



**E - FULFILLMENT, BACK - END SOLUTION FOR SME'S
E - COMMERCE BUSINESS TO CONSUMER (B TO C)
LOGISTIC MODEL FOR BANGKOK METROPOLITAN**

by

Mr. Narongrid Galaputh

**A Final Report of the Three - Credit Course
CE 6998 Project**

**Submitted in Partial Fulfillment
of the Requirements for the Degree of
Master of Science
in Computer and Engineering Management
Assumption University**

April, 2001

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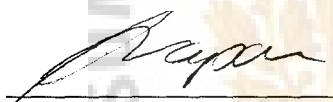
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Project Title	E-fulfillment, Back-end Solution for SME's E-commerce Business to Consumer (B to C) Logistic Model for Bangkok Metropolitan
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ABSTRACT

The objective of this project study, namely Business to Consumer (B to C) logistic model for metropolitan, is to deliver a workable solution to the readers. It focuses on SMEs who wish to do business on Internet and at the same time on the local market which is Bangkok.

The author consolidates informations, ideas and proof methods from various sources, including learning material from Assumption University on graduate school of Computer and Engineering Management (CEM), Internet and Proof methods from personal experience in transportation industry.

Definitions, work flows, analytical techniques used in transit time calculation were presented in Chapter III. Manpower planning, cost structure customer service features are also presented in brief detail. The emphasis is on operating at minimum cost while service level is attainable.

In Chapter IV the readers will find a conclusion where significant benefit could be gained when SMEs employ the proposed model to be used by its supplier.

The readers will also find a useful reference of 3PL logistic contract and insurance policy, which is practical in real market case.

ACKNOWLEDGEMENTS

Different people felt differently about their hard working and felt differently with each of every hard work. Working to accomplish your desired objective is more on the positive feeling, but not always the case. I thought, pursuing for another academic step is logical and worth trying. However, once I got on the process, I was wondering if I really felt it. At this stage, I felt the real value of supports that I have been receiving from people surrounding me.

It was my previous boss, Mr. James Earns Oden. Jim has always supported me, especially to my wish to progress my capability. He had not just only agreed but also sponsored my expenses of this master's degree. To Dr. Chamnong Jungthirapanich, his vision and care to students of CEM has made me feel warm and being accepted to the CEM society. One of the most inspired teacher is Dr. Prapon Phasukyud. His commitment to teaching and transforming his students in the class of Principle of Engineering 2 was highly appreciated by most of us. He did not try to teach but rather change the point of view of the new Thai generations. Paradigm change is the key word that has been demonstrated by his teaching style.

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I. INTRODUCTION

1.1 General Background

Economy recovering process of Thailand after the crisis started in July 1997, had been slow and hopeless. The unstable political system is a major hold back factor. However, in business world, the external factors called globalization and the Internet is also topping more pressure up to the recovery process. Thailand has to adjust quickly the changing way/mode of doing business. The trade barrier of the last decade such as import duty is no longer available in most countries (Especially to the member of WTO). The Internet makes virtual market become tangible in values and volume of transactions.

While the highlight of Thailand's economic value depends on only few large corporations such as Siam cement, CP group or Chin corporation, but the majority of employment and population incomes come from Micro, Small and Medium Enterprises.

1.2 Statement of Problems

In Thailand, Thai government under the influence of economists had come to conclusion that Micro, Small and Medium enterprises (M, SMEs) must be promoted to be key elements of the new Thai Economic system.

However, in reality, M, SMEs are not only facing financial and procedure problems but also the new thread introduced by interne. Business and consumer are changing their consuming behavior, they want purchased goods to be used as soon as possible. herefore, time is a sensitive issue. It is cheaper and faster to acquire goods and service via E-Commerce media (Internet, telephone, TV shopping or smart card).

Micro enterprise, which is those family food shops or other family based business, may not confront the problem but the bigger sized called SME would be directly

confronting the E-Commerce. SME need to have fair idea about information technology before it could start its E-Commerce. However, the bigger problem of doing business on line is how to fulfil the need once customer has made a decision to buy (hard goods).

1.3 Objectives of the Project

The writer has direct experience of logistic management by working in an international logistic service company. Seeing the need to have a proper E-fulfillment system for E-business is a routine challenge in a developed company.

The writer wishes to present the workable logistic model to the readers or entrepreneurs who wish to do business online.

Derivable value could cover the following:

- (1) Characteristic of SMEs in Thailand and type of SME business
- (2) Basic knowledge of E-fulfillment
- (3) Requirement of E-Commerce
- (4) Business to consumer (B to C) logistic model for Bangkok city.

1.4 Scope and Limitation

- (1) The logistic model is for Bangkok, some parts of Nonthaburi, Pathumthani and Samutprakarn provinces.
- (2) Logistic model based on minimum number of distribution centers.
- (3) Goods' selling on web is hard dry goods.

II. LITERATURE REVIEW

As far back as humankind can recall, the goods that people wanted were not produced where they wanted to consume them or over not accessible when they deceived to consume them. Food and other commodities were widely dispersed and were available in abundance only at certain times of the year.

As logistic systems improved consumption and production began to operate Geographically, region would specialize in that commodity that could be produced most efficiently. Excess production could be shipped economically to other producing (or consuming) areas, and needed goods not produced locally were imported.

Logistics is the process of planning, implementing and controlling the efficient cost, effective flow and storage of row material, in process inventory, finished goods and related information from point of origin to point of consumption for the purpose of conforming to customer requirements.

By mean of logistics, it created needs for business to manage series of components. The component of typical logistics system are customer service, demand forecasting distribution communications, inventory control, material handling, order processing, part and service support, plant and warehouse site selection (location analysis, purchasing, packaging, return goods handing, salvage and serape disposal, traffic and transportation and warehousing and storage.

2.1 Logistic Model



Figure 2.1. Logistic Model.

2.2 Transport Decisions

Vehicle Routing

Because transportation costs typically range between one-third and two-thirds of total logistics costs, improving efficiency through the maximum utilization of transportation equipment and personnel is a major concern. The length of time that goods are in transit reflects on the number of shipments that can be made with a vehicle within a given period of time and on the total transportation costs for all shipments. To reduce transportation costs and also to improve customer service, finding the best paths that a vehicle should follow through a network of roads, rail lines, shipping lanes, or air navigational routes that will minimize time or distance is a frequent decision problem.

Although there are many variations of routing problems, we can reduce them to a few basic types. There is the problem of finding a path through network where the origin point is from the destination point. There is a similar problem where there are multiple origin and destination points. And, there is the problem of routing when origin and destination points are the same. Consider how each type might be solved. Separate and Single Origin and Destination Points

The problem of routing a vehicle through a network has been nicely solved by methods designed specifically for it. Perhaps the simplest and most straightforward method is the shortest route method. The approach may be paraphrased as follows: We are given a network represented by links and nodes, where there are connecting points between links, and the links are the costs (distances, times, or a combination of both formed as a weighted average of time and distance) to traverse between nodes. Initially, all nodes are considered to be unsolved; that is they are not yet on a defined route. A solved node is on the route. Starting with the origin as a solved node,

- (1) Objective of the n th iteration. Find the n th nearest node to the origin.

Repeat for

$n = 1, 2, \dots$ until the nearest node is the destination.

- (2) Input for n th iteration. $(n-1)$ nearest nodes to the origin, solved for at
- (3) Previous iterations, including their shortest route and distance from the
- (5) Origin. These nodes, plus the origin, will be called solved nodes; the others are unsolved nodes.
- (6) Candidates for the n th nearest node. Each solved node is directly the unsolved node with the shortest connecting branch. Ties provide additional candidates.

Example 1

Suppose that we have the problem shown in Figure 2.2, we seek a minimum time route between Amarillo, Texas, and Fort Worth, Texas. Each link has an associated driving time between nodes, and the nodes are road junctions.

We begin with labeling a table, as shown in Table 2.2. The first point to be identified as a solved node is the origin, or A . The nodes directly connecting to A that are unsolved are B , C and C . In step 1, we note that B is the nearest node to A and record the connection. Node B now takes on the status of a solved node since it is the only choice available.

Next, we note the nearest unsolved nodes from the solved nodes A and B . Listing only the closest connecting nodes from each solved node, we have $A \text{ --- } B$ and $B \text{ --- } C$. We list them as step 2. Note now that to reach a node through an already connected node requires that the minimum time to reach the solved node be added to the link time. That is, to reach C through B requires a total time of $AB + BC$, or $90 + 60 = 156$ minutes.

Comparing the total times to reach the unsolved nodes in step 2 shows that the minimum time of 138 minutes is achieved by linking A and C. C is now a solved node.

The third iteration finds the nearest unsolved nodes that are connected to the solved nodes. There are three of these. Summing all times from the origin to the unsolved nodes in question shows total times of 348, 174, and 228. The minimum time of 174 is associated with the link BE. It is now recorded as the result of step3.

The procedure continues in this manner until the destination node J is reached , as shown in step 8. The minimum route time of 384 minutes is noted. The route is found by linking the portions of the route starting with the destination. These links are identified with an asterisk (*). The optimum route is A **B > E> I** J.

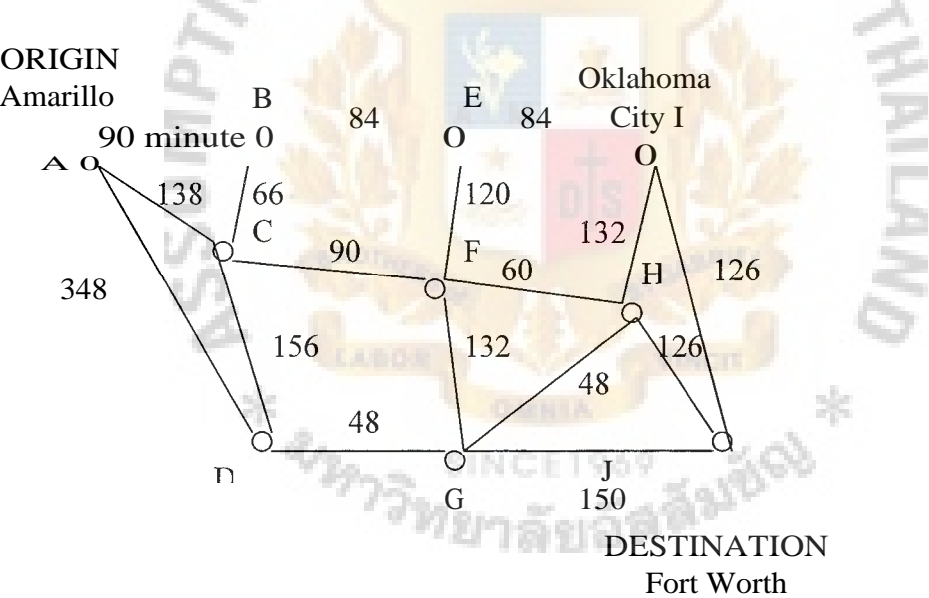


Figure 2.2. A Schematic Representation of the Highway Network between Amarillo, Texas, and Fort Worth, Texas, with Driving Times.

Table 2.1. Tabulation of Computational Steps for the Shortest Route Method.

Step	Solved Nodes Directly Connected to Unsolved Nodes	Its Closest Connected Unsolved Node	Total Cost Involved	<i>Nth</i> Nearest Node	Its Minimum Cost	Its Last Connection ^a
1	A	B	90	B	90	AB*
2	A B	C C	138 156	C	138	AC
3	A B C	D E F	348 174 228	E	174	BE*
4	A C E	D F I	348 228 228	F	228	CF
5	A C E F	D D I H	348 294 258 288	I	258	EI*
6	A C F I	D D H J	348 294 288 384	H	288	FH
7	A C F H I	D D G G F	348 294 360 336 384	D	294	CD
8	H I	J J	414 384	J	384	IJ*

^a Asterisk (*) denotes minimum-cost route.

(6) Calculation of *n*th nearest node. For each such solved node and its candidate, add the distance between them and the distance of the shortest route to this solved node from the origin. The candidate with the smallest such total distance is the *n*th nearest node (ties provide additional solved nodes), and its shortest route is the one generating this distance.

Although the procedure sounds somewhat complicated, an example can illustrate its

simplicity. (See Example 1)

The shortest route methods lend themselves nicely to computerized solution where the network of links and nodes can be maintained in a database. By selecting particular origin and destination pairs, the shortest routes can be developed. Absolute shortest distance routes do not account. Therefore, a practical route may be generated where *both* travel time and distance are given weights.

Application

Pc*Miler and COMPUMAP are examples of commercial software products available to find the most desired routes through a network. Suppose a truck is to be routed from Ashton, Iowa, to Des Moines, Iowa. The shortest distance is the objective for route design, PC*Miler produces the trip report as shown in Figure 2.2. Note that the driver can be given specific instructions as to the exact roads to drive the interchanges to take, and the distance that should be traveled on each leg of the journey. Mileage traveled within each state may also be found for state fuel reporting and auditing purposes. A similar report could also be produced as a practical route design. This design gives highest priority to interstate highways and other high-quality roadways. In this case, a practical design would increase total trip mileage from 216.9 to 229.2 miles.

Table 2.2. Shortest Route Road Distance between Ashton, Iowa and Des Moines, Iowa, as Generated by PC*Miler.

PC*Miler-Shortest Route						
51232 ASHTON IA to 50301 DES MOINES IA, 1 Stop 216.9 MILES						
State	Route	Miles	Interchange	Leg	Total	
Origin:			51232 ASHTON IA			
IA	Local	13.0e	SHELDON	IA	13.0	13.0
IA	US-18	11.0	SANBORN	IA	24.0	24.0
IA	US-59	17.0	CALUMET	IA	41.0	41.0
IA	IA-10	47.0	HAVELOCK	IA	88.0	88.0
IA	IA-4	7.0	POCAHONTAS IA	95.0	95.0	
IA	IA-3	23.0	HUMBOLT	IA	118.0	118.0
IA	US-169	48.0	BEAVER	IA	166.0	116.0
IA	US-30	15.0	BOONE	IA	181.0	181.0
IA	IA-17	11.0	MADRID	IA	192.0	192.0
IA	IA-415	19.0	Jct IA-415+US-69		211.0	211.0
IA	US-69	1.0	Jet US-69+US-65		212.0	212.0
IA	US-65	3.0	Des Moines	IA	215.0	215.0
IA	Local	1.9e	Des Moines	IA	216.0	216.9
Stop			50301 Des Moines	IA	216.9	

Source: ALK Associates, Inc. PC*Miler software output.

Multiple Origin and Destination Points

When there are multiple source points that may serve multiple destination points, there is a problem of assigning destinations to sources as well as finding the best routes between them. This problem commonly occurs when there is more than one vendor, plant, or warehouse to serve more than one customer for the same product. It is further complicated when the source points are restricted in the amount of the total customer demand that can be supplied from each location. This type of problem is frequently solved by applying a special class of the linear programming algorithm known as the transportation method. (See Box 2.2)

Example 2

Suppose that a glass manufacturer contracts with three soda ash suppliers located at various locations to supply three manufacturing facilities. The contract quantities are not to be exceeded, but the production requirements must be met. Figure 7-4 on page 196 shows the problem along with the appropriate per-ton shipping rates. These rates are the result of finding the shortest route between each supplier and each plant. Supply and requirements are in tons.

Solving this problem with the use of software called TRANLP² gives the following results in its output file:

Optimum Supply Schedule

TO:

1 2

FROM:

1 400 0 0

FROM:

2 200 200 300
3 0 300 0

Total Units transferred = 1,400

Minimum total cost = 6,600

The interpretation of this output is

Ship

400 tons from supplier *A* to plant 1

200 tons from supplier *B* to plant 1

200 tons from supplier *B* to plant 2

300 tons from supplier *B* to plant 3

300 tons from supplier *C* to plant 2

The minimum cost for this routing plan is \$6,600.

Coincident Origin and Destination Points

The logistician frequently encounters routing problems in which the origin point is the same as the destination point. This class of routing problem commonly occurs when transport vehicles are privately owned. Familiar examples are the routing of delivery trucks from a warehouse to retail points and return (resupplying food or drug stores from a central distribution center); the tour design of local delivery trucks from retail stores to customers (home delivery of merchandise); and the routing of school buses, newspaper delivery trucks, garbage collection trucks, and making deliveries of meals to shut-ins. This type of routing problem is an extension of problem of separate origin and destination points, but requirement that the tour is not complete until the vehicle returns to its starting point adds a complicating dimension. The objective is to find the sequence in which the points should be visited that will minimize total travel time or distance. The coincident origin and destination routing problem is generally known as the "traveling salesman" problem. Numerous methods have been proposed to solve it. Finding the optimal route for a particular problem has not been practical for

such problems when they contain many points. Computational time on the fastest computers for optimization methods has been too long for many problems of a realistic size. Cognitive and heuristic solution procedures have been good alternatives. ^aThe transportation rate in S per ton for an optimal routing between supplier A and plant 1.

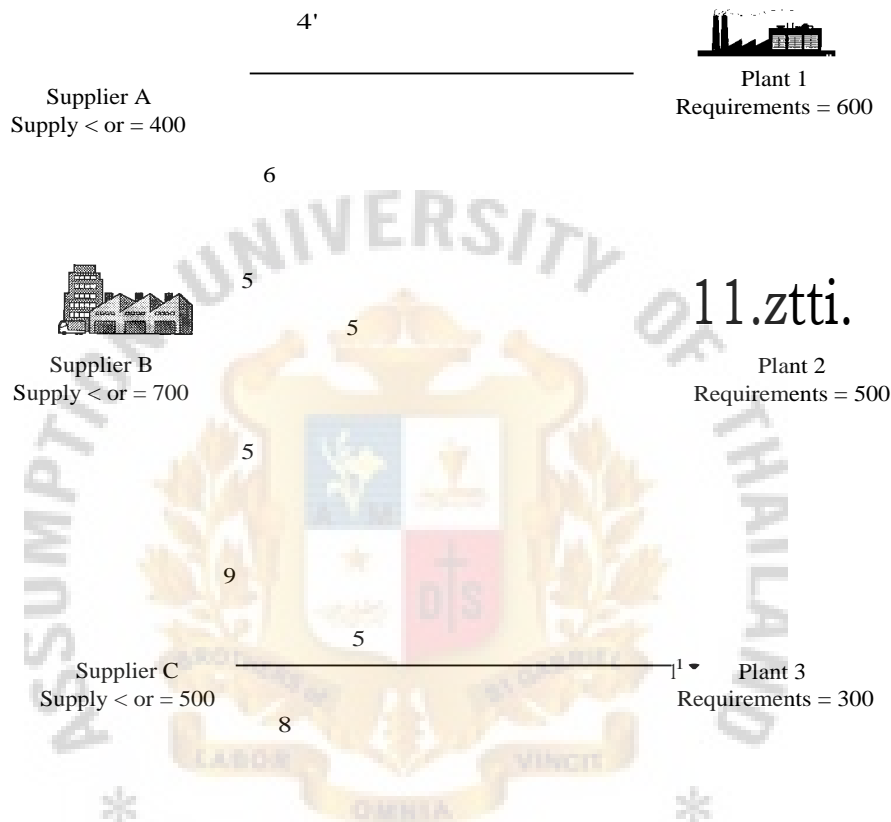


Figure 2.3. Example of a Multiple Origin-Destination Routing Problem Points Are Spatially.

Good solutions to traveling salesman problems of a realistic size can be found by using the pattern recognition capabilities of the human mind. We know that good stop sequences are formed when the paths of the route do not cross. Also, the shape of the route will usually bulge, or form a teardrop shape, where possible. Good and poor route designs are illustrated in Figure 2.3. Based on these two principles, an analyst can quickly sketch out a route plan that might require a computer many hours to find. Alternatively, a computer model can be used to find the stop sequences on a route. his

can be a better choice than cognition when the spatial relationship between stops does not represent their true travel time or distance. This may be the case when there are travel barriers, one-way streets, or traffic congestion present. However, whenever possible, locating stops geographically, such as with coordinate points, can simplify the problem by reducing the amount of data that needs to be collected to represent a problem. (There can be thousands of distances or times needed for even a relatively simple problem). The computer is assigned the task of estimating the distances or times. Computational procedures have been developed that rapidly solve the spatially represented problem and produce results that are close to optimum. (See Example 2)

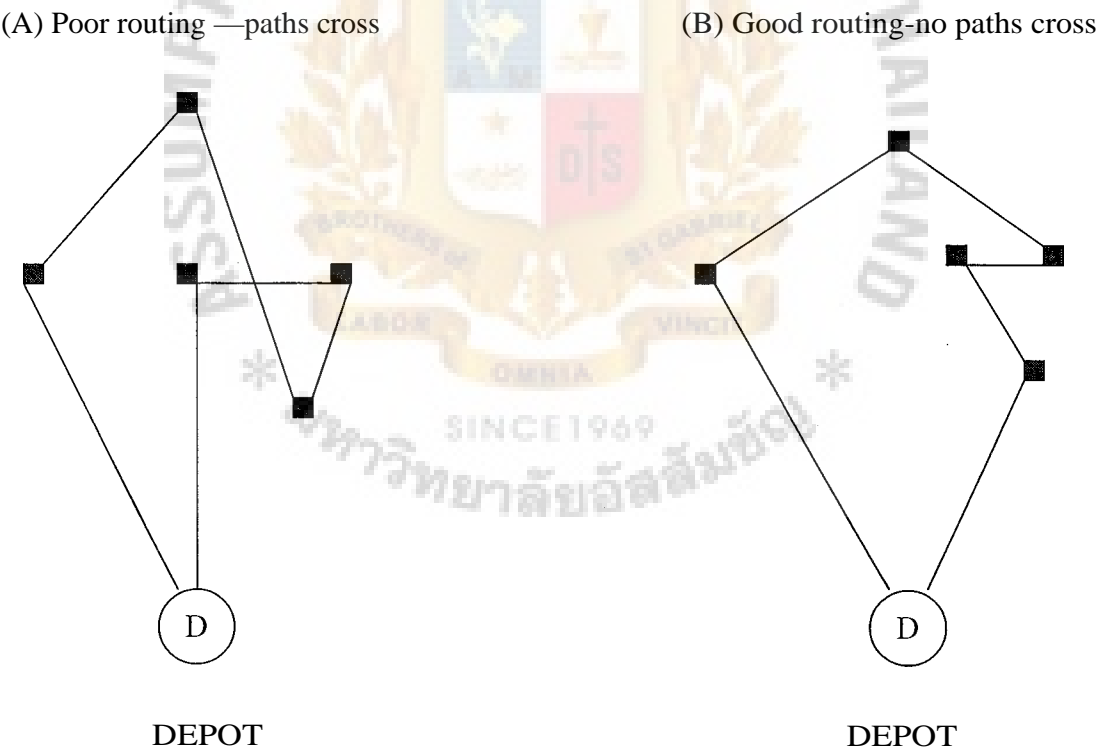


Figure 2.4. Example of Good and Poor Stop Sequencing.

Points Are Not Spatially Related

Where it is not easy to establish the spatial relationship between stops on the tour either by plotting them on a map or by identifying them with coordinate points, or where the spatial relationships become distorted for practical reasons as previously noted, exact distances, or times, should be specified between stop pairs. Cognitive procedure are less applicable, and we must resort to one of the many mathematical procedure suggested over the years to treat this problem. Although the interstop distances, or times, can be as exact as we wish to specify them, solution procedures tend to give approximate answers (See Example 3).

Example 3

The Anheuser-Busch Company user route salespersons to sell and other beverages from a truck that the local distributor owns. The salesperson is paid on a commission basis and, like the distributor, does not wish to spend any more time or travel any greater distance than necessary to cover the accounts on a daily basis. Pins on a map are used to locate the current accounts for a particular salesperson. An example of this type of information for 20 rural accounts has been transferred to the grid-overlay map shown as Figure 2.5. The coordinates relate to distance. We want the truck to start at the depot and return to the depot, visit all accounts, and travel the least distance possible.

Try the cognitive approach. Now compare your solution with the one generated by ROUTE software as shown in Figure 2.5. The total cost of the tour is 37.59 distance units. This is a good solution but not necessarily an optimal one.

(a) Location of beverage accounts
and distribution center (D) with
grid overlay

(b) Suggested routing pattern

Y Coordinates

8								
7		4				13	16	
6					10			19
5			6				15	20
4				8				18
3	2		5		D			17
2		3			12			
1	1			7		11	14	
	2	3	4	5	6	7	8	

X Coordinates

Y Coordinates

8								
7		4		9		13	16	
6					10			19
5			6				15	20
4	2			8				18
3			5		D	12		17
2		3						
1				7		11	14	
	0	2	3	4	5	6	7	8

X Coordinates

Figure 2.5. Stop on a Beer Truck Sales Route with Suggested Routing Patter as Developed by ROUTE Software.

Example 4

A Small delivery problem with a warehouse as a depot and four stops is shown in Figure 2.6. Travel times between stops are found by first choosing the most appropriate route and then multiplying by the speed to find the time to traverse the distance. We assume the time to travel between stop pairs in one direction will be the same in the opposite direction, hence the problem is symmetrical.

Using the traveling salesperson tour module of STORM a tour stop sequence of W to D to C to B to A to W is found. The total time to make the round trip is 156 minutes.

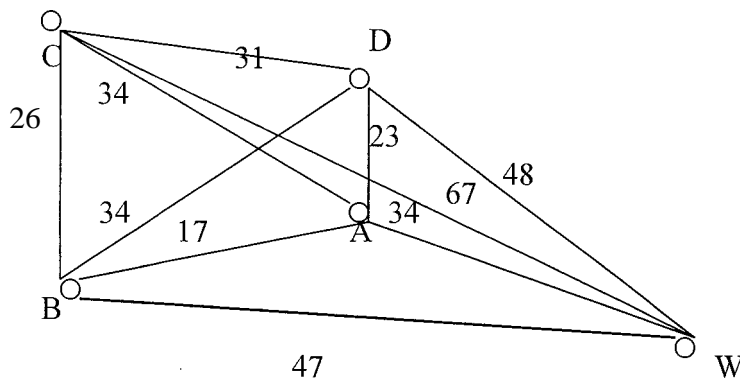


Figure 2.6. Example Delivery Problem with Travel Time in Minutes.

2.3 SME, E-Commerce and E-Fulfillment?

Small and Medium Enterprise (SME) is a name used in describing a type of business organization, typically by its size. In Thailand, the small and medium enterprise (SME) has becoming famous, being one of government policy, launched in late 1998 after a savior impact from economic crisis in 1997. By refocusing the country development, it was widely accepted that main part economy of Thailand bases on Small and Medium size business, in fact, they are micro and small scale business. This part of economy employs most employees in Thailand's economic system. In this topic, the author would like to present the basic knowledge about the business unit called SMEs. The following are the brief definitions and types of SMEs in Thailand.

Definition of SME in Thailand may be defined as following:

- (1) Capital investment lesser than one million bahts.
- (2) Annual revenue not exceeding 50 million bahts.
- (3) General management depends on one or two persons (in most cases, to owner of capital invested). Management goal is on a short-term profitmaximization.
- (4) One main product line or two main product lines.

(5) Involve limited local market circumstance.

Type of business contained in SME could be manufacturing, wholesaler, retailer or services.

From the definitions, some example of SME in Thailand may be listed as the following:

- (1) Tailor shops.
- (2) Food shops.
- (3) Jewelry business shop.
- (4) Leather and decorative products, business shops.
- (5) Silk and handicraft.
- (6) Audio/Electric shop.
- (7) Home decorative / construction material store.
- (8) Auto decoration shop.
- (9) Healthcare center.
- (10) Service shop, Internet cafe.³

The author agrees that the Thai government should promote SME because SME contributes more than 85 percent of total national economy. Once the majority small unit of economy is strong, it is possible that Thai economy will be strong in total. E-Commerce

E-Commerce is a mean of doing business activities between two and more than two parties on electronic network. These activities include product design advertisement of product or service, wholesaling, retailing, business contact and payment transactions. The electronic network may refer to Internet, Intranet, and other network such as television network or telephone network while the two parties could perform business activity to each other with smoothness and convenience. here are 3 main types of E-

commerce separated by the type of organization whom performs the business activity, namely; Business to Business (B to B), Business to Consumer (B to C) or Business to Government (B to G).⁴

(A) E-Commerce Business to Business (B 2 B)

EDI = Electronic Data Interchange



Figure 2.7. E-Commerce Business to Business (B 2 B).

This type of E-commerce module has the greatest amount of transaction because both sides are equally interested in effectiveness of doing business, likewise, they are similarly structured to the same goal. Staff in business organization are well trained to use high technology equipments including computer and Internet.

(B) E-Commerce Business to Consumer (B 2 C)

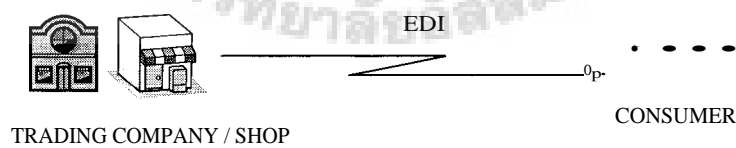


Figure 2.8. E-Commerce Business to Consumer (B 2 C).

The Business to Consumer E-Commerce is the finest business model that has high potential to become mass in volume. The expectation base on trend of trading to become small quantity at specific quality to fit the consumer's need. On the other and,

Internet is becoming popular and most accessible by public. In this study, we focus on how SMEs could respond to the request of consumer in this E-commerce module.

(C) E-Commerce Business to Government (B 2 G)

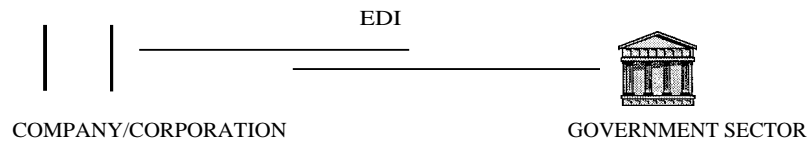


Figure 2.9. E-Commerce Business to Government (B 2 G).

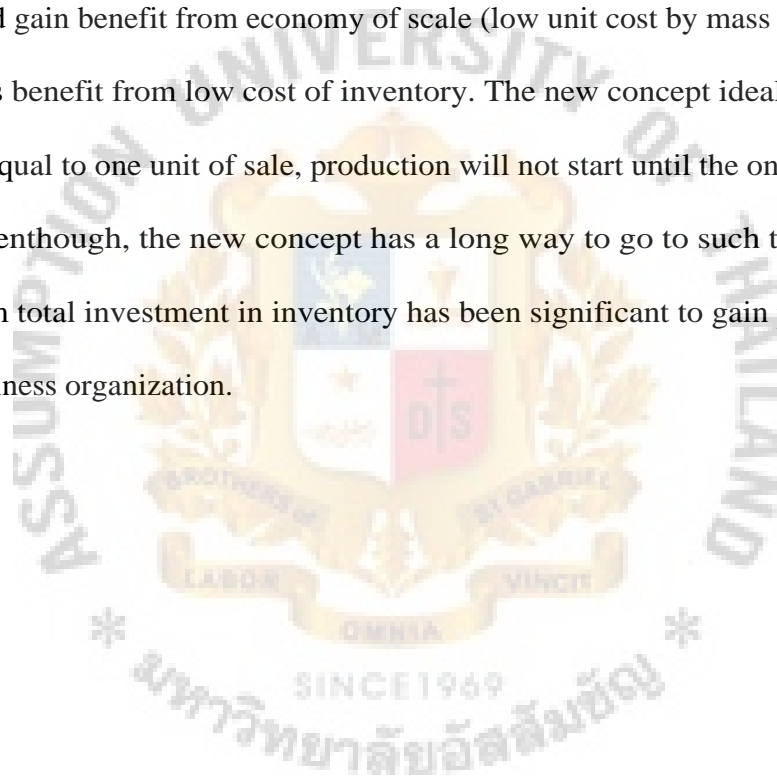
This type of E-Commerce module has a specific condition that it is the like between government organization to business organization whom would provide service to government body.

E-Fulfillment

E-fulfillment describes the activity that a business unit performs to satisfy the need of goods or services to their customer. It is an order fulfillment in traditional commercial senses but doing it in such the way that electronic technology is the mean structure. E-fulfillment doesn't refer only to forwarding to customer with what they ordered and do it on time, but also to the forwarding of all related custom service. For example, the customer must receive assembly and operation instruction. This can be done by including a paper document with the product, or by providing instruction on the web. In addition, if the customer is not happy with a product, an exchange or return needs to be arranged. Then, while order fulfillment is basically a part of the back office (back —end) operation, it is firmly related to the front office (front-end) operation as well.

Since E-Commerce is based on the concept of "pull" operation, which begins with order making, frequently a customized one, this is in contrast with traditional Research Institute foundation, "Status of E-commerce in Thailand" commerce process in which it begins with a production for inventory then sell to a customer.

The following is the comparison between the traditional commerce processes management called Supply Chain Management (SCM) and the Demand Chain Management (DCM). They are different by the force of transition, while SCM is built to stock and gain benefit from economy of scale (low unit cost by mass production), the DCM gains benefit from low cost of inventory. The new concept ideally aims to have inventory equal to one unit of sale, production will not start until the one unit inventory is sold. Eventhough, the new concept has a long way to go to such the concept, the saving from total investment in inventory has been significant to gain popularity from current business organization.



2.4 Supply Chain / Demand Chain Management

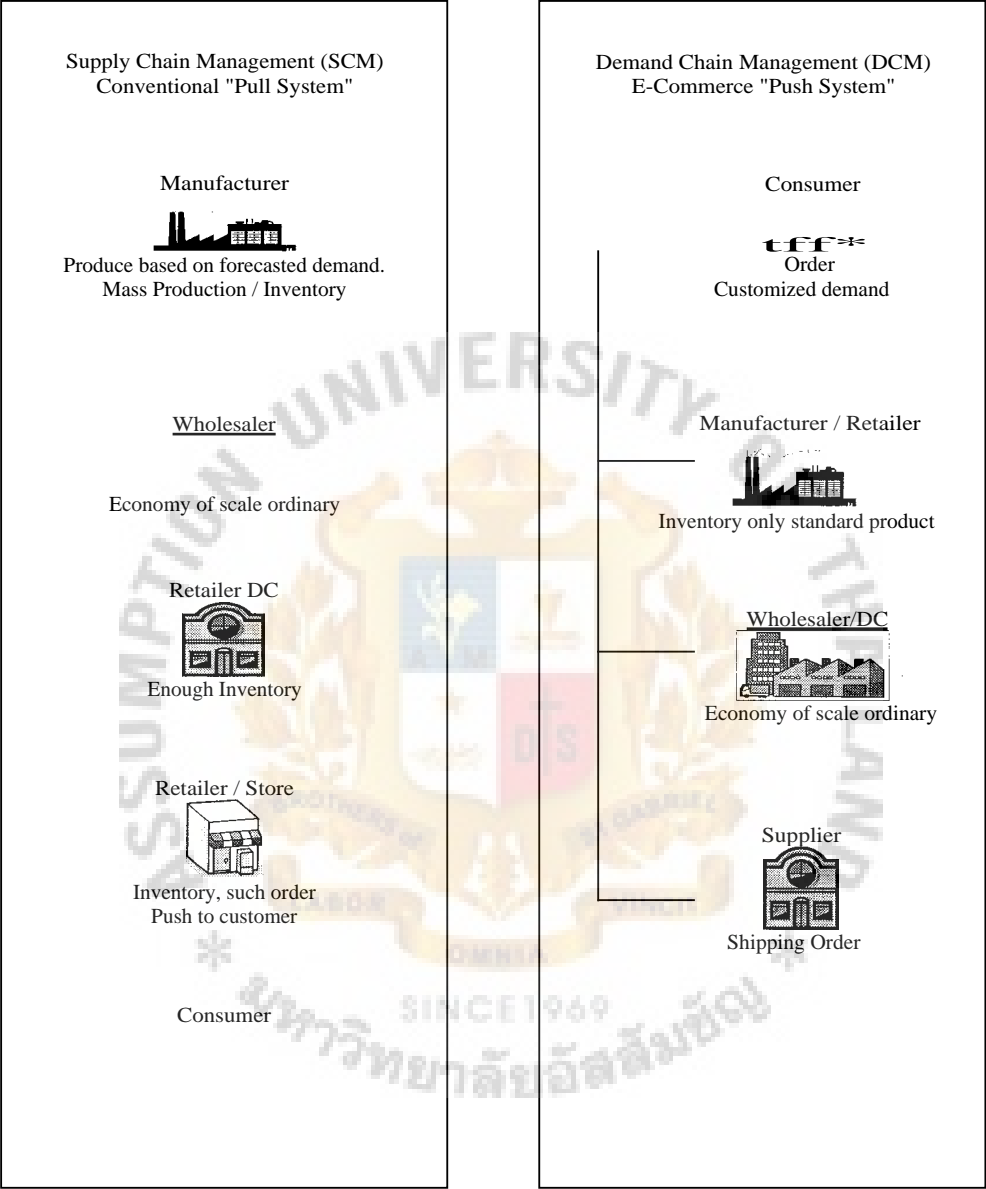


Figure 2.10. Supply Chain Management VS. Demand Chain Management.

2.5 Front Office Operations (Front-end)

Front office operation refers to all activities related to sale, marketing and customer contact. Specifically, in front office of E-commerce we include advertisement, promotion, helps in product customization, detail product, service information and order taking.

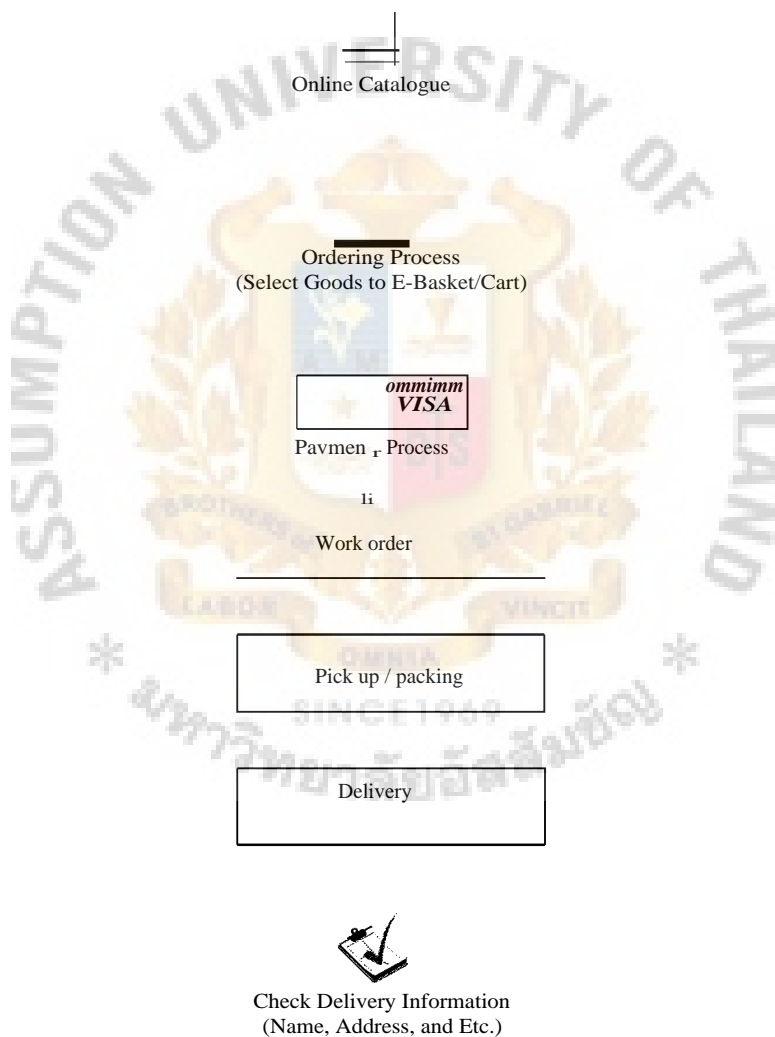


Figure 2.11. Front—end Operations Flowchart.

From the flow chart, assume that SMEs has their own Web site, in the Web site, here is an electronic catalogue prepared for Web shopper to choose any available products. Once selection has been made, all selected product's code as been put in E-basket, order processing can start. The order processing means checking availability of ordered product in stock including information flow to supplier to supply such the product to stock level. After items and quantity of products are confirmed, the shopper shall fill in delivery information and credit card information. Payment processing can be done electronically through the Internet between the bank of shopper and the bank of SMEs. Should all process are performed, purchase order shall be printed at the office of SMEs for back office operation.

2.6 Back Office Operation (Back-end)

The following diagram shows the process of work carried out within SMEs environment where consumer is unable to see from Website. The critical factor that SMEs E-Commerce shall confirm at the from office stage is accuracy of order and stock validation. It would be a serious impact to business on line if the confirmed order could not be fulfilled due to the unavailability of the product. SMEs shall update stock in E-shop as often as possible, usually, they should be done electronically an automatically.

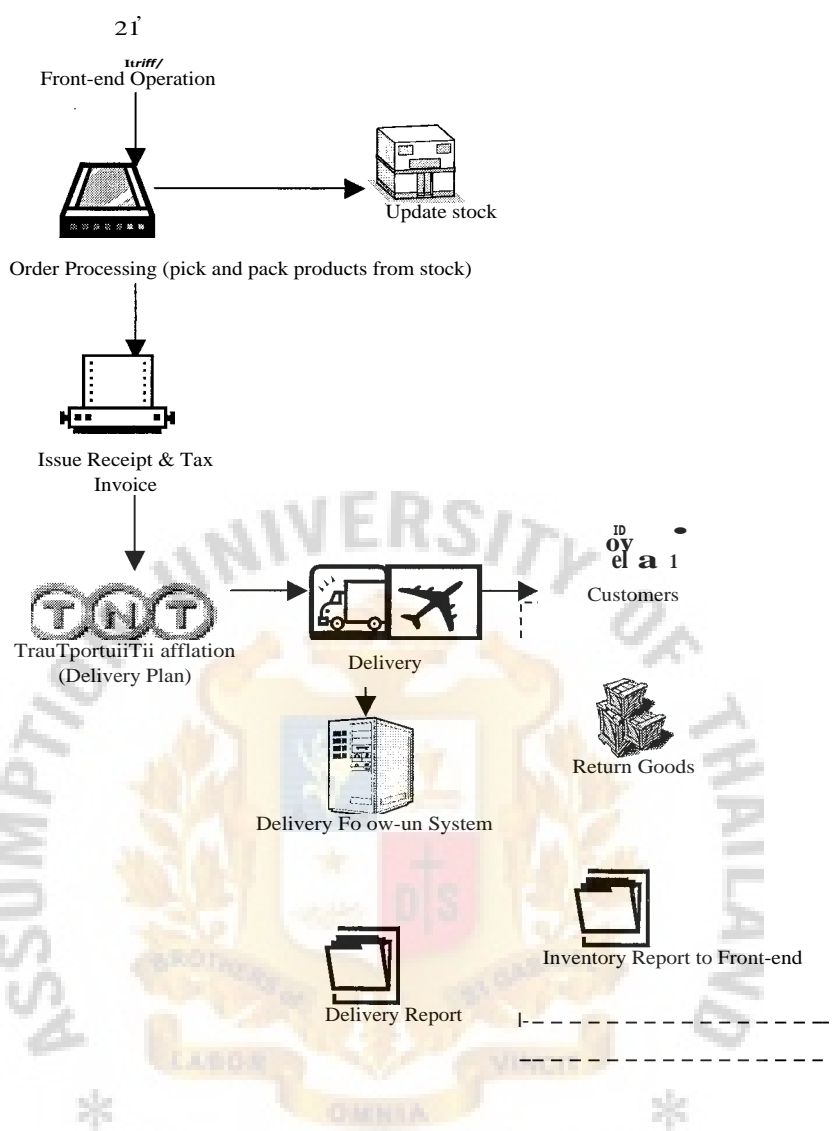


Figure 2.12. Back-end Operations Flowchart.

From the flow chart, back office operation starts at work order received for front office operation. Order processing including actual pick and pack product from stock room, information about stock shall be used to update inventory in stock room for further fulfillment steps. Afterwards, received and tax invoice shall be printed for transportation validation. Products shall be sent via proper mode, in this study, they will be done by small truck or motorcycle. Delivery report including consumer signature sign as receiver of the product shall be made for reference. In case that product can not satisfy the consumer, it may be returned, and if so, return report shall be done by

delivery staff. The report shall be used to update stock or destroy as necessary. The author has attached an executive interview of the managing director of a company called DST(Direct Sale Trading), Appendix B, to give more idea of real SMEs whose business is online in Bangkok.

2.7 Fundamental Requirement of E-commerce

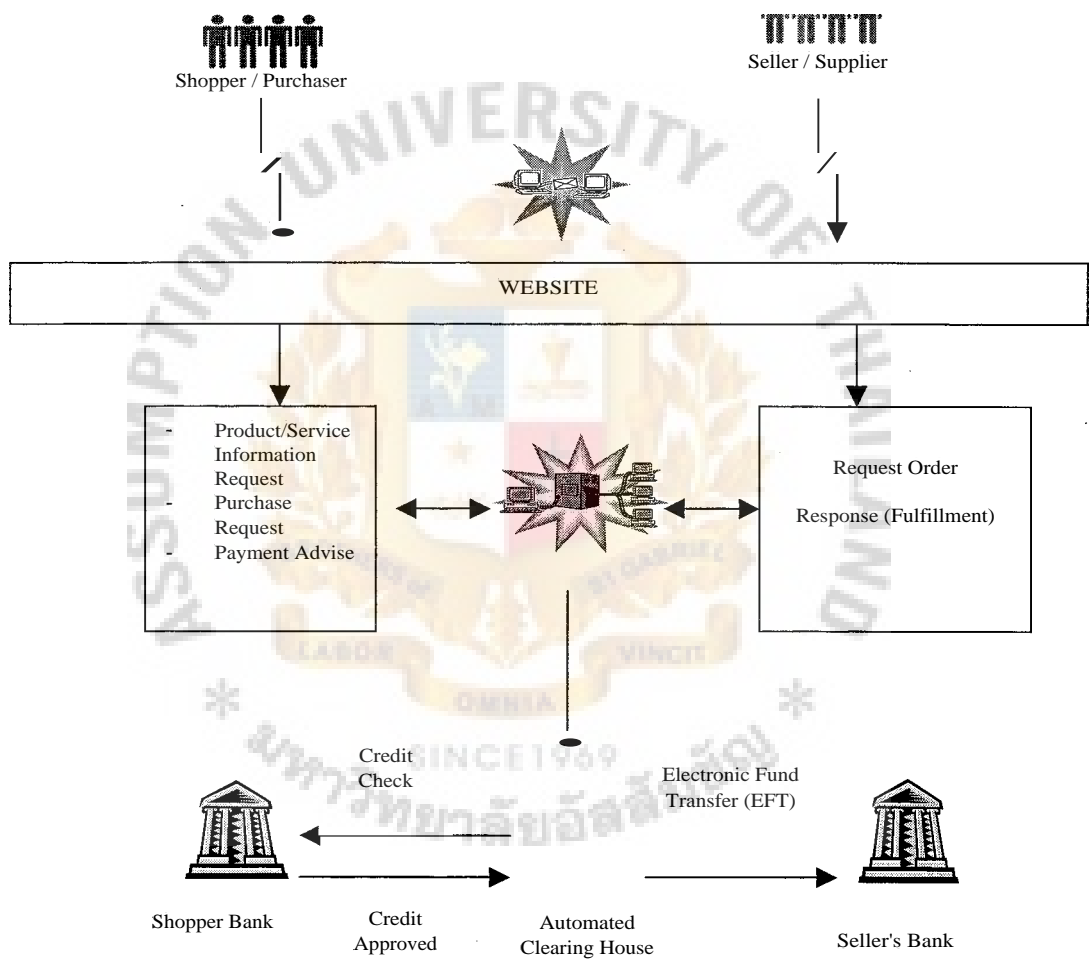


Figure 2.13. Fundamental Requirement of E-commerce.

The fundamental requirement of E-Commerce as shown above explains the basic flow of request from shopper to seller to respond via Internet platform. Website in the virtual market where the two parties can meet while automate clearing house would be a

support function once decision to buy services or products has been made by shopper.

2.8 Setting up SMEs E-Commerce

Once SMEs confirm their wish to do business on line via Internet, there are several steps they have to acquire. The following diagram note shall present basic idea in setting up SMEs E-commerce.

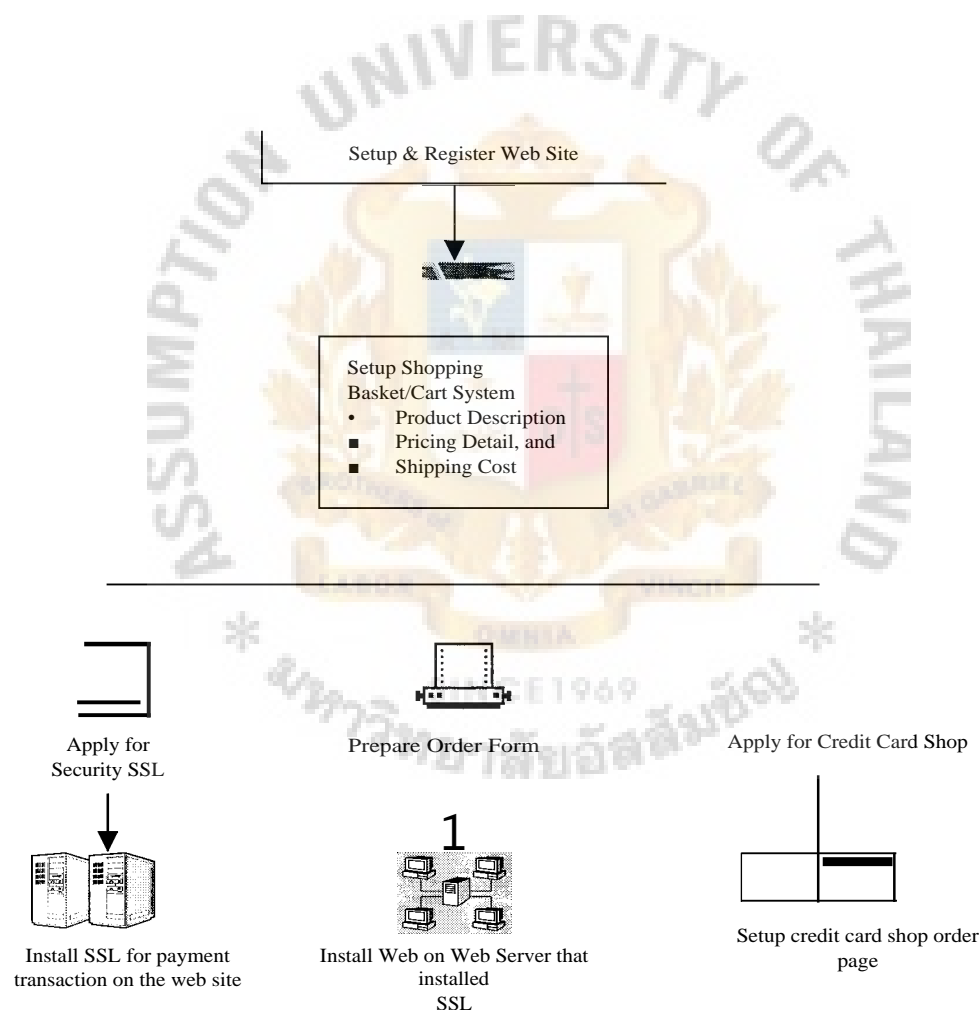


Figure 2.14. Setting up SMEs E-commerce.

First, SMEs shall register their Web site at a website that provides domain name register both in Thailand and internationally. It is recommended that SMEs hire a service from Web constructor that provides turn key service to construct an attractive Website. In the world of Internet, Web site is very important to the success of a business on line. Next, SMEs shall design a catalogue, and cart system. Detail like product name, descriptions price and shipping cost are necessary to be included. Three more important elements are also necessary to be acquired, including Security system, to protect their Web site from non preferred attempts.

Secondly, order form must be available when shopper wants to buy a product from their Web site. And last, SMEs shall apply for being a credit card shop from their bank. To the matter of question as why SMEs shall set up an E-Commerce feature beside from the physical shop or market, the author would like to suggest by presenting in form of opportunity and threat as the followings;

Opportunity

- (1) IT is an equal chance for SME towards large company to present good image of the company by Web site, because customer do not know the actual size of the company on Web. They judge by the Web site of each company. SME could be perceived a better company if a large company tries to save cost on their web site construction cost.

Threat

- (1) SME that can't enter E-commerce has a high chance of catastrophic because E-commerce will make competitor gain direct contact to customer where the particular SMEs are not.
- (2) Customer has more choice from global suppliers in Internet.
- (3) Ability to use English as business language is a barrier to Thai SMEs.

III. RESEARCH METHODOLOGY

In this chapter, the author divides the study into 9 parts; starting from presenting scale of area in Bangkok and its vicinities where delivery service could cover. Secondly, the three types of logistic network; namely single site logistic model, small-scale logistic model and large-scale logistic model. Third, the author will explain the function and processes flows of order processing. Fourth, inventory management will be covered by showing cost element of inventory and how to balance cost and maintain service at the desired level. Fifth, the author will present a step by step transit time calculation. The author uses his personal experience in transportation industry to define scope of transiting goods from the point of order taking until goods delivered to customer. Sixth, manpower planning would be shown in such the way that is suitable to selected logistic model. The objective of manpower planning is to employ only the minimum staff to fulfill delivery work requirement. Seventh, the service quality model which is very important to service industry will be mentioned, but detail will be shown in Appendix A. Eighth, topic about customer service is a must for such a highly competitive market, the author will present the elements of customer service, definition and criteria's to be measured versus actual service offered to customer. Ninth, the operation control covering key performance indicators and contingency planning would be presented. Tenth, the cost model for operating delivery trucks and motorcycle within selected area is presented in terms of fixed cost and operating cost respectively.

3.1 Bangkok by Geographical

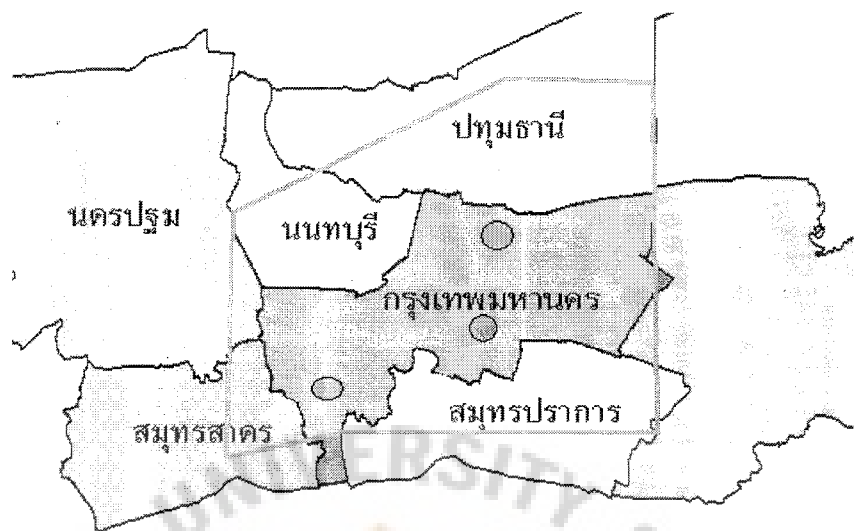


Figure 3.1. Bangkok by Geographical.

Table 3.1. Bangkok by Geographical.

Province name	Total area (Sq.km)	Area of coverage (Sq.km.)
Bangkok	1,569	1,500
Samoot-prakarn	1,004	500
Nonthaburi	622	150
Pathum thani	1,526	350
Total	4,721	2,500

As shown in the table above, this B to C logistic model for Bangkok metropolitan is limited within Bangkok and partial Samutprakarn, Nonthabiri and Pathum Thani. The total area of coverage is approximately 2,500 Sq.kms in the city area and the industrial area which is close to the main roads. This study aims to minimize the total inventory cost and fixed investment cost for delivery fleet, however, minimum net work should consist of 3 distribution centers. First DC should be located at the center of Bangkok

city (around Sukhumvit area), the second should be at the northern part (may be the area near the airport) and the last DC shall be located at the southern part which is Thonburi area. This study doesn't specify the exact area, the author suggests SMEs to finalize this location issue by further assistance of an expert.

Assume that the DC will be located at the middle part of the areas, traveling time from the center to each direction plus delivery activity within route would be completed within 2-3 hours.

3.2 Logistic Network and Operation Work Flow

The logistic networks may be divided into 3 categories, namely single site Logistic model, small scale logistic model and large scale logistic model. They are divided, based complexity of the entire network. In this study, the author will suggest a small scale logistic model for SMEs to consider for employment. It is possible that SMEs set up the small scale logistic network as a different department within their organization, however, the author would recommend hiring the service from a qualified third party because SMEs could focus onto core business activity such as production or front office operation.

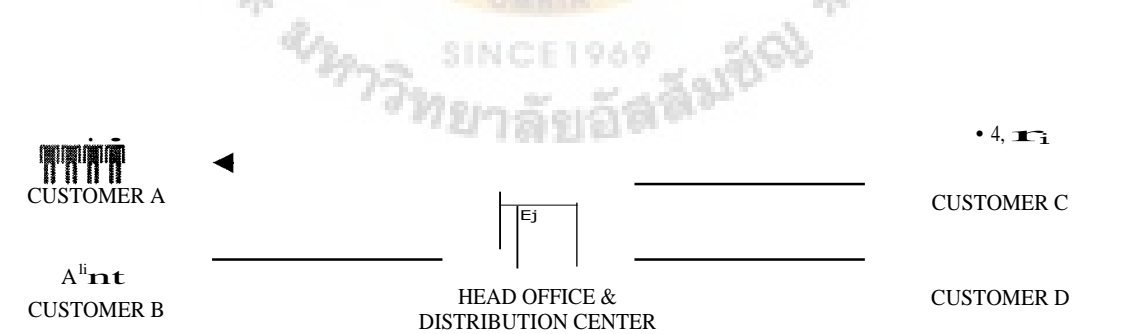


Figure 3.2. Single Site Logistic Model.

The single site logistic model consists of one distribution center and delivery vehicles. Distribution center could be the same place as the general office of the SMEs

or separated location depending on the need of the firm. The types of vehicles are mostly small pick up trucks or motorcycles because delivery addresses are within a short distance and the products are of small size. On the other hand, this logistic model is mostly suitable to city delivery due to transportation restriction within the city, in which larger vehicles are not allowed.

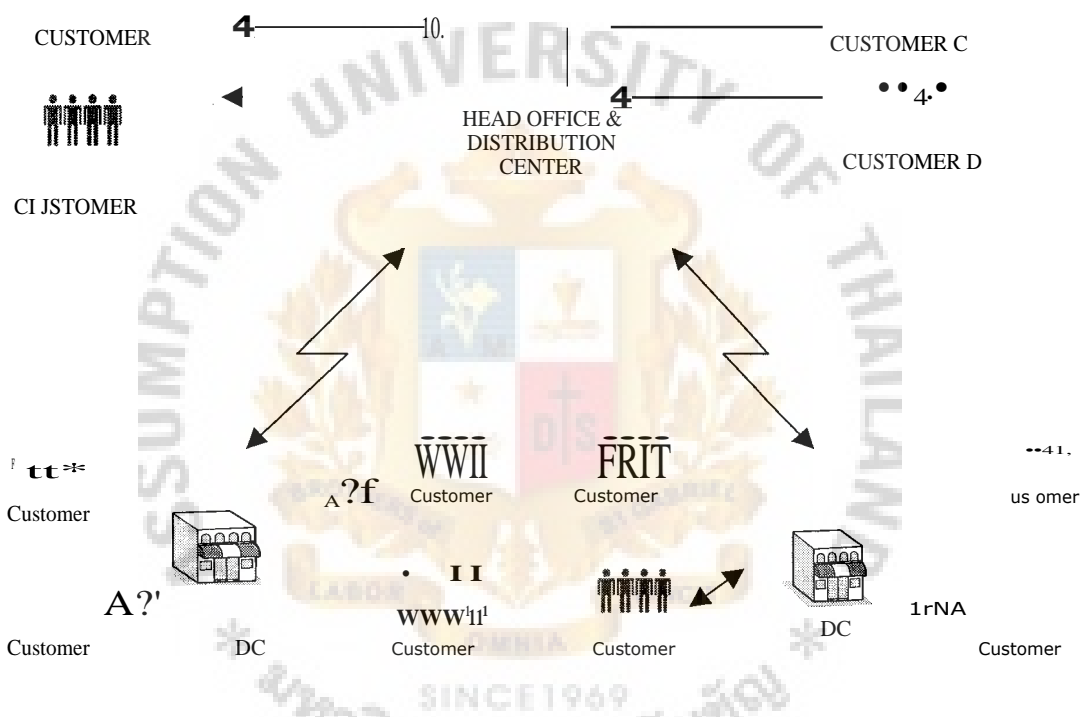


Figure 3.3. Small Scale Logistic Model.

Small scale logistic model is rationally the next step of single site model. Once business requirement increases, either in volume or speed of delivery, SMEs may reach the point that single site model would not be enough to handle the volume. Therefore, the small model shall be implemented. Managing a small scale model could be from the head office where the majority of good are stored , the smaller DC located at further distance will be used as short-term stock holding. The other purpose of smaller DC is to

be a meeting point for delivery trucks, so that vehicle's operating cost can be minimized. Since this study covers the area throughout Bangkok and its vicinities, it is appropriate to introduce this model for a startup.



Large Scale Logistic Model

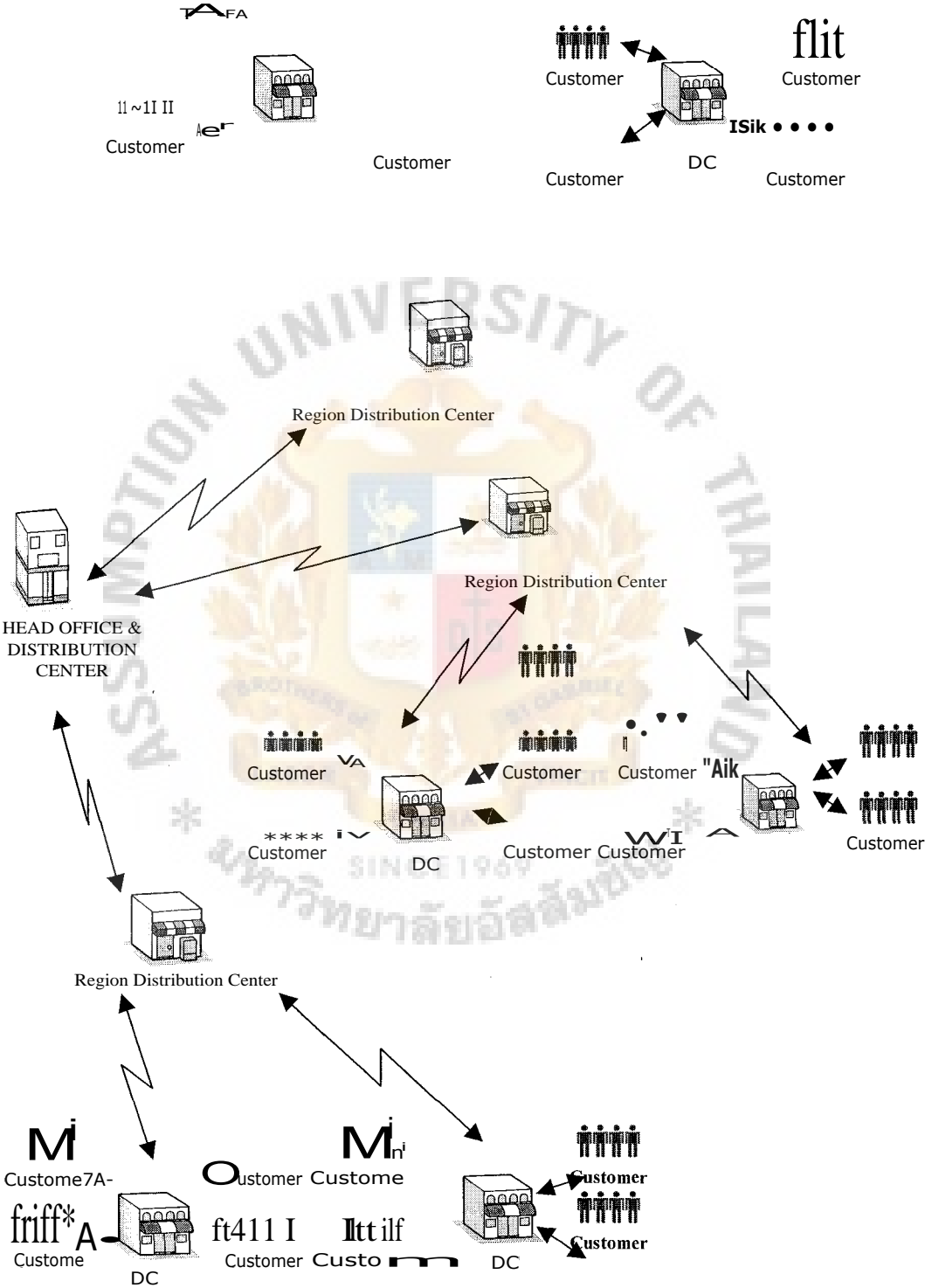


Figure 3.4. Large Scale Logistic Model.

The large scale logistic model has most complexity in term of network and required skill. The head office would take only the management role while routine work will start at regional head office. This level of network could be applied to the site of country, continental or global logistic network. Information technology is critical for this side of model, the link between head office to regional DC and local DC must be done electronically at a fast speed. Stocking of goods could be done from regional DC down to local DCs depending on specific needs. Total inventory cost throughout the entire network is important to the competitiveness of the firm. SMEs shall a balance between total cost and service level. Should they stock more goods with in the network, they could have higher chance to serve their customer, however, more stock means more capital investment.

3.3 Order Processing

3.3.1 Customer Payment Validation

What matter in order processing is making sure that customer will pay for product or services cost. Depending on payment method, and prior arrangement, an investigation must be made regarding the validity of the payment. This activity may be done by the SMEs finance department and/or a financial institution (bank, credit card brand such as Visa). Thus, the require payment information needs to be transferred to the checking mechanism and sometimes to an outsider. Then a feedback to finance, accounting and to the customer follows. The interfaces between the involved parties and the lines of communication must both be effective and efficient. Any delay may cause a shipment delay, resulting in a loss of good will or, more importantly, the customer.

3.3.2 Stock Validation

Regardless to if the vender is a manufacturer or a retailer, an inquiry needs to be made regarding stock availability. Several scenarios are possible here, involving both the material management and production department, as well as outside suppliers. Here again, the order information needs to be connected to the information about in-stock availability. Furthermore, if an item has been promised for a delivery it should be deducted automatically from the in-stock inventory.

3.3.3 Arranging Shipment

If the product is available, it can be shipped to the customer (otherwise go to step 5). Product can be digital or physical. If it is physical and it is readily vailable, packing and shipment arrangement need to be made. Both the shipping (packaging) department and internal shippers or outside transporters may be involved. Digital items are usually available since their inventory is not depleted. Special packaging including brochure or instruction may be included at this stage, based on individual shipment requirement.

3.3.4 Insurance

Sometimes insurance for the shipment is needed. Both the finance department and an insurance company could be involved and again, information needs to flow frequently not only inside the company, but also to and from the customer and insurance company.

3.3.5 Production

Customized customers' order will always trigger a need for some manufacturing or assembly operation. Production can be done in house or by contractors. An in-house production needs to be planned for . Production planning involved the acquisition of material and the components. The supplier may have their own supplier, frequently in the several tiers.

3.4 Inventory Model

A primary objective of inventory management is to minimize cost of holding inventory, however, an optimum target is to achieve a balance between inventory holding cost and service to customer. The essential task of determining a proper balance requires continuous and comprehensive planning. An automated and integrated order processing system can reduce the time needed to perform certain element of order cycle, including order entry, order processing and inventory replenishment. Time saved in the performance of this activities can be used for inventory planning. In this way the SME can gain substantial cost saving by reducing safety stock.

In addition, an automated and integrated order processing system can reduce message errors and unexpected time delays. This facilitates decision making and improves internal coordination in the SME. Remote terminal linked to a central processing unit can handle the most complex communication flows. It is vital to look at inventory cost as part of logistic cost, following are cost structures of related terminology in logistic.

Total logistic cost can be derived by:

$$\text{Total logistic cost} = \text{Inventory holding cost} + \text{delivery cost}$$

$$\text{Inventory holding cost} = \text{unit cost} + \text{quantity}$$

$$\text{Inventory cost} = \text{Inventory unit cost} (\text{quantity})$$

$$\text{Inventory quantity} = \text{Safety stock quantity} + \text{in-transit quantity}$$

We can forecast safety stock based on EOQ technique (not to be covered in this study) However the in-transit to fulfill all order within one day. Therefore quantity in-transit is equal to daily consumption. We could forecast the daily consumption based on history or sales projection.

The SME shall apply the proven inventory forecast technique and strictly hold on

the projected quantity. The higher demand shall not be the case to stock more goods but to do with faster delivery process. In case of manufacturer, production line must be set in favor to small quantity lot side, production lead time shall be minimum. But if SMEs needs to acquire product from suppliers, safety stock shall be calculated by factored peak demand seasonal.

Minimum Inventory within Network

Inventory is a major use of capital, for this reason, the objective of inventory management is to increase profitability, in other words to minimize the total cost of logistic activity.

In SME's E-commerce, the inventory cost is inter related to transported cost. The two costs sum up to total cost. It is important that SME's E-commerce would hold up fulfillment's objective as defined. Reducing transportation cost may result in high inventory cost and may reflect in a high total cost.

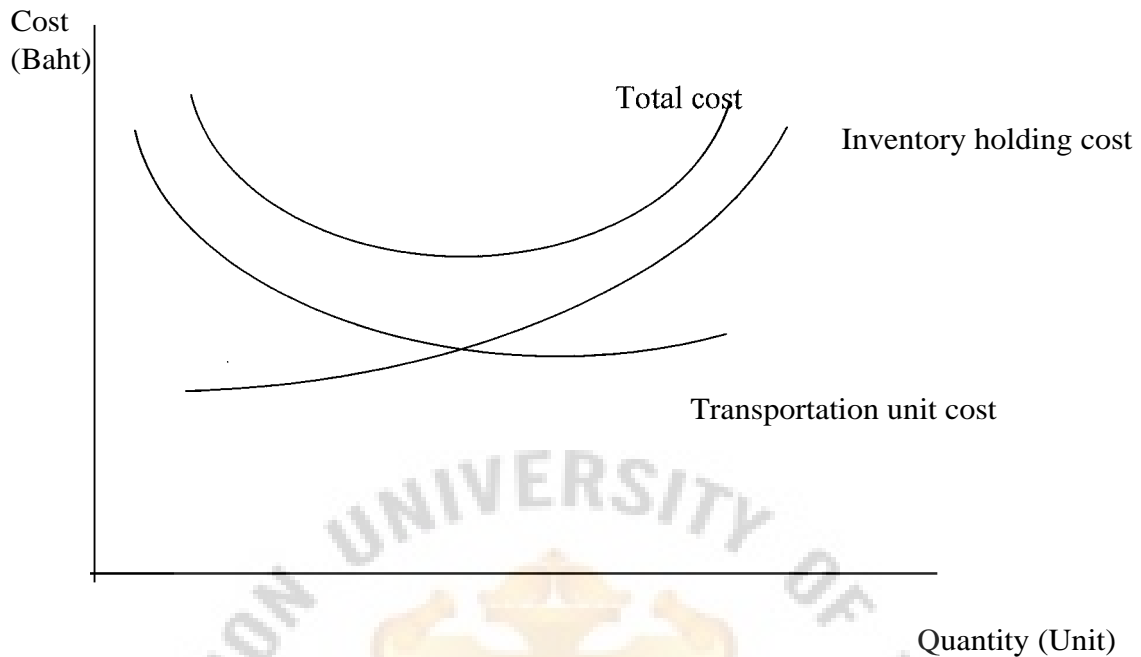


Figure 3.5. Minimum Inventory within Network.

What are counted as inventory cost throughout the logistic network for E-commerce?

The inventory including;

- (1) Finished goods purchased from supplier
- (4) Finished goods produced in house but counted at transition point of acquisition to point of payment received.
- (5) Goods in warehouse
- (6) Goods in D.O
- (7) Goods in transit
- (8) Returned goods
- (7) Repaired goods

3.5 Transit Time Calculation

Time unit of delivery within Bangkok metropolitan should be in unit of hour. The

customer expects to receive goods within reasonably quick time. This is critical to purchasing behavior of E-Commerce's shoppers. Goods may not be needed if it is not available within few hours based on current market standard.

Selling goods on Web for delivering within a city, SMEs shall set a delivery service as a competitive weapon. It is highly recommended that SMEs hire a service from a professional and reliable delivery network. The main point SME's E-Commerce has to offer to customer is convenience, speed and truth. Wisely SME shall keep the points as market segmentation criteria.

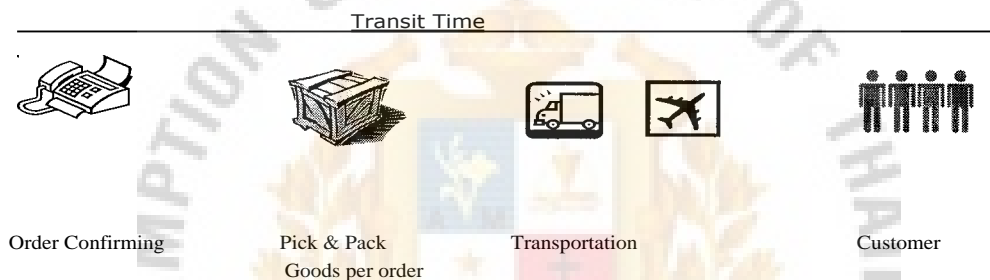


Figure 3.6. Transit Time Calculation.

As started in order processing, criticality of achieving the set transit time is accurate information. Once emphasis is on the accuracy of order processing, the success in delivery process is viable. The diagram above defines length of transit time for SMEs to refer for measuring their commitment to customer. Clock starts when customer confirms order until customer receives their order with satisfaction in both condition and quantity.

3.5.1 Transportation Configuration

Part of transit time calculation, we need to define type of vehicles to be used in transportation network. In this study, small scale logistic model for Bangkok

metropolitan, we will discuss transportation model as the following structure. Pick up trucks, vans and motorcycles are suitable for delivery network in Bangkok due to the restriction of 6 wheel and more bigger truck. Equally they are more flexible to move within the congested city of Bangkok.

Following are types of vehicles available in Thai market, they are suitable for different kinds of work requirements.

<u>Type/Specification</u>	<u>Nature of suitable use</u>
<u>Pick up truck with Sheller</u>	
- 4 wheeler	- Frozen product
- Refrigerated box installed	- Cool product
- Double security lock for containing unit	- Grocery product
- Most expensive due to Sheller unit	
<u>Pick up truck</u>	
- 4 wheeler	- Dry grocery product
- Fiber glass roof	- Durable goods
- Double security lock for containing unit	- General goods / products
- Less expensive and suitable to be used	- Delivery to all kinds of building and places in Bangkok
<u>Van</u>	
- 4 wheeler	- Dry grocery product
- Double security lock for containing unit	- Durable goods
- More expensive that pick up truck	- General goods / products
but has more loading capacity and	- Long distance
could present better image to company	

dedicated vehicle to operate in each DC, it is better to set up a regular departure time from DC for every vehicle. The following table is suggested to optimize service and cost.

(1) Delivery schedule by motorcycle

The first type of vehicle is motorcycle. For short distance and light weightshipment, motorcycle could be most suitable for speedy service and optimum cost. Two motorcycles are assigned by code and number as M1 and M2.

Table 3.2. Delivery Schedule by Motorcycle.

Round	Order cutoff time	Loading time	Delivery time	Vehicle number	Note
1	8:00AM.	8:20AM.	08:30AM.-12:00AM.	M1/1	Flexible run pattern
2	10:00AM.	10:20AM.	10:30AM.-01 :30PM.	M2/1	Flexible run pattern
3	12:00AM.	12:20PM.	01:00AM.-03:30PM.	Mi/2	Flexible run pattern
4	02:00PM.	02:20PM.	02:30AM.-05:00PM.	M2/2	Flexible run pattern
5	04:00PM.	04:20PM.	04:30AM.-06:30PM.	M1/1	Flexible run pattern
6	06:00PM.	06:20PM.	06:30AM.-09:30PM.	M3/2	Flexible run pattern

Round 1 to 6 are assigned to fixed delivery time frame throughout the day. Each round is inter-related to order cutoff time and loading time. Each motorcycle has to make three rounds in a day. Run pattern is flexible based on actual delivery address of each run. Rider of motorcycle should be employed from local area because he/she knows the road network and traffic condition in the area.

(2) Delivery schedule by truck

The second type of vehicle is pick up truck. The pick up is good for heavier bulky shipment and for the longer distance from DC. We assign one pick up truck per DC, and similarly code and number is assigned as P1.

Table 3.3. Delivery Schedule by Truck.

Round	Order cutoff time	Loading time	Delivery time	Vehicle number	Note
1	10:00AM.	10:20AM.	10:30AM.-02:00PM.	P1/1	Flexible run pattern
2	02:00PM.	02:20PM.	02:30PM.-06:00PM.	P1/2	Flexible run pattern
3	06:00PM.	06:20PM.	06:30AM.-09:00PM.	P1/3	Flexible run pattern

The same concept for job assignment is assigned to pick up truck. One truck needs to run 3 rounds within a day order cutoff time, loading time and delivery time are pre-determined throughout the day.

Transit Time Calculation

We want to determine proper transit time that would be acceptable by customer while we are confident that they are achievable and attainable. Therefore, we use statistical technique to estimate an average transit time. The out come of this calculation will be published in SMEs Web site.

Table 3.4. Transit Time Calculation.

Order receiving time		Order confirm time		Size of order		Delivery vehicle	Time Transit
		Small	high				
Before 08:00	08:00 AM.	✓		M1/1	08:30-12:00	1-4	
			✓	P1/1	10:30-02:00	2-6	
08:00-08:30	08:30AM.	✓		M2/1	10:30-01:30	2-4.3	
			✓	P1/1	10:30-02:00	2-5.3	
08:31-09:00	09:00AM	✓		M2/1	10:30-02:00	1.30-.3	
			✓	P1/1	10:30-02:00	1.30-5.0	
09:01-09:30	09:30AM.	✓		M2/1	10:30-01:30	1-4	
			✓	P1/1	10:30-02:00	1-4.3	
09:31-10:00	10:00AM.	✓		M1/2	10:30-02:00	0.3-3.3	
			✓	P1/2	10:30-02:00	0.3-4	
10:01-10:30	10:30AM.	✓		M1/2	10:30-02:00	2.3-4.30	
			✓	P1/2	10:30-02:00	4.00-7.30	
10:31-11:00	11:00AM.	✓		M1/2	01:00-03:30	2.00-4.30	
			✓	P1/2	02:30-06:00	3.30-7.00	
11:01-11:30	11:30AM.	✓		M1/2	01:00-03:30	1.30-4.00	
			✓	P1/2	02:30-06:00	3.00-6.30	
11:31-12:00	12:00AM.	✓		M1/1	01:00-03:30	1.00-3.30	
			✓	P1/1	02:30-06:00	2.30-6.00	
12:01-12:30	12:30AM.	✓		M2/2	02:30-05:00	2.-430	
			✓	P1/2	02:30-06:00	2-5	
12:31-01:00	01:00PM.	✓		M2/2	02:30-05:00	1.30-4.00	
			✓	P1/2	02:30-06:00	1.30-5.00	
01:01-01:30	01:30AM	✓		M2/2	2:30-05:00	1.00-3.30	

Table 3.4. Transit Time Calculation. (Continued)

<u>Order receiving time</u>		<u>Order confirm time</u>		<u>Size of order</u>		<u>Delivery vehicle</u>	<u>Time Transit</u>
		<u>Small</u>		<u>high</u>			<u>time</u>
			✓		P1/2	02:30-06:00	1.00-4.30
01:31-02:00	02:00PM.	✓			M2/2	02:30-05:00	0.30-3.00
			✓		P1/2	02:30-06:00	0.30-4.00
02:01-02:30	02:30PM.	✓			M1/3	04:30-06:30	2.00-4.00
			✓		P1/3	06:30-09:00	4.00-6.30
02:31-03:00	03:00PM.	✓			M1/3	04:30-06:30	1.30-3.30
			✓		P1/3	06:30-09:00	3.30-6.00
03:01-03:30	03:30PM.	✓			M1/3	06:30-09:00	1.00-3.00
			✓		P1/3	06:30-09:00	3.00-5.30
03:31-04:00	04:00PM.	✓			M1/3	06:30-09:00	0.30-2.30
			✓		P1/3	06:30-09:00	2.30-5.00
04:01-04:30	04:30PM.	✓			M2/3	06:30-09:00	2.00-4.30
			✓		P1/3	06:30-09:00	2.00-4.30
04:31-05:00	05:00PM.	✓			M2/3	06:30-09:00	1.30-4.00
			✓		P1/3	06:30-09:00	1.30-4.00
05:01-05:30	05:30PM.	✓			M2/3	06:30-09:00	1.00-3.30
			✓		P1/3	06:30-09:00	1.00-3.30
05:31-06:00	06:00PM.	✓			M2/3	06:30-09:00	0.30-3.00
			✓		P1/3	06:30-09:00	0.30-3.00
06:01-08:00 (next day) ----- t o be delivery on next day-----							

From table above, the minimum transit time is 30 minutes and the maximum transit time is 7:30 hours. However, based on fare chance distribution the suggested publish transit time could be calculated as the following:

Table 3.5. Frequency Table.

Transit time	Frequency	Quantity	%
0:30-1:00 hrs		0	0
1:00-2:00 hrs		0	0
1:00-3:00 hrs	////	5	12.0
1:00-4:00 hrs	//// //	9	21.5
1:00-5:00 hrs	//	2	4.7
1:00-6:00 hrs		0	0
1:00-7:00 hrs		0	0
2:00-3:00 hrs		0	0
2:00-4:00 hrs	//// /	6	14.3
2:00-5:00 hrs	//// //	9	21.5
2:00-6:00 hrs	//	2	4.7
2:00-7:00 hrs		0	0
3:00-4:00 hrs		0	0
3:00-5:00 hrs	//	2	4.7
3:00-6:00 hrs	//	2	4.7
3:00-7:00 hrs	/	1	2.4
4:00-5:00 hrs		0	0
4:00-6:00 hrs	/	1	2.4
4:00-7:00 hrs	//	2	4.7

Table 3.5. Frequency Table. (Continued)

<u>Transit time</u>	<u>Frequency</u>	<u>Quantity</u>	<u>%</u>
4:00-8:00 hrs		1	2.4
500-6:00 hrs		0	0
500-7:00 hrs		0	0
	<u>Total</u>	42	100

Assumptions

- (1) Disregard 30 minutes transit time by counting from 1 hour onward due to suitability for real case application.
- (2) From table, transit time distribution is as follows:

Table 3.6. Cumulative Frequency.

<u>Transit time</u>	<u>Frequency</u>	<u>Percentage</u>	<u>Cumulative</u> <u>percentage</u>
1:00-3:00	5	12	12
1:00-4:00	9	21.5	35.5
2:00-4:00	6	14.3	47.8
1:00-5:00	2	5.7	52.5
2:00-5:00	9	21.5	74
3:00-5:00	2	4.7	78.7
2:00-6:00	2	4.7	83.4
3:00-6:00	2	4.7	88.1
4:00-6:00	1	2.7	90.5
3:00-7:00	1	2.4	92.9

Table 3.6. Cumulative Frequency. (Continued)

<u>Transit time</u>	<u>Frequency</u>	<u>Percentage</u>	<u>Cumulative percentage</u>
4:00-7:00	2	4.7	97.6
4:00-8:00	1	2.4	100

By above statistic, it is possible to set transit time by preferred technique of SMEs, for example at 90% chance, transit time could be committed at 1-6 hours. However, 6 hours seem to be too long to wait in the internet world. Therefore, more information could be obtained. In this study, the author has conducted an interview with the managing director of an SMEs called DST (Direct Sale Trading). DST is doing business on line by selling grocery products via an Internet (WWW.DST) the following information is captured to obtain frequency or order taking from Internet Website of DST.

Period of date gathered: November 1-30, 2000

<u>Order receiving time</u>	<u>Number of order</u>	<u>Delivery transit time</u>	<u>Percentage</u>
		(Motorcycle, hr.min)	

Before 8:00	244	1.0-4.0	20.7
8:00-8:30	30	2.0-4.3	2.5
8:31-9:30	58	1.3-4.3	5.0
9:01-9:30	42	1.0-4.0	3.6
9:31-10:00	62	0.3-3.3	5.2
10:01-10:30	43	2.3-4.3	3.6
10:31-11:00	50	2.0-4.3	4.2

Period of date gathered: November 1-30,2000

Order receiving time Number of order Delivery transit time Percentage

(Motorcycle, hr.min)

11:01-11:30	66	1.3-4.0	5.5
11:31-12:00	24	1.0-3.3	2.0
12:01-12:30	19	2.0-4.3	1.5
12:31-01:00 PM.	52	1.3-4.0	4.5
01:01-01:30 PM.	128	1.0-3.3	11.0
01:31-02:00	37	0.3-3.0	5.0
02:01-02:30	23	2.0-4.0	1.9
02:31-03:00	36	1.3-3.3	3.0
03:01-03:30	19	1.0-3.0	1.5
03:31-04:00	59	0.3-2.3	5.0
04:01-05:00	64	2.0-4.3	5.4
05:01-05:30	32	1.3-4.0	2.5
05:31-06:00	78	1.0-3.3	6.6
06:01-08:00 (next day)		0.3-3.0	

Total 1164

Weight transit time calculation

<u>Order receiving time</u> (hrs)	<u>Number of order</u>	<u>Percentage</u>	<u>Cum.percentage</u>
1:00-3:00	211	18.1	18.1
1:00-4:00	495	42.5	60.6
2:00-4:00	202	17.4	78.0

Weight transit time calculation

<u>Order receiving time</u> (hrs)	<u>Number of order</u>	<u>Percentage</u>	<u>Cum.percentage</u>
1:00-5:00	0	-	78.0
2:00-5:00	188	16.1	94.1
3:00-5:00	70	6.9	100
2:00-6:00	-		100
3:00-6:00			100
4:00-6:00		-	100
3:00-7:00			100
4:00-7:00	-	-	100
4:00-8:00		-	100
<u>Total</u> 1164			

Conclusion: From additional data gathered from DST, it is possible to conclude that the suggested logistic model could ensure delivery transit time within Bangkok metropolitan within 1-5 hrs after order receiving.

3.6 Manpower Panning

In order to have proper manpower planning, SMEs shall establish standard operating procedure at first. Refer to vehicle operating time frame and fleet structure, step by step operating procedure shall be done as follows:

General Operating Procedures:

Packing staff prepare shipment by withdrawing goods from stock according to purchasing order issued from front office operation.

(1) Delivery staff verify quantity of goods versus delivery order. Should there

be any discrepancy, delivery staff will inform to packing staff for correction.

- (2) Driver/rider plans his delivery run by setting the sequential. Delivery address that closer to DC shall be set as priority, far distance address shall be reached along the way of travelling.
- (3) Driver/rider uploads goods to vehicle.
- (4) Goods must be delivered to customer's premises with in the predetermined timeframe criteria after receipt of a request order. In case of unclear/wrong delivery address or customer is not present at their premises to receive goods, delivery shall make an attempt to reconfirm the address or status of the customer within the maximum of 10 minutes after the arrival. If the staff still is unable to delivery the goods to the customer, the staff shall pass the problem to delivery co-ordinate at DC. The co-ordinate shall contact the customer to reconfirm the address for the next shift of delivery.
- (5) Driver/rider returns to DC, completes delivery status report and gives brief report to delivery co-ordinate.
- (6) Delivery co-ordinate shall report all daily operating costs and delivery performances to management at the end of each operating day.

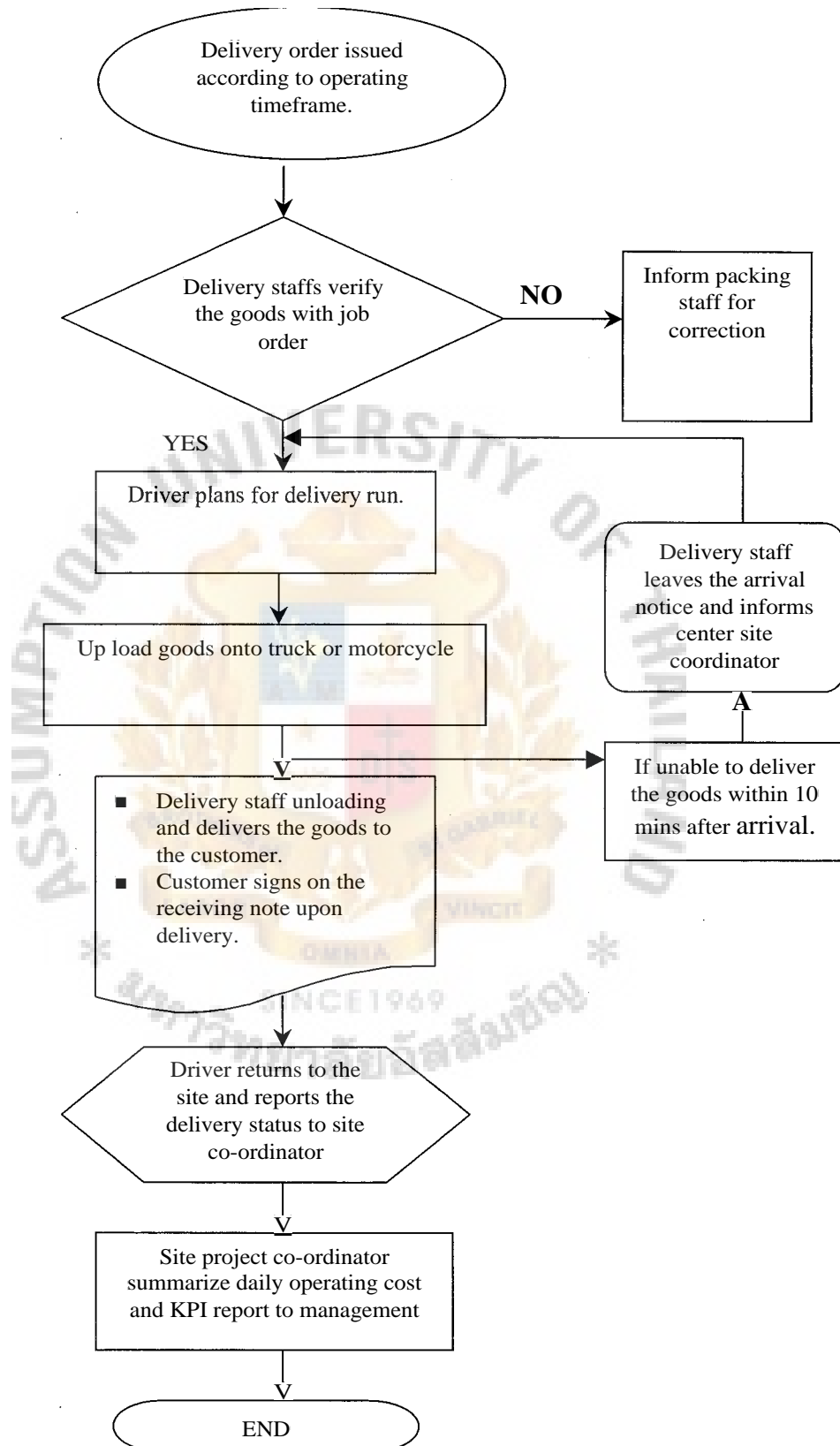


Figure 3.7. General Operating Procedure.

Vehicle operating hours

Motorcycle and driver

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15			
Vehicle	8:00	9:00	10:00	11:00	12:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	Number	O.T	Total
number																hours	hours	hours
M1		4		3.30 hrs	10	4		2.30 hrs		0.4		2 hrs	0			8*	0	8
M2			4	3 hrs		10		2.30 hrs		0.4		2 hrs	0			8*	0	8
																16*	0	16"

Figure 3.8. Motorcycle and Driver.

Motorcycle departure time: 8:30 AM, 10:30 AM, 1:00 PM, 2:30 PM, 4:30 PM and 6:30 PM

Pick up truck and driver

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15			
Vehicle	8:00	9:00	10:00	11:00	12:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	Number	O.T	Total
number																hours	hours	hours
P1				1	3.30 hrs		1	2		3.30 hrs		2.30 hrs				8	1.3	9.3
																8	1.3	9.3

Figure 3.9. Pick up Truck and Driver.

Pick up truck departure time: 10:30 AM, 2:30 PM and 6:30 PM

Based on more than one distribution center within the logistic network, the optimum DC for Bangkok plus some part of Pathumtani, Nonthaburi and Samutprakarn as per presented in earlier part, are subject to employment opportunity as follows.

Table 3.7. Total Manpower Should Be Employment.

<u>Total manpower should be employed</u>		
<u>Location</u>	<u>Motorcycle rider</u>	<u>Pick up driver</u>
DC 1	2	1
DC 2	2	1
DC 3	2	1
Total	6	3

Note: Assume that staff absenteeism is equal to 10%, therefore, it is recommendable that SMES hire a delivery co-ordinate to administrate delivery work and he/she shall perform delivery job if necessary.

3.7 Service Quality Model

When customer fines little or no difference between products and service, that is the customer is really willing to try the second choice. SME on E-commerce, except those who are holding a very unique product, must take customer service as number one priority to the SME. The author would not like to discuss details of service quality model, in this part, but to refer to Appendix A under service agreement contract.

3.8 Customer Service

Customer service is very important on every stage of Customer Delivery Value (CDV). In E-commerce, customer service may cover from front office operation until the very far end like after sales service. There is a similarity in other means of commerce but its customer would expect more when the price of goods is higher.

Customer Service in Back-end Solution

In long part, the back-end process has less control over product's substitutability, yet SME must plan for the distribution of products with varying degree of substitutability. Substitutability can be veined in terms of lost sales to the SME. The higher substitutability usually means the greater chance for customer to select competing products. SME is generally due with last sales through transportation choice, storage choice or both. Usually both choices are combined.

Definition of Customer Service

Some definitions may be listed to present the meaning of customer service. The author shall give some sample as the following;

"Customer service, when utilized effectively, is a prime variable that can have a significant impact on creating demand and retaining customer loyalty"

OR

"The speed and dependability in which items ordered (by customer) can be made available "2.

From the definitions, the key words are speed, efficiently loyalty and available. They are so important and even more with the fast moving trend like E-Commerce.

Customer Service Elements

From a corporate perception, customer service has been viewed as an essential ingredient in marketing strategy.

Elements of customer service may be identified according to when the transactions between the supplier and customer took place. These elements are grouped into pre transaction, transaction and post transaction categories.

- (1) Kyi, Larissa S. and Myroslow J. Kyi. "Customer Service: Differentiation in International Markets," International Journal of Physical Distribution &

Logistic Management 24, No. 4 (1994):41.

- (2) Heakett, James L. "Controlling Customer Logistic Service," and Intonation
Journal of Physical Distribution & Logistic Management 24, No. 4
(1994):32-40.
- (3) Laalonde, Bernard J. Lalonde and Paul H. Zinszer. Customer Service:
Merging and Measurement. Chicago: National Council of Physical
Distribution, 1976.

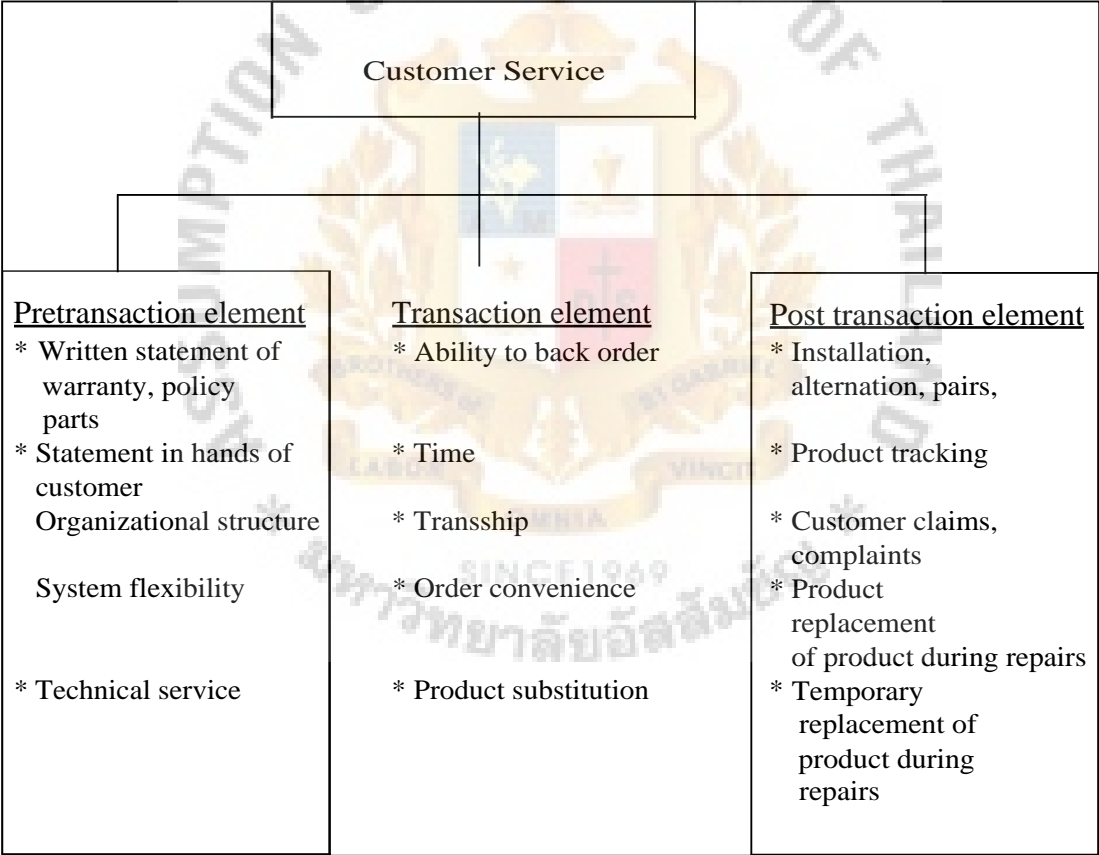


Figure 3.10. Customer Service.

SME's E-commerce shall imply the elements to set a clear customer service module for its own good. Future adjustment to fit the real demand of business depends on the desired level of service, competition or both.

Source: Adapted from Bernard J. Lalonde and Paul H. Zinozer. "Customer Service as a Component of Distribution System," Working Paper Series WPS 75-4 (Columbus, OH: The Ohio State University, College of Administrative Science, February **1975**).

Customer Service Criteria

Based on customer survey conducted by TNT, criteria is value to customer when dealing with delivery service are;

- (1) Delivery as fast as I require
- (2) Delivery is on time
- (3) Accurate information used in delivery such as name and reference number.
- (4) Quote and invoice price the same
- (5) Drivers are helpful
- (6) Professional manner
- (7) Prompt advice of problem, should it occur

The above criteria are to be referred to as example to view customer interests. any companies view delivery quality from the wrong side, it is easy for a company to find itself making a lot of effort to improve customer service but the criteria they use are from service provider while in fact, they should view it from the service buyer.

3.9 Operation Control

Logistic management is about service and cost. We have covered most issues in this report except cost control matter. It is easy that unbalanced situation could happen any time that emphasize on one side would happen. All effective logistic firms have

extensive operation control.

Key Operation Performance indicator

Service performance

- (1) Pick up on time (Percentage)
- (2) Accuracy of report
- (3) Delivery on time (Percentage)
- (4) Exact goods were picked up for delivery
- (5) Exact quantity were pick up for delivery

Cost performance

- (1) Overtime hour work
- (2) Vehicle utilization rate (Hour on road, loading hour etc)
- (3) Staff productivity rate (Depot departure time)
- (4) Vehicle maintenance cost
- (5) Accident rate
- (6) Unplanned cost ratio to planned cost

Contingency Planing

Providing a daily delivery service is an extra ordinary working system, SME has to be aware of the working condition on weekend, or long public holiday. Back up plan in case of emergency such as accident, absenteeism or over workload, shall be addressed in advance. Written procedure must be prepared. Staff concerned must be trained accordingly. Management of logistic network is about planning and excuting the plan, every situation is planable.

3.10 Cost Model

To see more meaning of the proposed logistic model that consist of 3 DCs, author will present the transportation cost model for SMEs. Starting from cost structure, detail

of cost in major line item and total estimated cost for operating the net work on monthly basis.

3.10.1 Cost Structure

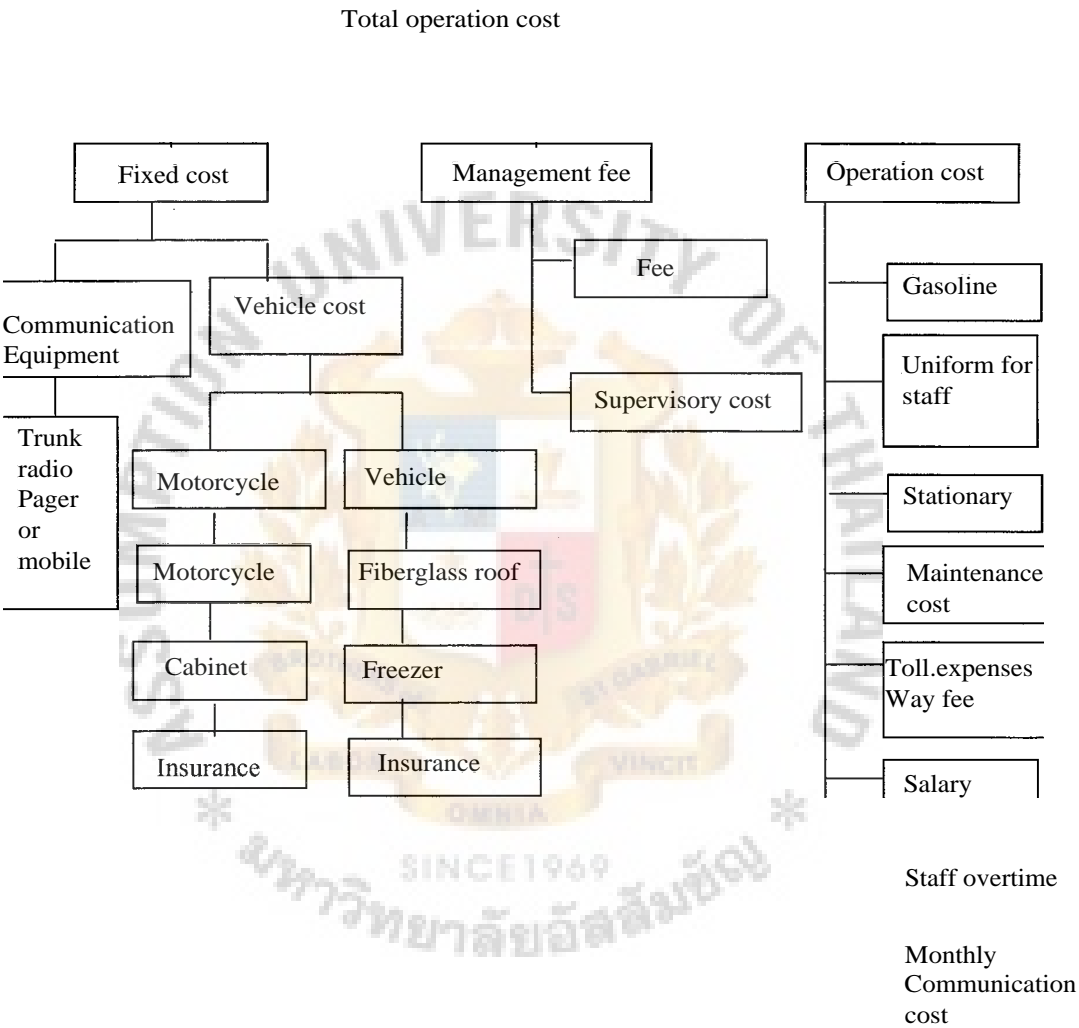


Figure 3.11. Cost Structure.

Table 3.8. Fixed Cost — Vehicle.

Fixed cost — Vehicle

Description	Monthly rental/unit	Unit	Total monthly
Pic-up truck	17,500 *	3	52,500
motorcycle	>,*	6	-
Total	17,500	9	52,500

* Minimum 1 year contract rate, plus insurance.

** It is practical to rent motorcycle together with hiring motorcycle rider (own by employee)

Table 3.9. Fixed Cost — Communication.

Fixed cost — communication

Communication system	Unit cost	Unit	(5 years) Total	Total monthly
- Base station radio	40,500	1	40,500	675
- Fleet trunk radio	37,000	9	333,000	5,550
- Monthly fee	900	10	-	9,000
Total			373,500	15,225

Table 3.10. Operating Cost.

Description	Salary	No.staff	Total monthly
Driver	5,500	4 (3+1)	22,000
Motorcycle	6,000	8(6+2)	48,000
Plus motorcycle cost			
Fleet co-ordinator	8,000	1	8,000
Gasoline - pick up	(250x30)	3	22,500
Gasoline - motorcycle	2,500	6	15,000
Overtime			
- driver = 1.30 Hr/day	50/ hour	4	9,000
Total			124,500

Grand total 52,500+15,225+124,500
192,225 Bahts per month



IV. CONCLUSIONS AND RECOMMENDATIONS

4.1 Conclusions

From this structure SME, shall commit a 1-5 hours delivery capability to all places in Bangkok plus partial Pathumtani, Nonthaburi and Samutprakan where most business and high purchasing demand are located. However, to keep unit cost as low as possible, SME shall have observed unit cost calculation as the following.

Table 4.1. Conclusions.

Total delivery per month	Total cost estimated	Cost per delivery
1000	192,225	192.25
2000	192,225	96.00
3000	196,725*	65.50
4000	201,225**	50.25
5000	210,225***	42.00

* Add gasoline cost per month at 4,500 Bahts

** Add gasoline cost per month at 9,000 Bahts

*** Add gasoline cost per month at 18,000 Bahts

From the unit cost perspective SMEs that have less volume shall avoid capital investment. The choice of buying service from 3rd party logistic provider shall be selected. For example if volume to be delivered is equal or less than 3,000 deliveries per month, they should select a choice of buying service from the third party logistic company.

4.2 Recommendation for Further Study

As logistic is about storing and moving, how many to store, where to store, how many to be moved and when to move are such the dynamic questions. The optimum

solution has to depend on various conditions and objectives of the firm. This study is focuses on frequency daily deliver at small quantity order to customer in Bangkok. The goods are majority durable goods. Key success factors of backend e-fulfillment are speedy delivery and low unit cost. Group of customers who shops on line are expecting fast response time. However, due to the high competition, the delivery charge must not be a burden to stop people from shopping on line.

Based on the defined scope, SME's shall not invest on neither warehouse nor delivery vehicle. They should consign the entire fulfillment progress to third party logistic provider. SMEs can gain benefit from unit cost while service quality is reliable at the professional standard, no capital investment on fixed assets, less concerns from labor issue cost are

There are simply two methodologies that the third party logistic provider would charge to SME; cost plus fee or per unit charge.

Cost Plus Fees

This is a method that suits a large network and special conditions where service are dedicated to the SME. 3PL will propose the designed dedicated network to SME. SME may apply on top of total operating cost (SME to pay to 3PL) add or cut features of the network to satisfy their needs. Therefore a certain fees are to be:

The Per Unit Charge

This is a more general service option based on established network of the 3PL. It is suitable to the newly started SME with less transaction requirement or less concern of product's velocity.

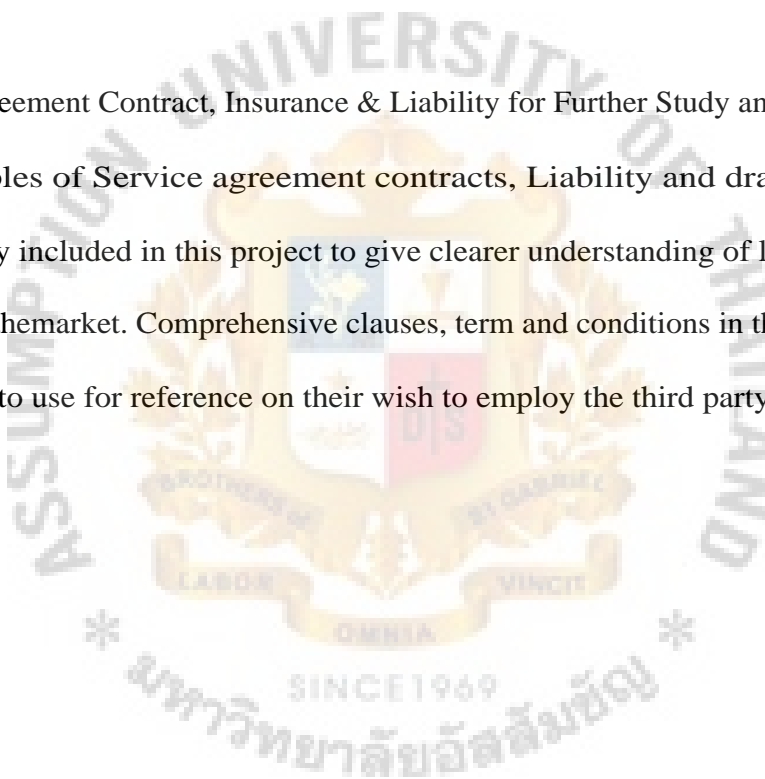
There are three main kinds of per unit charges in the fulfillment process namely; warehouse charge, pick and pack, and delivery charge. Should SME require or function support from 3LP such billing, money collection or product return service, additional

charge may be applied.

The author urges the readers to find more concept and knowledge about outsource logistic service from Internet. There are much more internet Web sites that present articles about or related topic to E-Commerce and logistic. In the Appendix of this report, there are books and web site names. The author wishes to thank the managing director of a company called DST for his desire on launching SMEs E-Commerce in Thailand. Wish him and DST the bright future in the unrelenting challenge business world.

Service Agreement Contract, Insurance & Liability for Further Study and Reference

Samples of Service agreement contracts, Liability and drawing right are intentionally included in this project to give clearer understanding of logistic services, offered in the market. Comprehensive clauses, term and conditions in the sample would help SMEs to use for reference on their wish to employ the third party logistic service provider.





APPENDIX A

SAMPLE OF CONTRACT / LIABILITY AND DRAWING RIGHT

WAREHOUSE AND DISTRIBUTION SERVICES AGREEMENT

THIS AGREEMENT is entered into on this---- day of ----month----year.

BETWEEN XXX

AND YYY

RECITALS:-

- is a member of the -- Group of Companies and provides transport, distribution, logistics and warehousing services.
2. The Customer is principally engaged in the production and manufacturing of -- -
3. The Customer and --- have agreed to provide transport warehousing, logistics and distribution services for and on behalf of the Customer in the Territory (as defined below).

NOW IT IS HEREBY AGREED AS FOLLOWS:

1. DEFINITIONS

"this Agreement"	means this document, all Schedules which are or will be attached hereto, as well as such other documents which shall form an integral part hereof;
"Goods"	means -- of the Customer handled by TNT under this Agreement;
"Services"	means the services to be performed by --- for the Customer as set out in Schedule 1 as amended in writing by the parties from time to time;
"Tariffs"	means the rates as set out in Schedule 2 to be charged by ---- to the Customer for providing the Services as amended in writing by the parties from time to time;
"Territory"	means the Kingdom of Thailand; and
"Warehouse"	means the warehouse facility in Bangkok, Thailand operated by ---- in the provision of the Services as set out in Schedule 1.

2. APPOINTMENTS

- 2.1 The Customer hereby appoints --- to provide the Services in the Territory as described in Schedule 1 on a non-exclusive basis for and on behalf of the Customer. ---- accepts this appointment on this basis and agrees to provide them efficiently and diligently.
- 2.2 The Customer consents to -- subcontracting the transportation portion (but not the warehousing portion) of the Services to another Contractor outside the ---- Group of Companies at its own discretion subject to --- taking responsibility for the actions of these sub-contractors and ensuring

- that they conform to ---- operating standards.
- 2.3 Such sub-contractors or agents appointed by --- according to Clause 2.2 shall be under the full and sole responsibility of -- and it is expressly agreed that the Customer shall have no liability or responsibility whatsoever for or towards any such sub-contractors or agents or any appointment thereof notwithstanding the approval by the Customer of such contractors or agents.

3. DURATION

This Agreement shall commence on date month year and expire on date month year unless terminated in accordance with the provisions set out below. Not later than 6 months prior to the Expiry Date, the Customer and ---- shall agree whether the term of this Agreement shall be extended and the terms of such extension.

4. SPECIFIC TERMS

- 4.1 The terms and conditions for the carriage of the Goods by ---- shall be governed by the --- General Conditions of Carriage an example of the current version being attached in Schedule 3. In the event of a conflict between the terms and conditions of this Agreement and the said General Conditions of Carriage the former shall prevail.
- 4.2 For greater certainty the applicable ---- General Conditions of Carriage shall apply to any carriage of Goods carried out by -- even if for some reason no consignment note was completed or provided in respect of any particular act of carriage.

5. OBLIGATIONS

Customer

- 5.1 The Customer warrants that it is entitled to hand over possession of the Goods to to be stored and transported in accordance with this Agreement.
- 5.2 The Customer shall ensure that all Goods are safely packed, clearly labelled in accordance with its own specified standards and sealed to facilitate their storage and carriage and any additional measures agreed with ----.
- 5.2 The Customer will provide ---- on a timely basis with such information about the nature and the manner in which the Goods should be handled and the precautions that should be taken which the Customer knows or ought to know are of importance to --
- 5.4 The Customer shall comply with all statutory and any legal requirements regarding the Goods which are relevant for the proper performance by ---- of the Services, inclusive of any requirement in respect of the procurement of documents from the sending or receiving country and proper safeguards against the Goods causing physical injury, death or damage or loss of property.
- 5.5 The Customer warrants that description and details relating to the general nature of the Goods furnished to --- shall be accurate and complete.
- 5.6 The Customer shall be responsible for supplying --- throughout the period of the Agreement with up to date and complete data with respect to the names and addresses of the Customer's customers to whom and from whom Goods are to be carried.

The company

- 5.7 ---- shall deliver the Goods on time and as specified in packing instructions and related operational communications or documents.

- 5.8 ---- shall receive, store, process and deliver the Goods in accordance with Customer-supplied written specifications and taught through Customer-supplied training and procedures.
- 5.9 ---- shall be in daily contact with the Customer in regard to managing the warehouse systems and promptly notify Customer regarding issues that arise in connection with the Services.
- 5.10 -- shall safeguard the Goods during the course of operations and house said operations in agreed environmental conditions, and contact Customer's Information Technology support, and or Customer-supplied and Customer-paid system maintenance contractors as required for equipment maintenance or repair.
- 5.11 shall not pledge, charge, mortgage or encumber in any way of transfer title to the Goods, which are the property of the Customer, by way of security for any indebtedness.
- 5.12 shall provide the Customer with a daily and monthly activity report in a form reasonably accepted to the Customer detailing the services provided.

6. TARIFFS AND PAYMENT

- 6.1 The Customer shall pay -- all amounts due for providing the Services such amounts having been calculated in accordance with the Tariffs and in the manner stated in Schedule 2. The Tariffs are exclusive of any taxes, duties and/or rates, which if payable shall be borne by the Customer. Payment of the Tariffs shall be in Thai Baht.
- 6.2 shall submit to the Customer detailed and accurate invoices in respect of the amount due for providing the Services. The Customer shall pay the total amount stated in the invoices and credit notes not later than 45 day from the placing bill date.
- 6.3 In the event of a dispute invoice or part thereof -- shall at the Customer's request within 14 days provide documentary evidence to support the disputed charge on the relevant invoice. If no amicable settlement can be reached after a further 7 days then the parties shall meet at an agreed venue for the purpose of reconciling all disputed invoices.
- 6.4 If the Customer raises a genuine query on an invoice after it has been paid and ---- agrees with the Customer that a refund for the amount challenged should be made then ---- shall have a discretion to grant the refund in cash or give a credit against the next issued invoice following the acknowledgement.
- 6.5 Except for a bona fide dispute invoice, if the Customer does not pay an amount included in an invoice by the due date for payment of that amount, then the Customer must in addition to any amount payable under this Agreement, pay interest on the amount included in that invoice at the rate of 2% per month from the due date for payment of that amount until the date of payment (both before as well as after judgement).
- 6.6 The parties shall keep accurate books, accounts and records covering all transactions between the parties relating to this Agreement and shall upon reasonable request provide to the other copies of such documentation and information necessary to enable the other party to reconcile any financial differences between them.

7. CONFIDENTIAL INFORMATION

- 7.1 For the duration of this Agreement and 2 years thereafter the parties shall maintain as confidential and shall not disclose to any person outside of its employ, nor use for purposes other than in its performance of this Agreement, any business information of the other which the receiving party learns in confidence during the course of this Agreement such as specifications, technical

information, business data criteria used for pricing except such information shall not be considered confidential where it is already in the public domain through no fault of the receiving party. Upon expiration or earlier termination of this Agreement the parties shall promptly return to each other all tangible confidential material and all copies thereof upon request.

- 7.2 Neither party shall in any manner disclose, advertise or publish the existence or the terms and conditions of this Agreement unless it has the other party's prior written consent.

8. **TERMINATION FOR CAUSE**

Either party may terminate this Agreement in whole or in part at any time by written notice in the event that other party:

- (a) fails to comply with any material provision of this Agreement provided that the failure has not been remedied by the party in breach within 30 days of a written warning notice having been sent by the party alleging breach requesting the breach to be remedied;
- (b) becomes insolvent or makes an assignment for the benefit of creditors, or a receiver or similar officer is appointed to take charge of all or part of the other party's assets; and
- (c) merges with or is acquired by a third party of which the other party disapproves for whatever reason.

9. **TERMINATION AT WILL**

Should there be any termination at will, either party shall be entitled to terminate this Agreement by given the other party not less than 60 days prior written notice.

10. **NOTICE**

Any notice which may be or is required to be given under this Agreement shall be written and shall be sent by registered/recorded post. All notices shall be effective when received at the following addresses:

If to --- :----- With a copy to:

If to the Customer:

11. **EXCLUSION OF LIABILITY**

Neither party shall be liable to the other for any special, economic, indirect or consequential loss suffered by that party including but not limited to loss of profits, anticipated savings, goodwill or an opportunity.

12. **INDEPENDENT CONTRACTOR**

The parties in its performance of their obligations under this Agreement are acting as independent contractors and not as a representative, agent or employee. Neither party is authorized to make or assume any obligations or incur any liabilities on behalf of the other except as expressly set out in

this Agreement.

13. DANGEROUS GOODS

- 13.1 ----reserves the right at its sole discretion and without notice to the Customer to refuse to carry any items as Goods which in the opinion of ---- are not adequately packed and/or be considered dangerous or are in the opinion of -- a prohibited item.
- 13.2 The Customer shall clearly label in a suitable manner any dangerous goods as dangerous.
- 13.3 In case of the declaration of nature of the Dangerous Goods from Customer in which -- accepted and certified by written notice prior possession of the Dangerous Goods by The Customer agrees that if dangerous goods become an actual danger to life and/or property in the opinion of ----, they may be unloaded, destroyed or rendered innocuous by -- as the circumstances may require without payment by ---- to the Customer of any compensation.

14. FORCE MAJEURE

- 14.1 For the purposes for this Agreement Force Majeure means any event or circumstances preventing or hindering the fulfilment of the obligations under the Agreement, if such event or circumstances is beyond the reasonable control of either party. This includes but is not limited to strikes, lockouts, or other labour disputes, shortage of labour, shortage of fuel, governmental restriction, riots, civil commotion, fire, war, weather conditions. Force Majeure shall not include breach of contract by ----'s subcontractors, or by customers of the Customer.
- 14.2 In the event of a Force Majeure situation which prevents or hinders to a material degree a party from fulfilling its obligations under this Agreement the party claiming Force Majeure shall be entitled to postpone performance of its obligations to the extent and for the period of time it is prevented from discharging them by the act of Force Majeure PROVIDED THAT it has given written notice to the other party immediately following the event of Force Majeure and set out the circumstances involving the occurrence. The party relying on Force Majeure shall keep the other party fully informed of any developments concerning the Force Majeure situation and advise the other party when the situation is likely to come to an end.
- 14.3 In the event of a Force Majeure situation affecting the whole or a substantial part of the Services for more than 6 consecutive weeks, the other party may terminate this Agreement upon giving 14 days prior written notice.

15. VARIOUS PROVISIONS

- 15.1 During the term of the Agreement and for a period of 12 months thereafter, neither party shall employ any employee of the other party who has had a substantial involvement in the performance of that party's obligations under this Agreement unless that party has received the prior written approval of the other party.
- 15.2 The Schedules form an integral part of the Agreement and are deemed to incorporated therein. All references to Schedules are schedules to this Agreement.
- 15.3 Neither party may assign or transfer any of its rights under this Agreement (except for --'s right to sub-contract) without the prior written consent of the other party.
- 15.4 Save as expressly provided in this Agreement no amendment or variation of this Agreement shall be effective unless made by an instrument in writing and signed by a duly authorised representative of

each of the parties.

- 15.5 The failure to exercise or enforce any right conferred under this Agreement by either party shall not be deemed a waiver of any such right to operate so as to bar the exercise or enforcement of such right at any time or times thereafter.
- 15.6 If any part of this Agreement becomes invalid, illegal or unenforceable the parties shall in such an event negotiate in good faith in order to agree a mutually satisfactory provision to be substituted for the invalid, illegal or unenforceable provision which as nearly as possible validly gives effect to their intentions as expressed herein.

16. APPLICABLE LAW AND JURISDICTION

This Agreement shall be governed by and construed in accordance with the laws of Thailand and the parties hereto submit to the non-exclusive jurisdiction of the Courts of Thailand.

EXECUTED BY the parties duly authorized representatives.

For and on behalf of

By: _____
Name
Title:

By: _____
Name:
Title:

For and on behalf of

By: _____
Name:
Title:

SCHEDULE 1

SCOPE OF SERVICES

---- shall provide to the Customer warehousing and distribution services of the Goods in the Kingdom of Thailand. The Goods shall be delivered to the customers of the Customer in Thailand. At the request of the Customer -- shall also provide customs clearance and pick and pack services in respect of the Goods received by air from the authorized agent and/or distributors of the Customer in various countries.

2. shall operate the Warehouse at:

Warehouse Operating Procedures:

1. shall receive the Goods from the Customer (or through its authorized agent) at the Warehouse. When the Goods arrive at the Warehouse, -- shall check whether the exterior of the Goods and the packaging has been damaged.
2. shall also check whether the Goods correspond to the packing lists, manifest and airway bills and whether there are any discrepancies in the documentation. -- shall check whether the Goods were properly packed.
3. ---- shall notify the Customer of any discrepancies in the documentation, any discrepancies between the Goods and the documentation, any damage to the Goods or packaging, and any inadequacies in the packaging by fax, by not later than the end of the working day following the day the relevant Goods arrived at the Warehouse.
4. shall sort the Goods in accordance with the Customer's written instructions.
5. shall provide inventory management services, which will include cycle counting.
6. shall confirm that the Goods are properly stored and the inventory updated to the Customer not later than twenty-four (24) hours after the Goods arrive at the Warehouse. Any equipment or other items provided by the Customer to -- for the performance of the services shall be in good condition and working order and shall be fit for the purposes for which they are intended to be used.
7. Once Goods have been dispatched or if the Customer needs to increase inventories, replacements will be dispatched to the ----warehouse location.
8. Goods must be delivered to Customer's premises within predetermined time criteria after receipt of a request to a ---- warehouse. The Customer may also require return of faulty or excess Goods to a central distribution warehouse to be actioned daily or weekly, via the --- next-day delivery service system.
9. Charges for storage and distribution will apply to the Customer and will vary depending on individual delivery requirements.
10. Various stock control and movement documentation that will apply to the Customer will be agreed from time to time.
11. The relevant ---- stock controller is responsible for ensuring that any difficulties incurred with a consignment (finding Goods, vehicle resources, delays, damages.) should be reported to the Customer immediately so that the Customer can make alternative arrangements if necessary. There are no exceptions to this instruction.

12. Should there be any discrepancy of the stock under custody of . . . shall settle down the outstanding at the actual cost of any discrepancy Goods.

General Procedures

The Warehouse shall remain in good, clean dry and safe operating condition and kept and operated in accordance with Customer supplied specifications and per customer supplied training.

--- shall provide on site 5 warehouse operators for the management of the Warehouse.

The Warehouse operating hours ("Normal Warehouse Operating Hours") shall be:

Mondays to Fridays: 0830 to 1800 hours
Saturdays: 0900 to 1630 hours

Closed on Sundays and Thailand Public holidays

Cut off time for receipt of delivery orders from Customer for next-day delivery: 1630 hours.

The Customer must give ---- prior notice of at least 1 business day, for requests for the Warehouse to operate beyond the Normal Warehouse Operating Hours.



Receive Good Products from - - - - (Inbound)

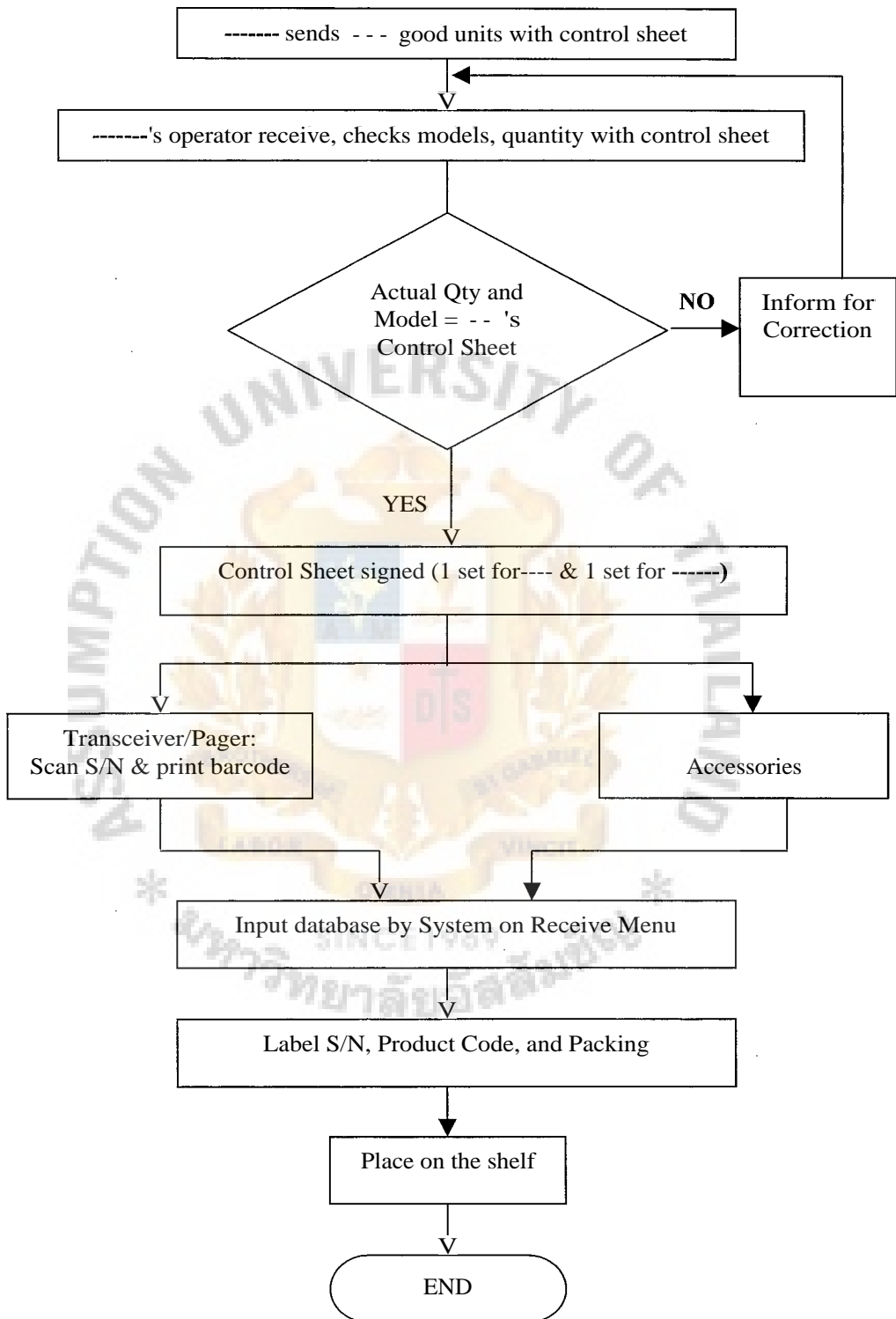


Figure A.1. Receive Good Product From - - - (Inbound).

Dispatching (Good products to – – –

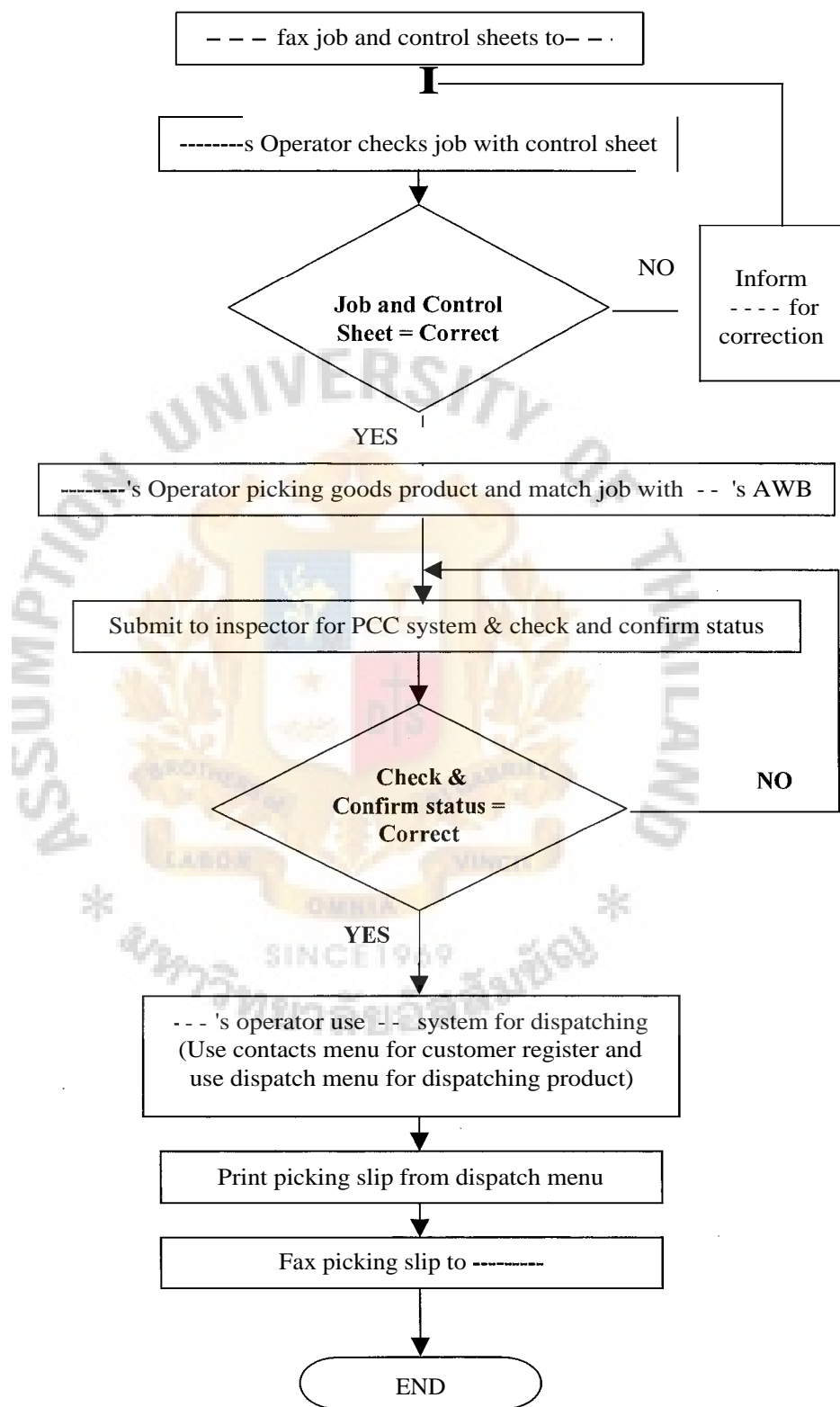


Figure A.2. Dispatching (Good Products to-----).

Receive Defective Product from Customer

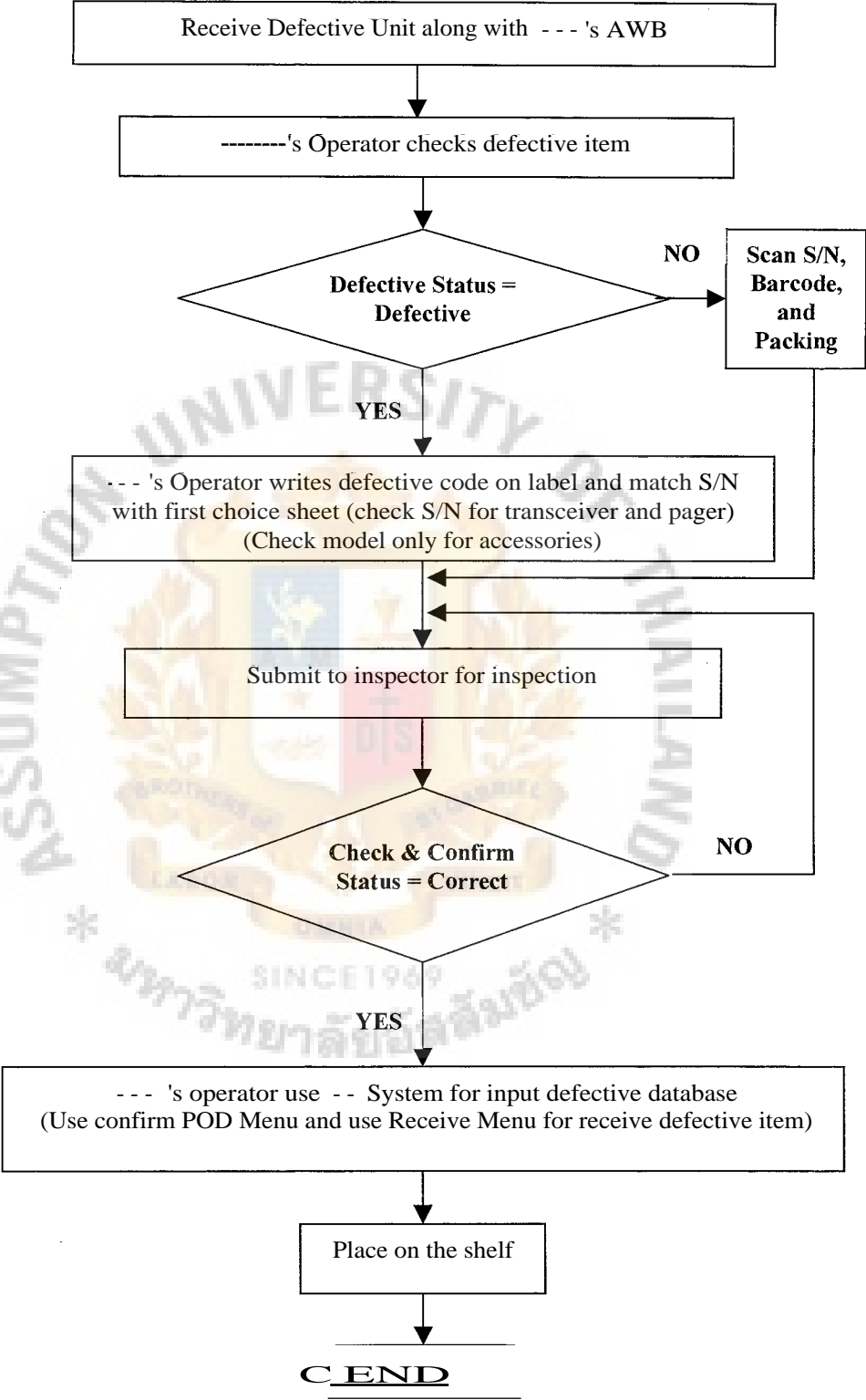


Figure A.3. Receive Defective Product from Customer.

Send to Repair Dispatch Defective to ----- for Repairing

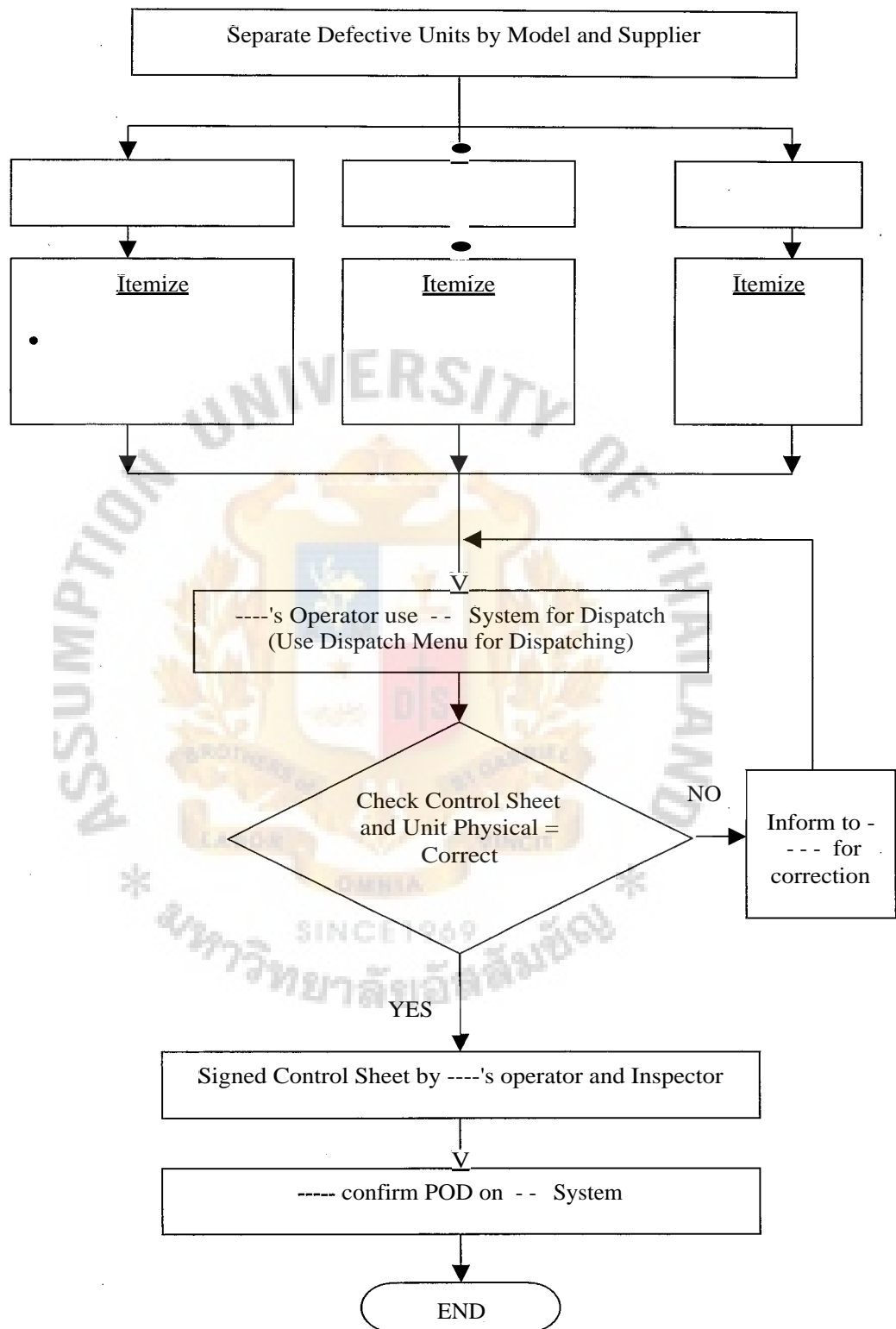


Figure A.4. Send to Repair (Dispatch Defective to -----for Repairing).

SCHEDULE 2

TARIFFS

Inbound replenishment delivery:

For each load received from ----, repacked, labeled, scanned and put into store, --- will charge ---- Baht per consignment

Warehouse Management

Warehouse management/administration charge will be billed at -- - Baht per month including hardware cost and stock management system.

Storage space for 20 square metres required will be charge at --- Baht per month.

Additional 20 square metres space will be charged at - - Baht per month.

This rate includes utilities, racking security and temperature controlled environment.

If total space of storage facility is required (including dividing mesh area), --- will charge -- Baht for remaining 20 square meters area.

Packaging

As per current supplier, we will source costs from our supplier to see if there is a saving. Dimensions with forecast numbers to be provided by stock controller and proved by the Customer. All costs will be back charged to the Customer with the month order.

Pick and Pack

Send to repair per exchange order received picked and dispatched charges are 15 Baht per order.

Local Distribution

Within Bangkok and metro area charges are Baht per delivery order on monthly basis, next day delivery.

If the Customer requires the same day delivery price will be Baht.

Upcountry deliveries are charged Baht for destination within a town area. There will be a surcharge of Baht over upcountry delivery charges for destinations, which are 15 km out of town for next day delivery.

Customs Clearance

If the Customer requires to provide customs clearance services, ---- shall prepay all necessary duties and taxes to expedient customs clearance. ----shall invoice the Customer for the cost of such duties and taxes and the Customer shall make payment on such invoices within 5 days of receipt of such invoices. In addition, ---- shall invoice the Customer in arrears, a handling fee of ---Baht duties and taxes for the Customer clearance services.

Overtime Surcharge

Order processing after Normal Working Hours (when requested by the Customer) will be charged at Baht per hour per ---- operator.

SCHEDULE 3

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SCHEDULE 4

SPECIAL CONDITIONS AND ANCILLARY SERVICES

1. Unless agreed otherwise in writing between the parties - - shall be at liberty to decide where the goods are to be stored in reasonably secure and dry locations. Unless otherwise agreed, in writing, the Goods shall be collected from and delivered to a named warehouse during the normal working hours of that warehouse.
2. ---- shall check whether the number of boxes in which the Goods are contained, match the number of boxes or package indicated on the accompanying document and indicate any discrepancy on the accompanying document. Unless agreed otherwise, ---- will not be obliged to (but has the right to) open the boxes or package in order to check whether the contents of each box or package match the number of Goods indicated on that box or package.
3. In the event that Goods sent to the warehouse are revealed to be damaged or defective condition, which is outwardly visible at the time of arrival, - - - shall note this on the consignment note specifying the defect or damage and in turn notify the Customer. Failure to notify the Customer on a timely basis shall not give the Customer any right to claim against ----. Unless specific instructions are given by the customer, ---- shall be entitled, but is not obliged, on its own authority and at the cost of the Customer to take all reasonable actions, which it considers necessary to protect the interest of the Customer.
4. If the Customer requires access to the Warehouse, - - - and the Customer shall agree in writing notice which representative of the Customer is entitled to enter the warehouse during working hours and any conditions applicable thereto.
5. Any other warehousing and ancillary services not included in the scope of Services schedule 1 shall only be performed at the Customer specific request at rates agreeable by both parties.
6. In the event that the Customer develops a warehouse management system for the Goods and wishes to implement the system in respect of the Services, shall be entitled to assume that the system provided has all of the facilities specified by the Customer and shall have the right to audit such system either itself or by a third party. Any costs or fees in respect of the implementation of the Customer's system including the development of an interface with 's system shall be agreed by the Customer and prior to the implementation of the system.
7. The company's liability for loss or damage caused to the Goods or part thereof or other property of the Customer caused by its negligence or otherwise whilst in the warehouse shall be limited to a maximum of - - - Special Drawing Rights (approximately US\$ - - -) per occurrence or series of occurrence arising from the same cause or to 2 special Drawing Rights per Kilogram damaged or lost gross weight, whichever is the higher provided that the maximum paid out does not exceed the cost price to the Customer such cost to be proved by the Customer. In the event that the special Drawing rights amount does not exceed the cost price then the cost price of the Goods shall be substituted as the maximum amount.
8. If the Goods are stored in a bonded warehouse the Customer shall indemnify ---- against all claims, demands, costs and expenses (including lawyers fees and expenses) arising from the customs authorities imposing duties associated with lost Goods upon - -

Executive interview

Background

Searching information from Internet about E-fulfillment in Thailand, the author had found an interesting Thai web site <http://www.dstmart.com> that sells grocery products via Internet. And, the most interesting part is the company could make a home delivery at a very low price. The author had tried the purchasing and could make an appointment with the managing director of the firm for an interview. It turned to be very interesting and was added in this report. Mr. Thweepon, the managing director of DST, states that the company was founded in 1998, after the economy crisis in Thailand (the crisis started 2 July 1997). His previous job was related to a leasing business (car, machine, and property). The company was a subsidiary company of a finance company. With a large number of staff in the company (more than 400), Mr. Thaweepon had difficulty keeping all staff with only one leasing business. Based on his background in computer managerial, finance and his own Internet in E-commerce, Mr. Thaweepon saw an opportunity to do business online. "What would I sell in internet?" He asked himself. Grocery products had come to his conclusion because of the three reasons; first, he has a good bill collection network from a leasing business. Secondly, no one had offered internet grocery product with home delivery in Bangkok, before. And last, grocery is fast moving consumer goods (FMCG), it would create frequency transaction.

Question & Answers

Q: Why do you enter E-commerce, especially grocery product?

A: Like I have explained, it was the crisis. I don't want to lay off any staff, I have good motorcycle network to deliver and collect from places in Bangkok. We thought grocery products fits us most, then we set up

distribution centers. We plan to have 20 centers but now only 11 centers. Our service model is every 10 kms. radiant we should have one DC and we want to achieve delivery lead-time within 1 hour.

Q: What had been an obstructer to your business and may will be?

A: Electronic payment has always been a major problem to E-Commerce in Thailand. Though I had set up everything with my bank, when it came the time that my customers wanted to buy a stamp (my other web is Web stamp), my bank sent me a big letter warning that though the transaction was approved, I must be careful of found and I am held final responsible to any loss. Thai bank is not ready!

Q: How do you see possibility to over come the problem?

A: I think virtual card that can enter user passwords bar online payment. Because you don't need passwords for paying by credit cards and that is so scary to cardholder to tell card number to web site. Ninety percent of my customers prefer cash on delivery (COD).

Q: How do you see future of E-Commerce in Thailand?

A: Bright. By 2004 virtual market will be a visible size in term of business transaction both B to B and B to C.

Q: How do you position DST in future?

A: Expand my coverage throughout Bangkok Metropolitan and major city in Thailand. We are working hard to add more lines of products to our web site

and also open more web site to specific market such as my newly open "Webstamp.com" I have more business partners such as CU bookstore, Grammy CD today, EGV movies ticket delivery.

Q: Talk about web site, how do you construct and maintain this?

A: From leasing business we had a fairly good size of computer system (hardware / software), we have a full team of technicians, I hire a web designer last two years to work with the team, especially artwork. We store most database in our server but rent some space from ISP to keep a fast response time to our customer.

Q: What would be minimum investment cost for you if you have to start from zero/

A: I think 300,000-500,000 Baht would be enough for front end.

Q: How do you design your logistic network?

A: Most of them are the network from bill collectors when we had a lot of work in leasing business. We looked at the map of Bangkok and decided that we should have approximately 8-12 convenience stores speeded in all parts of Bangkok and its vicinities. We have opened 11 stores until date (Nov. 2000). We have planned to expand our coverage to other main cities in the upcountry later on. We sell our products by both at front of store and on virtual market.

BIBLIOGRAPHY

English References

1. Ballon, H. Ronald. Business Logistic Management, 4th Edition. Upper Saddle River, New Jersey: Prentice-Hall, Inc., 1999.
2. Finnegan, Gerry. "Potentials and Barriers in the Development of Microenterprises in Thailand." Paper Presented at the Seminars on Conceptual Plan for SME Development in Thailand. Queen Sirikit National Convention Center, 23 August 1999.
3. Lambert, M. Douglas and Stock R. James. Strategic Logistics Management, 3rd Edition. Singapore: McGraw-Hill, 1999. Taha, A. Hamdy. An Introduction to Operations Research, 6th Edition. United States of America: Simon & Schuster/A Viacom Company, Prentice-Hall, Inc., 1999.
4. Turban, Efraims, Lee Jae, King David, and Chung H. Michael. Electronic Commerce: A Managerial Perspective. Prentice-Hall, Inc., 2000-2001.
5. Gates, William H., III. Business@ the Speed of Thought, Using a Digital Nervous System. A Time Warner Company Editions. United States of America: WarnerBooks, Inc., 1999.

Web Site References

1. www.thaiecommerce.net
2. www.dola.go.th/cgi-bin/area.sh
3. www.DSTmart.com
4. www.hostingkit-comifag.html
5. www.smethai.net/policy/tpolicy1.html
6. www.Prenhall.com/turban

Thai References

1. ๑51๒ I5011Itiff5, 61115 vially, f115i0f11715aW11111ftAflit'41114n.
1111a1119J11111f15: I5linillrfeflidf1111V101111-1f115"g8 (1f1.3). 2542
2. VflaltJA 5 6'169 1 Vi1114f11141A116:195FObafiT15171f111115nTlfffTIE1.
froqramvil5iiTinntinseigmtIvi7iitl. VITY6ientanAinuittviliJInitlfelY18. filltillA13J11114f15:
i5liimizier19-If1A11,1fl01111f115iiEJ (Vf1.1). 2542

