what customers want or is that service providers can deliver their services to customers. The good delivery of services will create customer satisfaction and customer relations, which result in customer retention and, consequently, customer loyalty will be established.

Sweetened condensed milk is cow's milk from which water has been removed and to which sugar has been added, yielding a very thick, sweet product that can last for years without refrigeration if unopened.

TDI stands for The Thai Dairy Industry Co., Ltd.

Transportation efficiency factor is one of the things that influence the ability to transport the product well.

1.9 Summary

The advantage of this study is that it will be useful for TDI. The results will serve the objectives. The significance of transportation factors affecting customer satisfaction will be found and it will be predicted how they affect that satisfaction. And the efficiency of the budget invested in transportation will increase as customer satisfaction will increase at the same time.

CHAPTER II

REVIEW OF RELATED LITERATURE AND RESEARCH FRAMEWORKS

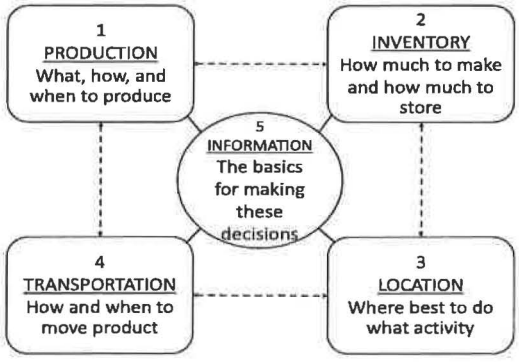
In this chapter, some related literature and studies are reviewed. Because customer satisfaction with transportation is part of the supply chain, a short review of the distinction and relationships between supply chain, logistics, and transportation is first presented. Then, transportation efficiency factors including company administration, product transformation information, and service quality as well as customer satisfaction are reviewed.

2.1 Distinction between Supply Chain, Logistics, and Transportation

2.1.1 Supply Chain

Frazelle (2002) described that the supply chain is the network of facilities (e.g. warehouses, factories, terminals, ports, stores, and home), vehicles (e.g. trucks, trains, planes, and ships), and logistic information systems or LIS connected by an enterprise's suppliers and its customers. He also noted that logistics is what happens in a supply chain. Hugos and Thomas (2006) suggested that there are five major supply chain drivers as shown in Figure 2.1.

Figure 2.1: The five major supply chain drivers



Source: Hugos and Thomas (2006, p. 7)

2.1.2 Logistics

Logistics is the process of planning, implementing, and controlling the efficient, effective flow, and storage of goods, services, and related information from point of origin to point of consumption in order to meet customer requirements according to the Council of Logistics Management's definition (Minahan, 1996). The logistics is one part of the supply chain and is like the supply chain's subset. This process is not concerned about production and inventory but it includes transportation.

2.1.3 Transportation

Transportation is like the life line of a supply chain (Blanchard, 2007). Hence, without transportation, there is no supply chain. According to Webster (2008), there are five main transportation modes, for instance truck, air, rail, water, and pipeline. He also noted that truck is the most dominant transportation mode due to its low fixed costs compared to other modes. Fuel, labor, usage taxes, and tolls costs make up the majority of trucking expenses. Over 70 percent of all goods in the U.S. in 2004 were transported on truck costing about $509 Billion (Blanchard, 2007).

In conclusion, a supply chain is a system starting from production to product consumption, while logistics is a process in the supply chain that involves moving something effectively by combining transportation with related information.

2.1.4 Importance of Transportation in Logistics

Coyle, Bardi, and Langley (1996) suggested that transportation has six main roles in logistics, which are:

1. It bridges the buyer and seller gap. Conceptually, a transportation link enhances the flow of goods between various fixed points and provides a connection between buyer and seller. Transportation, therefore, is very important for a company to be highly efficient. The transportation carrier used by the company is a very important factor indicating the efficient supply chain operation as well as the company's competitive edge and product demand.

2. It increases the value added. In today's global economy, operating a firm without the aid of transportation is inconceivable as most companies are divorced from theirs supply sources. Transportation adds the value to the firm by creating time and place utility. Hence, the value added is the movement of goods to the place desired and at the desired time.

3. It relates to global impact. International transportation today connects buyers and sellers that are quite far away from one another resulting in higher transportation costs as well as higher storage costs.

4. It has an important effect on the economy. Considering the transportation cost of the U.S. in 1993, it cost about 6.26 percent of the U.S. GNP (Coyle et al., 1996). In 2004, U.S. companies spent approximately 5.5 percent of the U.S. GDP with respect to the transportation of goods (Webster, 2008).

5. It is a very important issue for a company. According to a report quoted in Coyle et al. (1996), the outbound transportation cost amounted to 3.09 percent of total sales or about 39.0 percent of total distribution costs. Hence, if the company can reduce transportation cost, it would enhance its competitive edge.

6. It enhances the cost-service trade-off. Choosing the appropriate mode of transportation is very decisive for cost reduction. For example, truck is the most dominant transportation mode stemming from the vast road network throughout the world. Pickup can deliver goods from truck to locations not accessible by other modes (Webster, 2008).

2.2 Transportation Efficiency Factors

Efficiency of transportation refers to how well the transportation of goods or passengers is. Development of transportation should increase transportation efficiency in the same time (Apiprachyasakul, 2007). It can be described in many ways such as transporting without making a mistake, wasting time and energy. Previous studies

suggested that there are several factors that can provide some impacts on customer satisfaction. However, only three transportation-related factors have been commonly mentioned in previous researches. These factors can be called "transportation efficiency factors." The first of the three major transportation efficiency factors is administration which includes flexibility of administration, personnel capability, and collaboration (Hugos & Thomas, 2006). The second is information which covers information technology, sufficiency of information, and update of information (Closs, Goldsby, & Clinton, 1997). Furthermore, transportation service quality is considered a third part and increases transportation efficiency also (Gould, 1995). Details of each factor are described below.

2.2.1 Administration

Hugos and Thomas (2006) stated that supply chain management requires simultaneous improvements of internal operation efficiencies. This may imply that good administration is needed in the company.

There are many factors affecting the supply chain such as product price, customer demand, and transportation cost. These factors produce many kinds of situation, so efficient transportation should be able to change in order to suit different situations or conditions (Bowersox, 2003). The administration should be flexible. It will be good for both the company and customer. For example, the company can provide more salespersons during the high season or periods of peak customer demand and so forth.

Furthermore, logistics, supply chain, and transportation are important topics. The rapid growth of the global economy requires a great number of competent personnel. However, there are few numbers of people who specialize in this field (Bowersox, 2003). Hence, administration can be enhanced with high personnel capability.

2.2.2 Information

Communication is one of the most important behavioral aspects in business life. Based on literature studies and observations, Mintzberg (1973) suggested that

managers spend about 75 percents of their working hours in conferences, face-to-face-meetings and telephone calls. In particular, cross company interactions with customers and suppliers were extraordinarily time-consuming (Mintzberg, 1973). Håkånsson (1975) found that Swedish purchasers dedicated about 20 percent of their time to external communication with suppliers. Recently, cross-cultural research has shown that purchasers spend about 30 percent of their working hours on external communication with suppliers (Large, Kovács, Davis, & Halstead-Nussloch, 2003). Supplier management is especially a time consuming task in purchasing. Supplier management can be described as the external part of the purchasing management process that plans, implements and controls the business relationships with suppliers.

According to the Council of Logistics Management, the definition of supply chain management is "the process of planning, implementing, and controlling the efficient, effective flow, and storage of goods, services, and related information from point of origin to point of consumption for the purpose of conforming to customer requirements" (Minahan, 1996, p. 48). The information is a mechanism for successful supply chain management. It is necessary especially for product transportation because it supports all transportation cooperation and communication.

Sorat (2007) suggested that there will be no efficient transportation without using a transport information system. This indicates that technology plays an important role in today's transportation and logistics. The transport information system will facilitate the flow of data among senders, service providers, and receivers.

Frazelle (2002) explained logistics activities stating that all activities always transfer information to related activities in logistics. Insufficiency of information from any activity will affect other activities and cause economic loss. A strong information aspect means that information has to be sufficient for making a decision in every activity.

Bowersox (2003) summarized information in a logistical system as being information that is transferred in the system continuously. Information sent in transportation

should be updated for business planning also because transportation factors are costly and influence business profit.

2.2.3 Service Quality

Service quality indicates the level of how good a service is. Parasuraman, Zeithaml, and Berry (1985) found that expectations and perception of service quality are affected by the following ten dimensions: 1) reliability, 2) sensibility, 3) competitiveness, 4) accessibility, 5) politeness, 6) communicability, 7) credibility, 8) safety, 9) understanding and consumer commitment, and 10) tangibility. In 1988, they revised these dimensions into five dimensions which are: 1) responsiveness, 2) reliability, 3) empathy 4) assurance, and 5) tangibility. This is the best known service quality theory that has been applied to many industries. In the transportation context, five PZB's dimensions could be applied. The details can be discussed as indicated below:

2.2.3.1 Responsiveness

Responsiveness is theattention paid to a customer and ability to be ready to react in a suitable or positive way. Parasuraman et al. (1988) stated that responsiveness includes the pleasure to service a customer quickly. Responsiveness is important especially in emergency situations because it requires ready personnel to handle the situation immediately.

2.2.3.2 Reliability

Coyle et al. (1996) suggested transportation reliability relates to the operating efficiency. For customers, reliability influences their decision to consume almost every product. Reliability can be increased or decreased by product advertising and the consuming experience. The company can express reliability in many ways: keeping a promise, servicing the right customer requirement, and being on time.

This dimension can be measured by delivery performance. Khairur, Hayati, and Tan (2007) explained one measurement of delivery performance in the supply chain is

DIFOT. This stands for Delivered In Full On Time. DIFOT failure is measured from the opinion of a customer. The calculation of DIFOT is shown below.

$$DIFOT = 1 - \frac{(OTNIF + NOTIF + NOTNIF)}{(\text{Total Number of Orders})}$$

Where

OTNIF = Delivered On Time Not In Full

NOTIF = Delivered Not On Time In Full

NOTNIF = Delivered Not On Time Not In Full

The order is only considered successful when it achieves the promised service level. It has to be taken into consideration that delivery earlier than the promised date is considered not on time and more than the required quantity is also considered not in full, and both of these criteria are categorized as failure. If there is an order with more than a single item, failing on any single item will cause the whole order to be categorized as unsuccessful.

The concept of DIFOT is applied in this study. However, only indirect measurement of this concept is utilized. Customers' perception of reliability of the product transportation service is designed.

2.2.3.3 Empathy

Empathy is the ability to imagine how another person is feeling and thus understand his/her mood (Oxford, 2004). There are many kinds of customers. Some customers do not have enough experience in their business, while some lack business information. These customers need empathy from transportation companies or salespersons to take care of and advise them. For example, it is better if a salesperson can offer help before a customer requests it.

2.2.3.4 Assurance

Parasuraman et al. (1988) suggested assurance is one service quality measurement. A customer has problems sometime, so salespersons or staff should have enough

knowledge or ability to give them advice and help them. As knowledge is developing all the time, a company should support its salespersons to study and improve their knowledge. Furthermore, assurance can impress and persuade customers to be loyal to company.

2.2.3.5 Tangibility

Tangibility in product transportation means the infrastructure of transportation companies such as buildings and vehicles (Parasuraman et al. 1988). It does not mean infrastructure only, but also refers to visible service quality also such as cleanliness and perfection of the packages delivered. This dimension is easy to distinguish while customers receive products, so this is what usually leaves an impression of good or bad service on the customer.

Furthermore, safety and quality of goods are important also. Customers are usually serious about safety in product transportation because the risk is the cost of their business. On the other hand, safe product transportation can reduce the insurance costs (Joanna, Artur, and Andrzej, 2009). For the quality of the goods, it is wasted if transported products are broken. Most customers make a decision to select better goods quality (Bechtel & Jayaram, 1997).

2.3 Customer Satisfaction

Most customers are quite sensitive and are always mindful of a company's service quality. Their satisfaction usually is not stable and difficult to be measured. Customer satisfaction is important for every company as it causes customers to make a decision to consume a product or service. There are many customer satisfaction definitions in varied dimensions.

Satisfaction, in particular supplier satisfaction, is defined and operationalized in various ways (Benton & Maloni, 2005; Andaleeb, 1996; Ganesan, 1994). Benton & Maloni (2005, p.2) define supplier satisfaction as "the feeling of equity with the relationship no matter what power imbalances exists" and call satisfaction the "over

riding factor" in affecting the future of a supply chain partnership. Scheer and Stern (1992, p.133) describe satisfaction as "the overall approval of and positive affect towards the other party". Wong (2000, p.428) state about the relationship between dissatisfied suppliers and buyer's performance that "If suppliers are dissatisfied, their contributions might not be the best, which can in turn influence the buyer's performance".

Furthermore, research on supplier satisfaction in buyer–supplier relationships is scarce and primarily of a conceptual nature (Benton & Maloni, 2005). Measuring customer satisfaction with products is regarded problematic as the measurement can be inaccurate or even misleading (Ross, 2006). However, customers and suppliers should be able to provide valid perceptions of the effectiveness of supplier-customer linkages (Tan & Tracey, 2007, p.7).

2.3.1. Customer Satisfaction Definitions

Craig (2003, p. 1), suggested that "Customer satisfaction can mean virtually anything. It can involve such variables as price, lead time, conformance, responsiveness, reliability, professionalism, and convenience". These previous listed variables are what people most often think of as product quality what the product does and how it looks.

Pisanbutr (2006, p. 8) explained the meaning of customer satisfaction as "satisfaction when the customer received their satisfied product or service in limitations of vender or server and service objectives".

Scott (2009, p. 1) suggested that "Customer satisfaction measures how well a company's products or services meet or exceed customer expectations. These expectations often reflect many aspects of the company's business activities including the actual product, service, company, and how the company operates in the global environment. Customer satisfaction measures are an overall psychological evaluation that is based on the customer's lifetime of product and service experience."

In conclusion, customer satisfaction means the preference a customer develops from consuming required products or services. It involves varied factors such as price, lead time, conformance, responsiveness, and reliability.

2.3.3 Importance of Customer Satisfaction

Many world-class firms have adopted a supply chain perspective in many dimensions of business. Such a business philosophy requires that trading partners "jointly plan, execute, and co-ordinate logistical performance" (Bowersox, 1991). Sharing of information and plans provides the potential to make channels more efficient and competitive (Closs et al., 1997; Daugherty et al., 1996; Ellram & Cooper, 1990; Gopal & Cypress, 1993).

Within the customer satisfaction literature, this is referred to as "voice of the customer". Listening to customers and responding to their requests should have a "pay off" in terms of more satisfied and more loyal customers. Customer satisfaction involves keeping customers happy both in day-to-day interactions and long-term perspective (Hunt, 1977; Johnson & Fornell, 1991).

The competition pressures the firms to identify customer requirements and develop their strategies which allow them to meet the service levels provided by competitive vendors (Verwijmeren, Van der Vlist, & Van Donsellar, 1996). Such customer-oriented contacts typically mention on determining relevant dimensions of service or products as well as an assessment of the customers' perceptions of how well the producing firm can meet those expectations (Sterling & Lambert, 1987).

However, it is not sure that greater customer contact related to customer loyalty. Loyalty has been defined as a long-term repurchasing about both repeated patronage and a favorable attitude (Dick & Basu, 1994). The development, maintenance, and enhancement of customer loyalty represent a fundamental marketing strategy in order to attain competitive advantage (Gould, 1995; Kotler, 1988; Reichheld, 1993).

Some researches address that issue by examining the two dimensions of customer loyalty - commitment to the relationship (favorable attitude) and repurchase intentions (repeat patronage). Repurchase intentions encompass the customer's perceptions of continuity expectations such as relationship renewal (Kumar, Scheer, & Steenkamp, 1995) and the customer's willingness to recommend the supplier to a successor (Cronin & Morris, 1992). Commitment exists only when a committed partner wants the relationship to continue indefinitely, when the relationship is considered important, and when the partner is prepared to work at preserving it (Morgan & Hunt, 1994).

In conclusion, Scott (2009) gave the importance of customer satisfaction that effective marketing focuses on two activities: retaining existing customers and adding new customers. Customer satisfaction is a strong predictor of customer retention, customer loyalty and product repurchase, so the measures about it are critical to the product or service company (Scott, 2009).

2.4 Research Framework and Hypotheses

Every company needs good administration for supporting the other parts to make as much company benefit as possible. Hugos and Thomas (2006) stated that supply chain management requires simultaneous improvements of internal operation efficiencies. Customer benefit may be involved with company administration because he needs good administration too. So, company administration should have a relationship with customer satisfaction. Thus the following:

Hypothesis 1: The company's administration has a relationship with customer satisfaction.

Information Technology or IT is an effective tool for distributing product information to customers. Because the business situation usually changes over time, a customer has to get correct information quickly through the support of information technology.

It is wasted if the customer gets information quickly from high information technology but it is not enough for making a decision. Each customer needs many details for his business such as product data and market trends. The latest information is also important for a customer to win over his business competitors because it suggests how to adjust to a situation. In the case of an urgent situation, a customer needs the information immediately.

The customer has to know many details of product transportation in order to plan and manage his business. Good companies should provide product data for their customers. So, product transportation information should have a relationship with customer satisfaction.

Hypothesis 2: Product transformation information is positively related to customer satisfaction.

A customer should not feel satisfied with the best product that comes with poor service. Sometimes, service quality is prioritized as higher than product quality in term of its importance, if both qualities meet the standard. So, service quality should have a positive relationship with customer satisfaction. However, service quality is composed of five dimensions which are reliability, assurance, tangibility, empathy, and responsiveness.-Thus the following hypotheses are made:

Hypothesis 3: Reliability of the transportation service is positively related to customer satisfaction.

Hypothesis 4: Assurance of the transportation service is positively related to customer satisfaction.

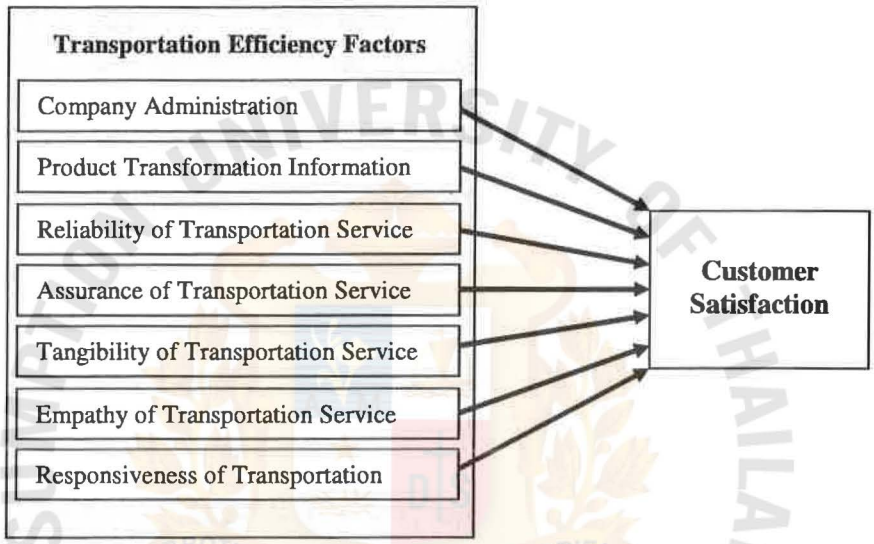
Hypothesis 5: Tangibility of the transportation service is positively related to customer satisfaction.

Hypothesis 6: Empathy of the transportation service is positively related to customer satisfaction.

Hypothesis 7: Responsiveness of the transportation service is positively related to customer satisfaction.

Based on the previous literature, the research framework can be proposed in Figure 2.2 as follows:

Figure 2.2: Research framework



2.5 Summary

There are many transportation efficiency factors but they can be arranged and grouped into three major factors: company administration, product transformation information, and service quality which is composed of reliability, assurance, tangibility, empathy, and responsiveness of the transportation service. These transportation efficiency factors are expected to impact customer satisfaction. As such, their details were discussed and there relationships were hypothesized in this chapter.

CHAPTER III

RESEARCH METHODOLOGY

This study is a survey research that attempts to examine the relationship of customer satisfaction and transportation efficiency factors. Population and sampling process is firstly discussed. Then, measurements of the transportation efficiency factors and customer satisfaction are explained in the questionnaire development section. Data collection plan is described. Finally, data analysis and multiple regression analysis process are discussed. The details of each stage are in the part that follows.

3.1 Population and Sample

The population of this study is customers of The Thai Dairy Industry Co., Ltd. which are totally 557 customers all over Thailand including Bangkok. The numbers of customers categorized by provinces are shown in Table 3.1.

Table 3.1 Number of TDI's customers in each province

Province	No.	Province	No.	Province	No.	Province	No.
Chiangmai	17	Trad	4	Puttalung	4	Samutprakarn	10
Cheangrai	14	Tak	16	Pichit	13	Samutsakorn	8
Pechaboon	6	Nakhorn Prathom	4	Pitsanulok	7	Samutsongkram	2
Pechburi	16	Nakhorn Panom	2	Phuket	7	Srakaew	9
Leay	5	Nakhorn	14	Mahasarakam	1	Saraburi	6
Prae	11	Rachasrima		Mukdaharn	5	Singhburi	6
Krabi	3	Nakhorn	6	Yasothorn	2	Sukhothai	12
Bangkok	62	Srithammarat		Yala	9	Supanburi	13
Kanchanaburi	10	Nakhorn Sawan	15	Royed	7	Surachthani	8
Kalasin	2	Nonthaburi	2	Ranong	7	Surin	7
Kumpangphet	3	Narathiwat	3	Rayong	6	Nongkhay	3
Konkean	13	Nan	3	Rachaburi	4	Nongboulumphu	1
Janthaburi	7	Burirum	11	Lobburi	3	Ayathaya	6
Chacheungchoa	6	Pathumthani	3	Lumpang	10	Aungthong	6
Chonburi	7	Phajoub Kirikun	18	Lumpun	3	Udonthani	8
Chainad	2	Prachenburi	5	Srisaket	3	Utharadit	10
Chaiyabhum	5	Pattani	3	Sakonnakorn	3	Uthaithani	6
Chumporn	8	Payao	4	Songkha	10	Ubonrachathani	8
Trung	8	Pungnga	4	Satoon	2	**Total**	**557**

Source: The Thai Dairy Industry Co., Ltd., 2009

Because the number of the population is known in this study, Yamane (1967) suggested a sample size of a known population number can be calculated from Yamane's formula. So, the sample size of this study is calculated as follows:

$$n = \frac{N}{1+Ne^2}$$

where n = Sample size

N = Population size

e = Precision or error limit which is set as 5%

Hence $$n = \frac{557}{1+557(0.05)^2}$$

$$= 233$$

As such the sample size would be 233 customers countrywide. The entire population will be divided to into groups, namely Bangkok, Central, North, South, and Northeast. Each group will have a sample amount portion the same as the customer number portion. Samples will be interviewed by questionnaires randomly.

First, a proportional stratified sampling process is applied by area of customers. The study dairy company has all 557 customers in five areas. In order to ensure that the sample represents all customers, a sample number will correlate with product sale volume ratio. The ratio of each area is calculated from the sale volume in each area divided by the total annual sale volume. Finally, the number of the sample in each area is calculated from the area ratio multiplied with the total sample number. Details of the sample number are shown in Table 3.2.

Table 3.2 Sample number in each area

Area	Annual Sale Volume	Proportion (Area sales: total sales)	Samples
North	310,460	19.53%	45
Central	356,560	22.42%	52
South	303,590	19.09%	45
North-East	501,758	31.56%	73
Bangkok	117,682	7.40%	18
Total	1,590,050	100%	233

Then, random process will be applied to sample the customers. A certain number of customers of the sample number in each area will be sampled randomly to answer the questionnaire. Details of the provinces in each area are shown in Table 3.3.

Table 3.3 List of provinces in each area

Bangkok	Central	South	North-East
Bangkok	Aungtong	Chumporn	Burirum
North	Ayuthaya	Krabi	Chaiyapoom
Chainat	Chacheasow	Nakornsrithammarach	Kalasin
Cheangmai	Cholburi	Narathiwat	Khonkean
Cheangrai	Jantaburi	Phuket	Leay
Kumpangpeth	Kanchanaburi	Prajoubkirikun	Mahasarakarm
Lumpang	Lopburi	Pudtalung	Mukdaharn
Lumpoon	Nakornpathom	Pudtani	Nakornpanom
Nakornsawan	Nonthaburi	Pungnga	Nakornrachasrima
Nan	Patumthani	Ranong	Nongboulumpu
Payouw	Pechburi	Satloon	Nongkhay
Pijit	Prajenburi	Saurachthani	Pechabuln
Pisanuloak	Rachburi	Songkla	Roeyed
Prae	Rayong	Trung	Sakaew
Sakhothai	Samutprakarn	Yala	Sakolnakorn
Tak	Samutsakorn		Srisaket
Utaradit	Samutsongkram		Surin
Uthaithani	Singhburi		Ubonrachathani
	Supanburi		Udonthani
	Trad		Yasothon

3.2 Questionnaire Development

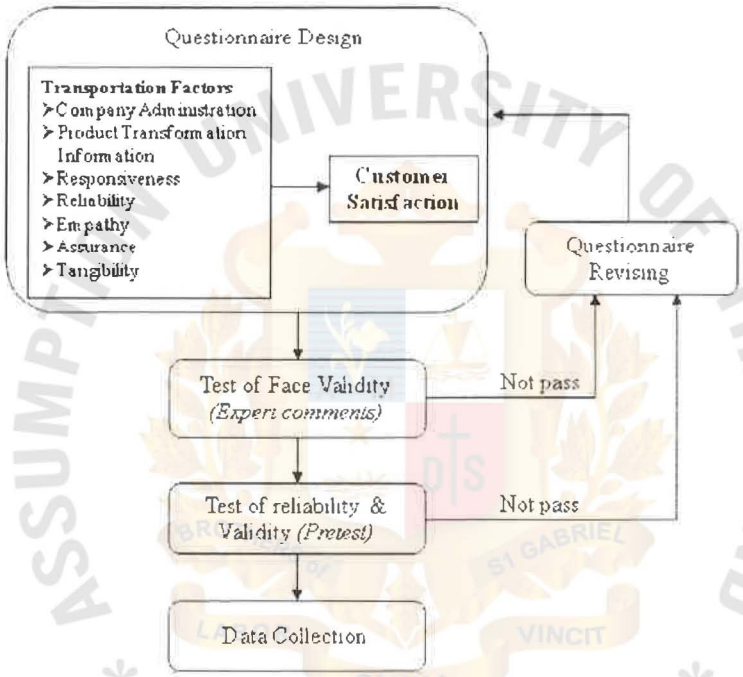
3.2.1 Questionnaire Development Process

A questionnaire will be used as a research instrument. Questions in the questionnaire can be categorized into three parts: retail information, transportation efficiency factors experience, and customer satisfaction opinion.

This process will start with a review of literature. The question items are modified from a model questionnaire in European Primer on Customer Satisfaction Management (EIPA, 2008). Face validity of the questionnaire is verified by the

product manager and assistant general sales manager of The Thai Dairy Industry Co., Ltd. Then, to pre-test, thirty three sets of the questionnaire are distributed to the customers. The reliability and discriminate validity are verified via the Cronbach's alpha coefficient analysis, item-to-total analysis and factor analysis. The details are shown in Figure 3.1.

Figure 3.1: Questionnaire development process



3.2.2 Questionnaire Complements

The research instrument in this study is a questionnaire which is composed of two parts:

Part I: This is a questionnaire about personal data in check-list form which has five questions.

Part II: This is the questionnaire part about product transportation data in rating scale form with four topics and thirty three questions. There are seven rating levels following the Likert Method. These rating levels are 1 for strongly disagree, 2 for very much disagree, 3 for disagree, 4 for no opinion, 5 for agree, 6 for very much agree, and 7 for strongly agree.

3.3 Pre-Testing and Pretest Results

Before collecting all data, some samples are interviewed for collecting pre-test data in order to test reliability. The process for collecting pre-test data is the same as research data collection with the cooperation of TDI salespersons. These pre-test samples are thirty three customers. This pre-test data is important for analyzing how reliable the questionnaire in the research is.

3.3.1 Reliability

The reliability test is an analytical technique to measure accordance and similarity of data collecting tools such as questionnaire, counter, and capacity meter. This technique measures reliability of the tool base on the hypothesis that the result of using the tool many times will get similar results. In this research it is used to analyze the questionnaire.

The reliability score is measured by Cronbach's alpha. This score should exceed a value of 0.70. However, a 0.60 score can be accepted in general research. It should be raised when the number of items increases (Hair et al, 2006).

The reliability analysis of thirty three questionnaires is presented by Cronbach's Alpha as shown in Table 3.4. Furthermore, the reliability of all product transportation efficiency factors and customer satisfaction variables exceeds the minimum reliability requirement.

Table 3.4 Reliability analysis results

Variable	Cronbach's Alpha
Administration	0.943
Transformation Information	0.956
Service Quality	0.960
Responsiveness	0.927
Reliability	0.849
Empathy	0.980
Assurance	0.985
Tangibility	0.876
Customer Satisfaction	0.932

3.3.2 Validity

Factor analysis is performed in order to measure data validity. It is measured by the Kaiser-Meyer-Olkin (KMO) statistics. The KMO predicts whether data are likely to factor well based on correlation and partial correlation. The variables which lack of multicollinearity can be identified by KMO in order to drop them from analysis. KMO value varies from 0 to 1.0. Overall KMO should be .50 or higher to proceed with factor analysis in any study (Joseph, 2006). Furthermore, a statistically significant Bartlett's test of Sphericity (Sig. > .05) indicates whether sufficient correlations among the variables for proceeding (Joseph, 2006).

The factor analysis result of this study data is presented by a KMO value of 0.755 and Bartlett's test (Chi-Square = 99.768; Df = 6; Sig. = 0.000). These results confirm enough data validity and sufficiency to proceed. Details of the KMO and Bartlett's test is shown in Table 3.5.

Table 3.5 KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.755
Bartlett's Test of Sphericity	Approx. Chi-Square	99.768
	Df	6
	Sig.	.000

Any decision on the number of factors to be retained should be based on several considerations. First, factors with Eigenvalues should be greater than 1.0. Enough factors should meet a specified percentage of variance explained and cumulative initial Eigenvalues usually meet 60% or higher. In this research, 29 variables were analyzed by factor analysis and the result can group all variables into seven components or factors. These seven components cover 78.955 % of the initial Eigenvalues which is more than the minimum requirement as shown in Appendix C.

Table 3.6 Rotated component matrix[a]

Factors	Component						
	1	2	3	4	5	6	7
Administration_1	0.920						
Administration_2	0.927						
Administration_3	0.945						
Transportation_1		0.810					
Transportation_2		0.899					
Transportation_3		0.747					
Reliability_1							0.823
Reliability_2							0.724
Reliability_3							0.678
Assurance_1						0.818	
Assurance_2						0.725	
Assurance_3						0.834	
Assurance_4						0.724	
Tangibility_1				0.719			
Tangibility_2				0.802			
Tangibility_3				0.605			
Tangibility_4				0.782			
Tangibility_5				0.804			
Tangibility_6				0.532			
Tangibility_7				0.544			
Empathy_1			0.877				
Empathy_2			0.841				
Empathy_3			0.748				
Empathy_4			0.816				
Empathy_5			0.682				
Responsiveness_1					0.863		
Responsiveness_2					0.845		
Responsiveness_3					0.870		
Responsiveness_4					0.890		

The rotated component analysis was performed in Table 3.6. It indicated that there is no variable that should be eliminated because of being in more than one group. So, this study can use all variables to analyze seven study factors.

3.4 Modification of the Questionnaire

After the questionnaire has been designed and distributed for pretest, comments from the pretest and the results were used to adjust the questionnaire. Most pretest comments are about duplicated questions and an excessive number of questions. Furthermore, Cronbach's alpha and Exploratory Factor Analysis (EFA) results show the importance of questionnaire modification.

The questionnaire has been adjusted by merging similar questions together and reducing the question group. The adjusted questionnaire features administration, product transportation information, and service quality.

3.5 Data Collection

The questionnaires are distributed to sample customers by the company's salesmen with survey explaining as planned. Each sample will answer all questions in the questionnaire depending on his or her attitude. After all questionnaires are filled out, they will be gathered and return to researchers. The data collecting processes can be summarized by following these processes.

1) Salespersons of TDI taking care of sample customers will be contacted for the questionnaire survey.

2) The contacted salespersons will be invited to a meeting about the questionnaire and for data collecting explanation.

3) The questionnaires will be distributed to samples by the salespersons.

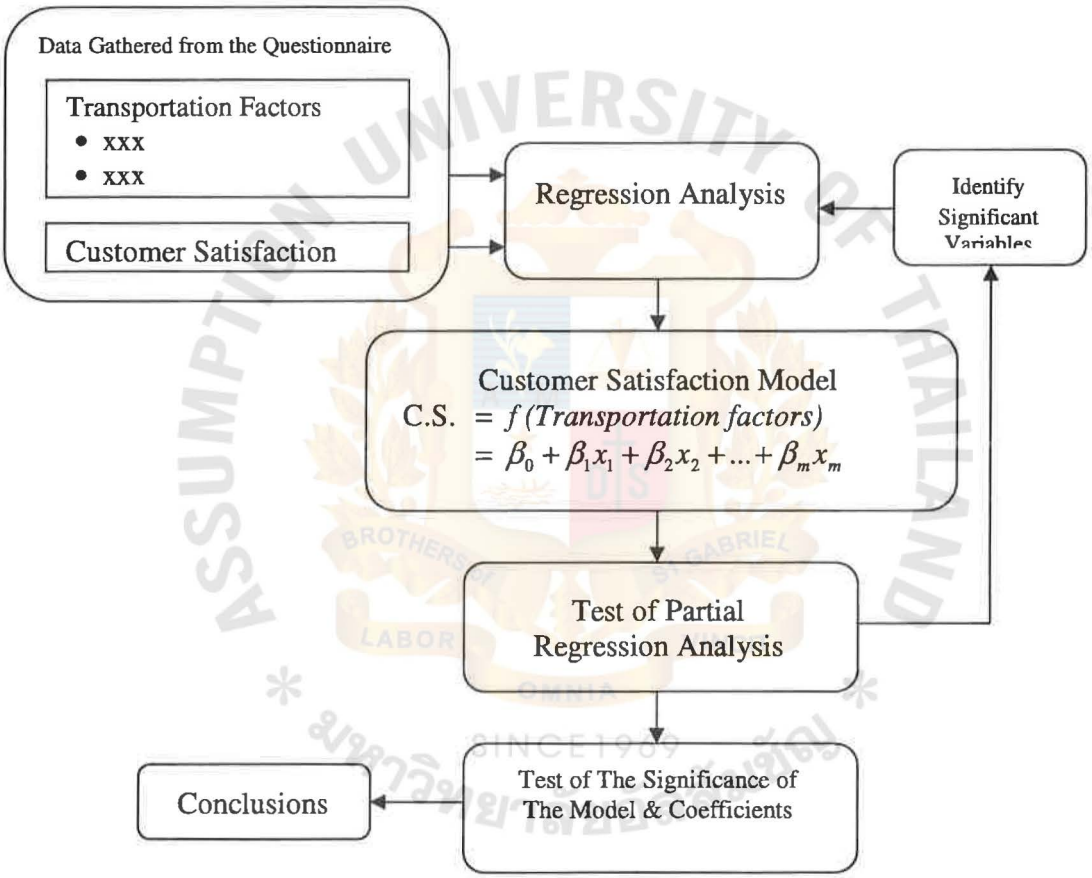
4) Answered questionnaires will be checked and input into a computer system for statistical analysis.

3.6 Data Analysis Plan

3.6.1 Data Analysis Process

The regression analysis is employed to test all of the hypotheses and to predict the relationship between each transportation efficiency factor and customer satisfaction. The data analysis process is illustrated in Figure 3.2.

Figure 3.2 Data analysis process



3.6.2 Statistics in Data Analysis

This study selects the statistical application program SPSS for analyzing collected data from the questionnaire survey which will be transformed to a number. In order to analyze the data, these few steps will be processed.

1) Personal data of the sample from Questionnaire Part I which is in check list form will be calculated by the frequency method and concluded.

2) Rating of transportation factors and customer satisfaction rating data will be analyzed by the regression method in order to produce a satisfaction model.
3) Significance of the regression model will be tested by F-Test.
4) Coefficient of regression will be tested by t-Test.
5) Results of the calculation will be concluded to present a relationship between transportation factors and customer satisfaction.

3.6.3 Multiple Regression Analysis

According to Wanishbhuncha (2007, p.295) multiple linear regression is a study of the relationship between three or more variables. The objectives of multiple regression analysis are estimation and forecasting one variable value from the other variables which are known before. The relationship between variables can be formed as:

$$y_i = \beta_0 + \beta_1 x_{1,i} + \beta_2 x_{2,i} + ... + \beta_m x_{m,i} + \varepsilon_i$$

where

y_i = dependent variable
$x_{m,i}$ = independent variable
β_0 = y-axis interception
β_m = regression coefficient of x_m
ε_i = random error

3.6.4 Test of Significance of the Regression Model

According to Wanishbhuncha (2007, p.302) standard deviation of regression from estimation or forecasting can be tested by the ratio of Mean Square of Regression (MSR) over Mean Square of Error (MSE) or F value.

$$y_i = \beta_0 + \beta_1 x_{1,i} + \beta_2 x_{2,i} + ... + \beta_m x_{m,i} + \varepsilon_i$$

Deviation of y or Sum Square of Total (SST)

$$SST=SSR+SSE$$

where

SSR = Sum Square of Regression

SSE = Sum Square of Error

so

$$SST = \sum_{i=1}^{n} (y_i - \bar{y})^2$$

F value

$$F = \frac{MSR}{MSE}$$

where

$$MSR = \frac{SSR}{k}$$

$$MSE = \frac{SSE}{(n-k-1)}$$

n = number of samples

k = number of independent variables

Standard Deviation of Regression can be tested by the hypothesis that at least one X in an amount of k variables has a relationship with Y.

$$H_0 : \beta_1 = \beta_2 = \ldots \beta_k = 0$$

$$H_1 : \beta_i \text{ at least one} \neq 0 : i = 1, 2, \ldots, k$$

Reject the hypothesis H_0 when $F > F_{k,n-k-1;1-\alpha}$

An accepted H_0 means Y doe not have any relationship with all Xs. On the other hand, a rejected H_0 means there is at least one X that has a relationship with Y. However in the case of a rejected H_0, each regression coefficient needs to be tested by t-Test.

3.6.5 Test of Partial Regression Analysis

According to Wanishbhuncha (2007, p.307) the coefficient of regression should be tested by a t-Test in order to prove the relationship between X_i variable and Y. This test is used for explaining relationships between product transportation factors and customer satisfaction. The hypothesis of this test is shown below.

$$H_0 : \beta_i = 0$$

$$H_1 : \beta_i \neq 0 : i = 1, 2, \ldots, k$$

$$t = \frac{\beta_i - 0}{S_{\beta i}}$$

where

t = t-value

β_i = coefficient of regression

$S_{\beta i}$ = standard deviation of coefficient of regression

Reject the hypothesis H_0 when $t > t_{1-\frac{\alpha}{2};n-k-1}$ or $t < t_{1-\frac{\alpha}{2};n-k-1}$. This means variable X_i has a significant relationship with the dependent variable Y.

Furthermore, partial regression analysis shows the results of the data to support the coefficient value of each factor from the regression process. If any factor does not pass this test, it will not support the results from the study data. On the other hand, if it passes, the results will be accepted at a significant level also.

3.7 Summary

In this research study, all required data is used to design a questionnaire for which reliability is analyzed before distributing it to sample TDI customers. Survey data from samples' filled out questionnaires will be analyzed in order to present the relationship between transportation efficiency factors and customer satisfaction. Factor analysis is performed in order to measure questionnaire validity. Furthermore, Rotated Component Matrix from the factor analysis result eliminates two variables. Finally, the results of study will identify the most important factors of transportation efficiency which affect customer satisfaction.

CHAPTER IV

PRESENTATION AND CRITICAL DISCUSSION OF RESULTS

After the study data has been collected and input into the computer, SPSS Statistics releases a 17.0.0 program that is selected for analyzing the data. In this chapter, collected data was analyzed by descriptive analysis and regression analysis in order to predict a relationship between product transportation efficiency factors and customer satisfaction. Some statistical results were discussed in many dimensions.

4.1 Sample Profiles

This study divides the sample area into five regions: Bangkok, North, North-East, South, and Central. The number of samples in each region is in the same portion as product volume. Samples in each region are selected randomly to fill out the questionnaire. The number of samples in each province is shown in Table 4.1.

Table 4.1 Number of samples in each province

Province	Frequency	Province	Frequency
Bangkok	**18**	**Northeast**	**73**
North	**45**	Srakaew	8
Chiangmai	8	Burirum	10
Cheangrai	5	Royed	5
Lampang	5	Khonkean	11
Sukhowthai	3	Mookdaharn	5
Nakhornsawan	7	Nakhornrachasrima	12
Phijitr	5	Pechaboorn	2
Tak	6	Surin	6
Utaradith	3	Ubonrachathani	7
Pisanuloak	3	Udornthani	7
South	**45**	**Central**	**52**
Prajoubkhirikhan	14	Phechburi	15
Surasthani	5	Chonburi	7
Phuket	5	Kanjanabiri	9
Yala	7	Samutprakarn	9
Trung	7	Supanburi	12
Songkha	7	**Total**	**233**

Most order volume of samples is in 10 to 100 cases per order group which is 39.1 percent. This result shows 78.5 percent of the sample orders is less than 300 cases per order. Details of the order size distribution are shown in Table 4.2.

Table 4.2 Order size

Size (cases/order)	Frequency	Percent
Lees than 10	34	14.6
10-100	91	39.1
101-300	58	24.9
301-500	25	10.7
501-1,000	19	8.2
More than 1,000	6	2.6
Total	233	100.0

This study surveyed sweetened condensed milk brand also. It found that Mali brand from TDI has the highest portion at 18.6 percent of samples which is on shelves while Carnation brand is the second with 14.7 percent. The smallest portion is My Boy brand with 1.5 percent. Detail of the sweetened condensed milk brand survey is shown in Table 4.3.

Table 4.3 Purchased brands

Brand[a]	Responses	
	N	Percent
Mali	210	18.60%
Birdwings	129	11.40%
Orchid	122	10.80%
Carnation	166	14.70%
BearBrand	97	8.60%
TeaPot	29	2.60%
Palace	125	11.00%
MyBoy	17	1.50%
Falcon	108	9.50%
Ship	129	11.40%
Total	1,132	100.00%

a. Dichotomy group tabulated at value 1.

TDI products are delivered by two deliverers: TDI salespersons and outsourced deliverers. Collected data shows 89.7 percent of TDI products were delivered by salespersons, while 9.9 percent were by outsource deliverer (0.4 percent is missing data) as shown in Table 4.4.

Table 4.4 Product deliverer

Deliverer	Frequency	Percent
Salesperson	209	89.7
Outsource	23	9.9
Missing	1	.4
Total	233	100.0

TDI was set up and launched its sweetened condensed milk business more than forty years ago. The majority of customers in this study's samples, 54.5 percent to be exact, have dealt with TDI for more than 5 years. Meanwhile a group of new customers who have dealt with the company for less than 1 year is the smallest group, totaling 4.7 percent. Details of dealing period with TDI are shown in Table 4.5.

Table 4.5 Dealing period

Deal Period	Frequency	Percent
< 1 year	11	4.7
1-3 years	38	16.3
3-5 years	57	24.5
> 5 years	127	54.5
Total	233	100.0

4.2 Hypotheses Testing

Before regression analysis was performed, every factor was described by some descriptive statistics. Simple values of statics in this process are mean and standard deviation. Twenty-nine study variables from the questionnaire were grouped by factor analysis into seven transportation factors. They are company administration, product

transformation information, reliability of transportation service, assurance of transportation service, tangibility of transportation service, emphatic transportation service, and responsiveness of transportation service. Factor descriptive statistics show the average value and deviation of factor value. Details of the descriptive statistics of all factors are shown in Table 4.6.

Table 4.6 Descriptive statistics

Factor	Mean	Std. Deviation	N
Satisfaction	4.9052	1.08968	233
Administration	4.6918	.91279	233
Information	4.2847	1.37350	233
Reliability	5.3966	1.03513	233
Assurance	4.8103	1.01830	233
Tangibility	4.4483	1.15384	233
Empathy	4.7716	.81770	233
Responsiveness	4.7103	.89916	233

All transportation factors were analyzed using a regression analysis in order to predict a relationship between customer satisfaction and product transportation factors. This analysis formed a customer satisfaction model. There are some statistical tests about this model which have acceptable results.

There is a model fit test by multiple coefficient of determination or R^2. This value can explain the changing of a dependent variable in the model. If it is close to 1, it indicates that the model fits well with the data. On the other hand, if it is close to 0, it shows that the model is not related to the data. However, if it is higher than 0.7, it shows the model is acceptable because it can explain 70 percent of the raw data. In this study, the model from regression analysis has a 0.738 R^2 value which is acceptable because it is higher than 0.7. Details of the regression analysis results are shown in Appendix C.

The relationship between customer satisfaction and product transportation factors in this model was tested by the F-test. Results of the analysis of variance (ANOVA)

shows the F value is 94.082 at a significant level value of 0.000. This means there is a relationship between customer satisfaction and the product transportation factors in this model. Details of the analysis of variance are shown in Appendix C.

This study formed a customer satisfaction model from the coefficient results. It is useful for predicting customer satisfaction from product transportation factors which are owned by the dairy company. This model shows the amount of the relationship between each factor and the satisfaction also. Details of the coefficient of product transportation factors are shown in Table 4.8. The satisfaction model is shown in the following equation:

$$Y=0.063 + 0.155X_1 + 0.209X_2 + 0.233X_3 + 0.404X_4$$

Where

Y	=	Customer Satisfaction
X_1	=	Product Transportation Information
X_2	=	Assurance of Transportation Service
X_3	=	Empathy of Transportation Service
X_4	=	Responsiveness of Transportation Service

A test of partial regression analysis was performed with the t-test. Each factor was tested in order to confirm the relationship between it and customer satisfaction. The t-test result shows four factors were accepted at the 0.05% significance level or 95% level of confidence because they have a significant value less than 0.05. They are product transformation information factor, assurance of transportation service factor, empathy of transportation service factor, and responsiveness of transportation service factor.

Furthermore, the remaining three factors are not accepted. These are administration, reliability of transportation service, and tangibility of transportation service because administration and tangibility of transportation service factors are not supported by the data while reliability of the transportation factor is marginally significant. Details of partial regression analysis test are shown in Table 4.7.

Table 4.7 Partial regression analysis results

Predictors	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	.063	.257		.244	.807
Administration	.043	.060	.037	.720	.472
Product Transformation Information	.155	.053	.195	2.894	.004
Reliability of Transportation Service	.132	.065	.141	2.033	.043
Assurance of Transportation Service	.209	.059	.195	3.558	.000
Tangibility of Transportation Service	-.128	.053	-.111	-2.404	.017
Empathy of Transportation Service	.233	.072	.183	3.244	.001
Responsiveness of Transportation Service	.404	.075	.331	5.404	.000

a. Dependent Variable: Customer Satisfaction
b. F-value is 94.082 and Significant value is 0.001
c. R= 0.865
d. $R^2 = 0.738$

4.3 Relationship of Product Transportation Factors and Customer Satisfaction

From previous statistical calculating results, customer satisfaction can be explained by its relationship with product transportation factors. The greatest relationship factor which affects customer satisfaction is a responsiveness of transportation service which has a 0.331 standardized coefficient value or Beta. It may be caused by the characteristic of Thais who desire responsible salespersons to take care of them.

The second and third most affective factors are product transformation information and assurance of transportation service as they have equal Betas at 0.195. Product transformation information is important for both customer satisfaction and TDI because it is concerned with all related information from point of product origin to point of consumption for the purpose of conforming to customer requirements.

For assurance of the product transportation service, the significant objective of assurance is trust of the customer in TDI transportation. Although the customers

cannot be aware of it with their eyes, they can feel it from salesperson activities and manner. This factor is the responsibility of the salesperson to do something in order to motivate customers to trust TDI transportation.

The forth affective factor is empathy of the product transportation service. The empathy coefficient value shows the importance of service care, giving priority to customer benefit and concerning customer requirements. Besides this, customers are satisfied with salespersons that provide excellent service. This means TDI has a greater chance of expanding its market share from better empathic service.

Furthermore, reliability of the transportation service has marginal support for its relationship with customer satisfaction. It shows that customers are little concerned about the company's trust. However, customer satisfaction will increase, if reliability of the transportation service increases.

On the other hand, customers almost do not care about company administration. It may be that customers care about the achievement of their requirements only and administration is considered to be an internal process in TDI which has little effect on customers.

Finally, the tangibility of transportation service coefficient is negative. This result assures that most of TDI's customers do not pay attention to the cleanliness of the truck, the dress and the characteristics of the salespersons. This may be because they are not end customers who consume the products but the one who sell products to the end customers. This means TDI's customers care about the profit from the sale of these products without considering minor parts like tangibility of the transportation such as perfection of packaging and perfection of product labels.

Statistical analysis results are used to render results for all seven hypotheses. Some hypotheses are supported by these results while some hypotheses are not supported. These results are then judged based on the coefficient value or Beta and significant level of t-test. The hypothesis results summary is shown in Table 4.8.

Table 4.8 Hypothesis results

Hypotheses	Relationships	Results
1	The company's administration has a relationship with customer satisfaction.	Not supported
2	Product transformation information is positively related to customer satisfaction.	Supported
3	Reliability of the transportation service is positively related to customer satisfaction.	Marginally supported
4	Assurance of the transportation service is positively related to customer satisfaction.	Supported
5	Tangibility of the transportation service is positively related to customer satisfaction.	Not supported
6	Empathy of the transportation service is positively related to customer satisfaction.	Supported
7	Responsiveness of the transportation service is positively related to customer satisfaction.	Supported

Based on the hypothesis results, there is no support for a relationship between the company's administration and customer satisfaction because its significant value is over 0.05 or its confidence level is under 95 percent. It does support a positive relationship between product transformation information and customer satisfaction because its significant value is under 0.05 and its standardized coefficient value is positive at 0.195. It marginally supports that reliability of the transportation service is positively related to customer satisfaction because its significant value of 0.043 is close to 0.05 and its standardized coefficient value is positive at 0.141. And there is support for a positive relationship between the assurance of the transportation service and customer satisfaction as well.

Furthermore, that tangibility of the transportation service is positively related to customer satisfaction is not supported because its standardized coefficient value is negative at -0.111 while its significant value is 0.017 which is accepted at the 95

percent level of confidence. The results support that empathy of the transportation service is positively related to customer satisfaction because its significant value is under 0.05 and its standardized coefficient value is positive at 0.183. The results also confirm that responsiveness of the transportation service is positively related to customer satisfaction because its significant value is under 0.05 and its coefficient value is positive at 0.331.

Finally, based on the analysis results, the responsiveness of service quality factor is identified as the most important factor of transportation efficiency which affects customer satisfaction. It has a 0.331 Beta, which means when every responsiveness is increased one unit, customer satisfaction will increase 0.331 units also. On the other hand, if TDI loses responsiveness one unit, TDI will lose customer satisfaction of 0.331 units as well.

4.4 Summary

As part of the study, the relationship between the transportation efficiency factor and customer satisfaction in the sweetened condensed milk market was analyzed. This is shown in following customer satisfaction model:

$$Y=0.063 + 0.155X_1 + 0.209X_2 + 0.233X_3 + 0.404X_4$$

Where

Y	=	Customer Satisfaction
X_1	=	Product Transportation Information
X_2	=	Assurance of the Transportation Service
X_3	=	Empathy of the Transportation Service
X_4	=	Responsiveness of the Transportation Service

All variables from the collected data could be transformed into seven factors which have different relationships with customer satisfaction. The customer satisfaction model could be built from these factors. This model can explain over 70 percent of the collected data.

CHAPTER V

SUMMARY FINDINGS, CONCLUSIONS AND RECOMMENDATIONS

This chapter provides a summary of findings, conclusions and recommendations of the study results. This chapter consists of four sections: The first section is the study summary, while the second section is a conclusion of the study, the third is a recommendation of the study, and the last section is a suggestion for further study.

5.1 Conclusions

Responsiveness of the transportation service is identified as the most important factor of transportation efficiency which most affects customer satisfaction. A customer expects a TDI salesperson to always be available for him, to provide service overtime, to service professionally, and to service as fast as he can.

Next priorities of the product transportation factors for customer satisfaction are product transformation information and assurance of transportation service. For product transformation information, customers expect TDI to make possible the ordering of products from various channels such as internet, fax, and mobile phone. For assurance of the transportation service, customers expect a TDI salesperson to have sufficient knowledge about the product, to provide high quality of service, and to provide a certain product delivery service.

The fourth priority of product transportation factors for customer satisfaction is empathy of the transportation service. Customers expect a TDI salesperson to give priority to their benefit, to be concerned about their requirements, and to service them with care.

The fifth priority of product transportation factors for customer satisfaction is the reliability of the transportation service. Customers expect the product delivery service not to be late or fail.

The product transportation factor with the least priority for customer satisfaction is company administration. The customers do not mind the administration of transportation procedures. This factor is about clear administration, the speed with which decisions of the company regarding the product transportation are made, and the availability of the administrative team to serve in emergency situations.

The customers almost disregard tangibility of the transportation service altogether. Examples of tangibility of the transportation services are a salesperson with good character, clean delivery trucks, complete and perfect packaging, and complete and perfect product labels because most study customers do not consume the product but instead sell them to their own customers and other consumers.

5.2 Recommendations

TDI should make a decision to give greater importance to the responsiveness of its product transportation especially because it is most important for customer satisfaction. TDI can improve this factor by training its salespersons to be available for customers, to be pleased to work overtime, to provide service as fast as they can, and to render service professionally.

The factors of product transformation information and assurance are next in importance. TDI should pay attention to improving information technology in its product transportation making use of options such as varied ordering channels for customer, a product monitoring system, and an emergency notification system. For the assurance factor, TDI should train its salespersons about product knowledge, how to offer high quality service, how to gain customer trust in TDI, and providing certain delivery services.

TDI should give more priority to empathy of the transportation factors as the fourth in terms of priority. The empathy coefficient value shows the importance of service care, giving priority to customer benefits, and being concerned about customer requirements. TDI should provide training to its salespersons in order to improve empathy and can also punish those who violate these policies and give special rewards for salespersons that are emphatic or achieve reliability standards.

TDI should make the reliability of transportation service factor its fifth priority. The results show that customers have almost no degree of concern for the company's administration. Thus, TDI should not change its administration in order to increase customer satisfaction because customers do not care about the administration. They care about the end result of their orders only.

5.3 Further Study

There are many factors that affect customer satisfaction. New factors are waiting to be found by further researchers. These factors could be built from correct variables which provide more correctness and more result accuracy. Future researchers should review previous studies both in the study area country to determine guidelines and an international study for varied dimensions of the study.

BIBLIOGRAPHY

Andaleeb, S. S. (1996). An experimental investigation of satisfaction and commitment in marketing channels: The role of trust and dependence. *Journal of Retailing*, 72 (1), 77–93.

Apiprachyasakul, K. (2007). *Logistics and Supply Chain Management: Strategy for Cost Reduction and Profit Increasing.* Bangkok: CY System Printing.

Bechtel, C., & Jayaram, J. (1997). Supply chain management: A strategic perspective. *The International Journal of Logistics Management,* 8 (1), 15–34.

Benton, W. C., & Maloni, M. (2005). The influence of power driven buyer / seller relationships on supply chain satisfaction. *Journal of Operations Management,* 23 (1), 1–22.

Blanchard, D. (2007). *Supply Chain Management Best Practices.* NJ: John Wiley & Sons.

Bowersox, D. J., Closs, D., & Cooper, M. B. (2003). *Supply Chain Logistics Management.* McGraw-Hill. p. 45.

Bowersox, D. J. (1991). *Improving the logistics/marketing/sales interface.* Annual Conference Proceedings, vol. I, Council of Logistics Management, Oak Brook, IL, pp. 243-255.

Closs, D. J., Goldsby, T., & Clinton, S. R. (1997). *Information technology influences on world class logistics capability.* Int. J. Physical Distribution & Logistics Management 27 (1), 4-17.

Coyle, J. J., Bardi, E. J., & Langley, C. J. (1996). *The Management of Business Logistics.* MN: West Publishing Company.

Craig, C. (2003). *Customer Satisfaction: Tools, Techniques, and Formulas for Success.* Paton Professional, p. 1.

Cronin, J. J., Morris, M. H. (1992). Satisfying customer expectations: The effect on conflict and repurchase intentions in industrial marketing channels. J. *Academy of Marketing Science,* 56, 55-68.

Daugherty, P. J., Ellinger, A. E., & Gustin, C. M. (1996). Integrated logistics: Achieving logistics performance improvements. *Supply Chain Management: An International Journal*, 1 (3), 25-33.

Dick, A. S., Basu, K. (1994). Customer loyalty: Toward an integrated conceptual framework. J. *Academy of Marketing Science,* 22 (2), 99-113.

Disyawanawat, V. (2009). *Condensed Milk Retail Index February 2009.* Bangkok: The Nielsen Company.

Ellram, L. M., & Cooper, M. C., (1990). *Supply chain management, partnerships, and the shipper-third party relationship.* Int. J. Logistics Management 1 (2), 1-10.

European Institute of Public Administration (EIPA) (2008). *European Primer on CUSTOMER SATISFACTION MANAGEMENT.* Maastricht, Netherlands.

Frazelle, E. (2002). *Supply Chain Strategy: The Logistic of Supply Chain Management.* NY: McGraw-Hill.

Ganesan, S. (1994). Determinants of long term orientation in buyer–seller relationships. *Journal of Marketing,* 58(2), 1–19.

Gopal, C., & Cypress, H. (1993). *Integrated Distribution Management: Competing on Customer Service, Time and Cost.* Irwin, Burr Ridge, IL, p. 1.

Gould, G. (1995). *Why it is customer loyalty that counts (and how to measure it).* Managing Service Quality 5 (1), 15-19.

Hair, J., Black, B., Babib, B., Anderson, R., & Tatham, R. (2006). *Multivariate Data Analysis*. Upper Saddle River, NJ: Pearson Prentice Hall. 6th edition.

Håkånsson, H. (1975). *Studies in industrial purchasing with special reference to determinants of communication patterns*. Ph.D. dissertation, Uppsala.

Hugos, M., & Thomas, C. (2006) *Supply Chain Management in the Retail Industry.* NJ: John Wiley & Sons.

Hunt, H. K. (1977). *CS/D - overview and future research directions. In: Keith Hunt, H. (Ed.), Conceptualization and Measurement of Consumer Satisfaction and Dissatisfaction*, Marketing Science Institute, Cambridge, MA.

Joanna, S., Artur, D., & Andrzej, N. (2009). *Management Systems for the Safe Transportation of Food in the Light of National and International Standards.* Proceedings of the 6th International Scientific Conference TRANSBALTICA 2009.

Johnson, M. D., & Fornell, C. (1991). *A framework for comparing customer satisfaction across individuals and product categories*. J. Economic Psychology 12 (2), pp. 267-286.

Joseph, F. H. (2006). *Research Methods for Business.* New York: Wiley.

Khairur, R., Hayati, H., & Tan, C. H. (2007). *An Improvement to the Performance Measurement System of the Logistics Operation*. The Institute of Engineers, Malaysia. Vol. 68, No. 2 p 42.

Kotler, P. (1988). *Marketing Management: Analysis, Planning and Control*, Prentice-Hall, Englewood Cliffs, CA. 6th edition.

Kumar, N., Scheer, L. K., Steenkamp, J. E. M. (1995). The effects of supplier fairness on vulnerable resellers. J. *Marketing Research,* XXXII, 54-65.

Large, R., Kovács, Z., Davis, S., Halstead-Nussloch, R. (2003). *Internationaler Vergleich der Internet-Nutzung im Beschaffungsmanagement*. Ergebnisse einer Befragung von Beschaffungsmanagern in Deutschland, Ungarn und den USA. Zeitschrift fur Betriebswirtschaft 73 (10), 1103–1123.

Min, S., & Mentzer, J. T. (2004). Developing and measuring supply chain management concepts. *Journal of Business Logistics,* 25 (1), 63–99.

Minahan, T. (1996). *Contract Logistics: Hype vs. Reality. Purchasing* 120(3), pp. 48-58.

Mintzberg, H. (1973). *The Nature of Managerial Work*. New York, 1973.

Morgan, R. M., Hunt, S. D. (1994). The commitment-trust theory of relationship marketing. *J. Marketing,* 58, 20-38.

Oxford University. (2004). *Oxford ESL Dictionary*. Hong Kong: Oxford University Press.

Parasurman, A., Zeithaml, A. V., & Berry, L. L. (1985). A Conceptual Model of Service/Quality and Its Implications for Future Research, *Journal of Marketing*, 49, 99-104.

Parasuraman, A., Zeithaml, A. V., & Berry, L. L. (1988). SERVQUAL: A multiple-item scale for measuring consumer perceptions of service quality. *Journal of Marketing*, 64 (Spring), 12-40.

Pisanbutr, S. (2006). *Customer Satisfaction Measurement*. Bangkok: Wittayapath.

Reichheld, F. F. (1993). *Loyalty-based management*. Harvard Business Review 71, 64-73.

Ring, P. S., & Van de Ven, A. H. (1994). Developmental processes of cooperative interorganizational relationships. *Academy of Management Review,* 19 (1), 90–118.

Ross, D. F. (2006). The intimate supply chain. *Supply Chain Management Review,* 10 (5), 50–57.

Scheer, L. K., & Stern, L. W. (1992). The effect of influence type and performance outcomes on attitude toward the influencer. Journal *of Marketing Research,* 29(1), 128–142.

Scott, M. S.(2009). *How to measure customer satisfaction: Customer Satisfaction theory.* Retrieved on May 28, 2009, from http://www.aboutsurveys.com/how-to-measure-customer-satisfaction-satisfaction-measurement-and-theory/

Sorat, T. (2007). *How to Apply Logistics and Supply Chain Management.* Bangkok: Prachumthong Printing.

Sterling, J. U., & Lambert, D. M. (1987). *Establishing customer service strategies within the marketing mix.* J. Business Logistics 8 (1), 1-30.

Tan, C. L., & Tracey, M. (2007). Collaborative new product development environments: Implications for supply chain management. *The Journal of Supply Chain Management,* 43(3), 2–15.

Verwijmeren, M., Van der Vlist, P., & Van Donsellar, K. (1996). *Networked inventory management information systems: Materializing supply chain management.* Int. J. Physical Distribution & Logistics Management 26 (6), 16-31.

Wanishbhuncha, K. (2007). *Statistical Analysis: Statistics for management and research.* Bangkok: Chulalongkorn University.

Webster, S. (2008). *Principles and Tools for Supply Chain Management.* NY: McGraw-Hill.

Wong, A. (2000). *Integrating supplier satisfaction with customer satisfaction.* Total Quality Management 11(4/5/6), 427–432.

Yamane, T. (1967). *Elementary Sampling Theory.* USA: Prentice Hall.

APPENDICES

APPENDIX A:

Questionnaire (English Version)

Product Transportation Questionnaire

Dear Business Owners/Managers/..../Executives:

This questionnaire is a part of the research study entitled "Customer Satisfaction with Product Transportation: A Case Study of A Thai Dairy Product Company" which is currently being carried out by Ms.Dujlada Sucharitkul, a master degree candidate in Supply Chain Management at Assumption University, Thailand.

The research focuses on the relationship between transportation factors and customer satisfaction. The results obtained from this study would improve the dairy company's budget management in order to expand the market share and profit.

As an owner of a retail store would apply the results of his business with profound knowledge and extensive experience in the industry, your participation and valuable information will be very beneficial to this study. Please complete the questionnaire by giving answers that best represent your opinion in all sections. This questionnaire consists of two sections: Customer Data and Quality of Product Delivery Service. It takes about ten minutes to finish. Please be assured that your response will be kept strictly confidential and that only aggregate results will be reported.

Thank you very much for your time and information, your contributions are highly appreciated.

Sincerely yours,

Ms. Dujlada Sucharitkul
Master Degree Candidate,
MSM School of Management, Assumption University

Part I: Customer Data

1. Location of your business: _____ (province).
2. Which sweetened condensed milk do you sell or consume? You can select more than one answer.
   ☐ Mali ☐ Birdwings ☐ Orchid ☐ Carnation
   ☐ Bear Brand ☐ Tea Pot ☐ Palace ☐ My Boy
   ☐ Falcon ☐ Ship ☐ Other, specify.....
3. On average, how many cases of sweetened condensed milk do you order (per order)?
   ☐ Less than 10 ☐ 10-100 ☐ 101-300
   ☐ 301-500 ☐ 501-1,000 ☐ More than 1,000
4. Who delivers the products to you?
   ☐ Salesperson ☐ Outsource company ☐ Other, specify.....
5. How long have you dealt with THE THAI DAIRY INDUSTRY CO.,LTD?
   ☐ Less than 1 year ☐ 1 to 3 years ☐ 3 to 5 years
   ☐ More than 5 years

Part II: Quality of Product Delivery Service

Please mark ✓ in the box that best explains your perception toward the quality of product delivery service of The Thai Dairy Industry Company Limited.

Factors of transportation efficiency	Strongly Disagree ← → Strongly Agree						
	1	2	3	4	5	6	7
1. Administration							
1.1 Transportation procedures administration of The Thai Dairy Industry Co., Ltd. is clear.	1	2	3	4	5	6	7
1.2 The decision of The Thai Dairy Industry Co., Ltd. regarding the product transportation is fast	1	2	3	4	5	6	7
1.3 The Thai Dairy Industry Co., Ltd. provides an administrative team to serve you in emergency situations.	1	2	3	4	5	6	7
2. Product Transportation Information							
2.1 You can order products from various channels such as Internet, fax and mobile phone.	1	2	3	4	5	6	7
2.2 There is a transportation monitoring system.	1	2	3	4	5	6	7
2.3 You were informed about the situation immediately in an emergency case about product transportation.	1	2	3	4	5	6	7
3. Service Quality							
Reliability							
3.1 You trust the product delivery service of The Thai Dairy Industry Co., Ltd.	1	2	3	4	5	6	7
3.2 Product delivery service of The Thai Dairy Industry Co., Ltd. has never failed.	1	2	3	4	5	6	7
3.3 Product delivery service of The Thai Dairy Industry Co., Ltd. has never been late.	1	2	3	4	5	6	7
Assurance							
3.4 Your salesperson has sufficient knowledge about the products.	1	2	3	4	5	6	7

Factors of transportation efficiency	Strongly Disagree ← → Strongly Agree						
	1	2	3	4	5	6	7
3.5 Your salesperson makes you trust the products.	1	2	3	4	5	6	7
3.6 Your salesperson provides high quality service to you.	1	2	3	4	5	6	7
3.7 The Thai Dairy Industry Co., Ltd. provides a certain product delivery service.	1	2	3	4	5	6	7
Tangibility							
3.8 Delivery trucks are clean.	1	2	3	4	5	6	7
3.9 Salespersons' dress is clean.	1	2	3	4	5	6	7
3.10 Salespersons have good characters.	1	2	3	4	5	6	7
3.11 All packages are perfect.	1	2	3	4	5	6	7
3.12 All products labels are perfect.	1	2	3	4	5	6	7
3.13 The quality of the product is completely perfect.	1	2	3	4	5	6	7
3.14 All packages contain the exact quantity ordered.	1	2	3	4	5	6	7
Empathy							
3.15 The salesperson shows his care for you.	1	2	3	4	5	6	7
3.16 The salesperson services you with care.	1	2	3	4	5	6	7
3.17 The salesperson is concerned about your requirements.	1	2	3	4	5	6	7
3.18 The salesperson gives priority to your benefit.	1	2	3	4	5	6	7
3.19 The Thai Dairy Industry Co., Ltd. offers you empathic services.	1	2	3	4	5	6	7
Responsiveness							
3.20 The salesperson is always available for you.	1	2	3	4	5	6	7
3.21 The salesperson is pleased to service you overtime.	1	2	3	4	5	6	7
3.22 The salesperson offers service professionally.	1	2	3	4	5	6	7
3.23 The salesperson services you as fast as he can.	1	2	3	4	5	6	7
4. Customer Satisfaction							
4.1 Your experience with The Thai Dairy Industry Co., Ltd. product transportation is as good as it is supposed to be.	1	2	3	4	5	6	7
4.2 The product transportation of The Thai Dairy Industry Co., Ltd. serves you your requirements correctly.	1	2	3	4	5	6	7
4.3 You have never been disappointed with The Thai Dairy Industry Co., Ltd. product transportation.	1	2	3	4	5	6	7
4.4 Overall, you feel satisfied with The Thai Dairy Industry Co., Ltd. product transportation.	1	2	3	4	5	6	7

Thank you for your kind cooperation and kindness.

APPENDIX B:

Questionnaire (Thai Version)

แบบสอบถามความคิดเห็นเกี่ยวกับการขนส่งสินค้า

เรียน ท่านผู้ประกอบการ

แบบสอบถามนี้เป็นส่วนหนึ่งของงานวิจัยเรื่อง "ความพึงพอใจของลูกค้าต่อการขนส่งสินค้า: กรณีศึกษา บริษัท ผลิตภัณฑ์นมในประเทศไทย" ซึ่งอยู่ในการดำเนินการของ นางสาวดุจลดา สุชาริตกุล นักศึกษาปริญญาโท สาขาการบริหาร supply chain มหาวิทยาลัยอัสสัมชัญ ประเทศไทย

งานวิจัยนี้ศึกษาความสัมพันธ์ของปัจจัยที่เกี่ยวข้องกับประสิทธิภาพในการขนส่งสินค้าที่มีผลต่อความพึงพอใจของลูกค้า ผลที่ได้รับจากการวิจัยนี้คาดว่าจะนำไปสู่การปรับปรุงการบริหารงบประมาณของบริษัทในการขายขนาดตลาดและผลตอบแทน

ขณะเดียวกันร้านค้าปลีกยังสามารถปรับใช้ผลการวิจัยในการดำเนินธุรกิจได้พร้อมกับความรู้และประสบการณ์ในอุตสาหกรรมนี้ การมีส่วนร่วมและข้อมูลที่มีค่ายิ่งของท่านจะเป็นประโยชน์อย่างมากต่อการศึกษา ขอท่านโปรดตอบแบบสอบถามโดยเลือกข้อที่ตรงกับความเห็นท่านมากที่สุดในทุกส่วน แบบสอบถามประกอบด้วย 2 ส่วน คือ ข้อมูลลูกค้า และ คุณภาพของบริการการขนส่งสินค้า ซึ่งจะรบกวนเวลาท่านในการตอบแบบสอบถามประมาณ 10 นาที โปรดมั่นใจได้ว่าข้อมูลที่ท่านให้จะถูกใช้สรุปเป็นผลการวิเคราะห์ในรายงานเท่านั้น

ขอขอบคุณท่านสำหรับเวลาและข้อมูลที่เป็นประโยชน์ ดิฉันสำนึกในความช่วยเหลือของท่านเป็นอย่างสูง

ขอแสดงความนับถือ

นางสาวดุจลดา สุจริตกุล
นักศึกษาปริญญาโท,
คณะการจัดการ มหาวิทยาลัยอัสสัมชัญ
MSM School of Management, Assumption University

ส่วนที่ 1: ข้อมูลลูกค้า

1. ท่านดำเนินธุรกิจอยู่ในจังหวัด_____

2. ท่านจำหน่ายนมข้นหวานตราใดบ้าง (สามารถตอบได้มากกว่า 1 ข้อ)

☐ มะลิ ☐ เบิดวิงซ์ ☐ ออร์คิด ☐ คาร์เนชั่น

☐ ตราหมี ☐ ทีพ็อต ☐ พาเลส ☐ มายบอย

☐ นกเหยี่ยว ☐ เรือใบ ☐ อื่น ๆ โปรดระบุ.....

3. ท่านสั่งนมข้นหวานจาก บริษัท อุตสาหกรรมนมไทย จำกัด เฉลี่ยครั้งละกี่ลัง

☐ น้อยกว่า 10 ☐ 10-100 ☐ 101-300

☐ 301-500 ☐ 501-1,000 ☐ มากกว่า 1,000

4. ท่านได้รับการจัดส่งสินค้าจากผู้ใด

☐ พนักงานขาย ☐ บริษัท ภายนอก ☐ อื่น ๆ โปรดระบุ.....

5. ท่านได้ทำธุรกิจกับ บริษัท อุตสาหกรรมนมไทย จำกัด มานานเพียงใด

☐ น้อยกว่า 1 ปี ☐ 1 ถึง 3 ปี ☐ 3 ถึง 5 ปี ☐ มากกว่า 5 ปี

ส่วนที่ 2: คุณภาพของบริการขนส่งสินค้า

กรุณาทำเครื่องหมาย ✓ ในช่องที่ตรงกับความเห็นของท่านมากที่สุด

ปัจจัยที่เกี่ยวข้องกับประสิทธิภาพในการขนส่งสินค้า	ระดับความเห็น ไม่เห็นด้วยมากที่สุด ←.....→ เห็นด้วยมากที่สุด						
	1	2	3	4	5	6	7
1. การดำเนินงาน							
1.1 การขนส่งสินค้าของ บริษัท อุตสาหกรรมนมไทย มีขั้นตอนชัดเจน	1	2	3	4	5	6	7
1.2 บริษัทฯ มีความรวดเร็วในการตัดสินใจในการจัดส่งสินค้า	1	2	3	4	5	6	7
1.3 บริษัทฯ เตรียมทีมงานให้บริการไว้สำหรับกรณีเหตุการณ์ฉุกเฉิน	1	2	3	4	5	6	7
2. ข้อมูลการขนส่งสินค้า							
2.1 ท่านสามารถสั่งซื้อสินค้าได้หลายช่องทาง เช่น ระบบอินเตอร์เน็ต, โทรสาร, ข้อความสั้นทางโทรศัพท์เคลื่อนที่ เป็นต้น	1	2	3	4	5	6	7
2.2 บริษัทฯ มีระบบติดตามสินค้าที่กำลังถูกจัดส่ง	1	2	3	4	5	6	7
2.3 กรณีมีเหตุฉุกเฉินเกี่ยวกับการส่งสินค้า บริษัทฯ จะแจ้งให้ท่านทราบ	1	2	3	4	5	6	7
3. คุณภาพการให้บริการ							
ความน่าเชื่อถือ							
3.1 ท่านเชื่อใจในกระบวนการจัดส่งสินค้าของ บริษัทฯ	1	2	3	4	5	6	7
3.2 การจัดส่งสินค้าของ บริษัทฯ ไม่เคยผิดพลาด	1	2	3	4	5	6	7
3.3 การจัดส่งสินค้าของ บริษัทฯ ไม่เคยล่าช้า	1	2	3	4	5	6	7

ปัจจัยที่เกี่ยวข้องกับประสิทธิภาพในการขนส่งสินค้า	ระดับความเห็น ไม่เห็นด้วยมากที่สุด ←.....→ เห็นด้วยมากที่สุด						
	1	2	3	4	5	6	7
ความมั่นใจ							
3.4 พนักงานขายมีความรู้เกี่ยวกับสินค้า	1	2	3	4	5	6	7
3.5 พนักงานขายสามารถทำให้ท่านเชื่อมั่นในคุณภาพของสินค้า	1	2	3	4	5	6	7
3.6 พนักงานขายให้บริการอย่างมีคุณภาพ	1	2	3	4	5	6	7
3.7 การจัดส่งสินค้าของ บริษัทฯ สามารถไว้วางใจได้	1	2	3	4	5	6	7
ลักษณะทางกายภาพที่มองเห็น							
3.8 รถขนส่งสินค้าสะอาด	1	2	3	4	5	6	7
3.9 พนักงานขนส่งสินค้าแต่งกายสะอาด	1	2	3	4	5	6	7
3.10 พนักงานขนส่งสินค้ามีบุคลิกดี	1	2	3	4	5	6	7
3.11 บรรจุภัณฑ์ของสินค้าที่จัดส่งอยู่ในสภาพดี	1	2	3	4	5	6	7
3.12 สลากสินค้าของสินค้าที่จัดส่งอยู่ในสภาพดี	1	2	3	4	5	6	7
3.13 สินค้าที่จัดส่งมีคุณภาพสมบูรณ์	1	2	3	4	5	6	7
3.14 บรรจุภัณฑ์ทุกลังมีจำนวนสินค้าครบถ้วน	1	2	3	4	5	6	7
ความเอาใจใส่ของพนักงานขาย							
3.15 พนักงานขายแสดงออกซึ่งความห่วงใย	1	2	3	4	5	6	7
3.16 พนักงานขายให้บริการด้วยความเอาใจใส่	1	2	3	4	5	6	7
3.17 พนักงานขายเป็นห่วงกับความต้องการของท่าน	1	2	3	4	5	6	7
3.18 พนักงานขายให้ความสำคัญกับสิทธิประโยชน์ท่าน	1	2	3	4	5	6	7
3.19 บริษัทฯ ให้บริการด้วยความเอาใจใส่	1	2	3	4	5	6	7
ความกระตือรือร้นของพนักงานขาย							
3.20 พนักงานขายมีเวลาว่างให้ท่านเสมอ	1	2	3	4	5	6	7
3.21 พนักงานขายยินดีให้บริการท่านเสมอ	1	2	3	4	5	6	7
3.22 พนักงานขายให้บริการแก่ท่านอย่างมืออาชีพ	1	2	3	4	5	6	7
3.23 พนักงานขายให้บริการส่งสินค้าด้วยความรวดเร็ว	1	2	3	4	5	6	7
4. ความพึงพอใจในการจัดส่งสินค้า							
4.1 บริษัทฯ ให้บริการส่งสินค้าแก่ท่านได้ดีอย่างที่คาดหวังไว้	1	2	3	4	5	6	7
4.2 บริษัทฯ บริการส่งสินค้าให้ท่านได้ตรงกับความต้องการ	1	2	3	4	5	6	7
4.3 บริษัทฯ ไม่เคยทำให้ท่านผิดหวังในการส่งสินค้า	1	2	3	4	5	6	7
4.4 โดยรวมแล้วท่านพอใจการส่งสินค้าของบริษัทอุตสาหกรรมนมไทย	1	2	3	4	5	6	7

ขอขอบคุณเป็นอย่างสูงสำหรับความร่วมมือและความกรุณาที่ได้สละเวลาทำแบบสอบถามนี้

APPENDIX C:

SPSS Data Analysis Results

D.1 Reliability of All Items

Reliability of All Product Transportation Efficiency Factors

Case Processing Summary

		N	%
Cases	Valid	33	100.0
	Excluded(a)	0	.0
	Total	33	100.0

a. Listwise deletion based on all variables in the procedure.

Reliability Statistics

Cronbach's Alpha	N of Items
.919	29

Reliability of Customer Satisfaction

Case Processing Summary

		N	%
Cases	Valid	33	100.0
	Excluded(a)	0	.0
	Total	33	100.0

a. Listwise deletion based on all variables in the procedure.

Reliability Statistics

Cronbach's Alpha	N of Items
.932	4

Reliability of Product Transportation Efficiency Factors

Case Processing Summary

		N	%
Cases	Valid	33	100.0
	Excluded(a)	0	.0
	Total	33	100.0

a. Listwise deletion based on all variables in the procedure.

Reliability Statistics

Factors	Cronbach's Alpha	N of Items
Administration	0.943	3
Transformation Information	0.956	3
Service Quality	0.960	23
Responsiveness	0.927	4
Reliability	0.849	3
Empathy	0.980	5
Assurance	0.985	4
Tangibility	0.876	7

D.2 Data Analysis

KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.755
Bartlett's Test of Sphericity	Approx. Chi-Square	99.768
	df	6
	Sig.	.000

Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	15.759	54.340	54.340	15.759	54.340	54.340	5.953	20.527	20.527
2	2.732	9.422	63.761	2.732	9.422	63.761	4.577	15.781	36.309
3	1.979	6.825	70.586	1.979	6.825	70.586	4.358	15.027	51.335
4	1.323	4.563	75.149	1.323	4.563	75.149	4.067	14.025	65.361
5	1.101	3.796	78.944	1.101	3.796	78.944	3.939	13.584	78.944
6	.742	2.557	81.502						
7	.627	2.163	83.664						
8	.500	1.725	85.389						
9	.422	1.455	86.844						
10	.384	1.323	88.167						
11	.358	1.234	89.401						
12	.311	1.072	90.473						
13	.272	.936	91.409						
14	.266	.919	92.328						
15	.239	.824	93.152						
16	.227	.781	93.934						
17	.210	.725	94.658						
18	.206	.711	95.369						
19	.193	.664	96.034						
20	.184	.636	96.669						
21	.160	.553	97.223						
22	.142	.488	97.711						
23	.131	.453	98.164						
24	.114	.393	98.557						
25	.105	.362	98.919						
26	.097	.336	99.254						
27	.080	.277	99.531						
28	.073	.252	99.783						
29	.063	.217	100.000						

Extraction Method: Principal Component Analysis.

Rotated Component Matrix[a]

Factors	Component						
	1	2	3	4	5	6	7
Administration_1	0.920						
Administration_2	0.927						
Administration_3	0.945						
Transportation_1		0.810					
Transportation_2		0.899					
Transportation_3		0.747					
Reliability_1							0.823
Reliability_2							0.724
Reliability_3							0.678
Assurance_1						0.818	
Assurance_2						0.725	
Assurance_3						0.834	
Assurance_4						0.724	
Tangibility_1				0.719			
Tangibility_2				0.802			
Tangibility_3				0.605			
Tangibility_4				0.782			
Tangibility_5				0.804			
Tangibility_6				0.532			
Tangibility_7				0.544			
Empathy_1			0.877				
Empathy_2			0.841				
Empathy_3			0.748				
Empathy_4			0.816				
Empathy_5			0.682				
Responsiveness_1					0.863		
Responsiveness_2					0.845		
Responsiveness_3					0.870		
Responsiveness_4					0.890		

D.3 Descriptive Analysis

Province

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Bangkok	18	7.7	7.7	7.7
	Burirum	10	4.3	4.3	12.0
	Chiangmai	8	3.4	3.4	15.5
	Cheangrai	5	2.1	2.1	17.6
	Chonburi	7	3.0	3.0	20.6
	Kanjanabiri	9	3.9	3.9	24.5
	Khonkean	11	4.7	4.7	29.2
	Lampang	5	2.1	2.1	31.3
	Mookdaharn	5	2.1	2.1	33.5
	Nakhornrachasrima	12	5.2	5.2	38.6
	Nakhornsawan	7	3.0	3.0	41.6
	Pechaboorn	2	.9	.9	42.5
	Phechburi	15	6.4	6.4	48.9
	Phijitr	5	2.1	2.1	51.1
	Phuket	5	2.1	2.1	53.2
	Pisanuloak	3	1.3	1.3	54.5
	Prajoubkhirikhan	14	6.0	6.0	60.5
	Royed	5	2.1	2.1	62.7
	Samutprakarn	9	3.9	3.9	66.5
	Songkha	7	3.0	3.0	69.5
	Spanburi	12	5.2	5.2	74.7
	Srakaew	8	3.4	3.4	78.1
	Sukhowthai	3	1.3	1.3	79.4
	Surasthani	5	2.1	2.1	81.5
	Surin	6	2.6	2.6	84.1
	Tak	6	2.6	2.6	86.7
	Trung	7	3.0	3.0	89.7
	Ubonrachathani	7	3.0	3.0	92.7
	Udornthani	7	3.0	3.0	95.7
	Utaradith	3	1.3	1.3	97.0
	Yala	7	3.0	3.0	100.0
	Total	233	100.0	100.0	

Brand Frequencies

		Responses		Percent of Cases
		N	Percent	
Brand[a]	Mali	210	18.6%	90.1%
	Birdwings	129	11.4%	55.4%
	Orchid	122	10.8%	52.4%
	Carnation	166	14.7%	71.2%
	BearBrand	97	8.6%	41.6%
	TeaPot	29	2.6%	12.4%
	Palace	125	11.0%	53.6%
	MyBoy	17	1.5%	7.3%
	Falcon	108	9.5%	46.4%
	Ship	129	11.4%	55.4%
Total		1,132	100.0%	485.8%

a. Dichotomy group tabulated at value 1.

Order Size

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	<10	34	14.6	14.6	14.6
	10-100	91	39.1	39.1	53.6
	101-300	58	24.9	24.9	78.5
	301-500	25	10.7	10.7	89.3
	501-1,000	19	8.2	8.2	97.4
	> 1,000	6	2.6	2.6	100.0
	Total	233	100.0	100.0	

Deliverer

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Salesperson	209	89.7	90.1	90.1
	Outsource	23	9.9	9.9	100.0
	Total	232	99.6	100.0	
Missing	System	1	.4		
Total		233	100.0		

Dealing Period

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	< 1 year	11	4.7	4.7	4.7
	1-3 years	38	16.3	16.3	21.0
	3-5 years	57	24.5	24.5	45.5
	> 5 years	127	54.5	54.5	100.0
	Total	233	100.0	100.0	

D.4 Regression Analysis

Descriptive Statistics

	Mean	Std. Deviation	N
Satisfaction	4.9052	1.08968	232
Empathy	4.7716	.81770	232
Tangibility	4.4483	1.15384	232
Administration	4.6918	.91279	232
Assurance	4.8103	1.01830	232
Reliability	5.3966	1.03513	232

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.865[a]	.738	.730	.56609	.738	125.983	7	226	.000

a. Predictors: (Constant), Administration, Information, Responsiveness, Reliability, Empathy, Assurance, Tangibility

ANOVA[b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	201.864	7	40.373	94.082	.000[a]
	Residual	72.425	226	.320		
	Total	274.289	231			

a. Predictors: (Constant), Administration, Information, Responsiveness, Reliability, Empathy, Assurance, Tangibility

b. Dependent Variable: Satisfaction

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.063	.257		.244	.807
	Administration	.043	.060	.037	.720	.472
	Product Transformation Information	.155	.053	.195	2.894	.004
	Reliability of Transportation Service	.132	.065	.141	2.033	.043
	Assurance of Transportation Service	.209	.059	.195	3.558	.000
	Tangibility of Transportation Service	-.128	.053	-.111	-2.404	.017
	Empathy of Transportation Service	.233	.072	.183	3.244	.001
	Responsiveness of Transportation Service	.404	.075	.331	5.404	.000

a. Dependent Variable: Customer Satisfaction

b. F-value : 94.082, Sig. 0.000

c. R = 0.865

d. R^2 : .738