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A SERVICE DESIGN FOR AIR CARGO BUSINESS

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วิภาวี แก้วเทพ : การออกแบบบริการสำหรับธุรกิจการขนส่งสินค้าทางอากาศ (A SERVICE DESIGN FOR AIR CARGO BUSINESS) อ.ที่ปรึกษาวิทยานิพนธ์หลัก: รศ. ดร. สมพงษ์ ศิริโสภณศิลป์, 63 หน้า.

งานวิจัยฉบับนี้จัดทำขึ้นโดยมีวัตถุประสงค์เพื่อออกแบบบริการให้แก่บริษัทตัวอย่างที่ให้บริการขนส่งสินค้าทางอากาศ ขั้นตอนแรกจะเริ่มจากการจัดกลุ่มลูกค้าประเภทอิเล็กทรอนิกส์ 92 รายโดยใช้วิธีการแบ่งกลุ่มแบบ K-Mean ผลของการแบ่งกลุ่มทำให้ได้ลูกค้าทั้งหมดสองกลุ่มประกอบไปด้วยลูกค้ารายใหญ่ 4 ราย และกลุ่มลูกค้ารายย่อยทั้งหมด 88 ราย หลังจากนั้นผู้เชี่ยวชาญของบริษัทจึงได้ทำการตรวจสอบความถูกต้องของกลุ่มที่แบ่งได้ ขั้นตอนต่อมาได้ใช้หลักการของ AHP เพื่อกำหนดความสำคัญเปรียบเทียบขององค์ประกอบบริการกับผลประเมินที่ได้จากลูกค้า 4 ราย จากทั้งกลุ่มที่ 1 และกลุ่มที่ 2 ท้ายที่สุดได้นำวิธี QFD มาใช้ในการออกแบบบริการให้เป็นไปตามความต้องการของลูกค้าแต่ละกลุ่มย่อย

สาขาวิชา การจัดการโลจิสติกส์และโซ่อุปทาน ลายมือชื่อนิสิต .....

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The aim of this research is to design service elements to be offered by a case company providing air cargo services. The study begins with the grouping of ninety-two air cargo customers in the electronic industry using the K-mean methodology. The segmentation results in two customer groups; four larger customers falling into group 1 while the remaining eighty-eight smaller customers in group 2. Experts of the case company are consulted to check the validity of the segmentation results. The study then applies the AHP method to determine the relative importance of service elements with the inputs from four customers in group 1 and a selected group of customers in group 2. Finally, the QFD method is performed to design logistics services specifically for each customer group.

Field of Study:	Logistics Management and Supply Chain Management	Student's Signature	.....
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Wiphawi Kaeothep

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Chapter 1

Introduction

1.1 Problem Statement

Thailand is one of the largest exporters in Asia and its economy continues to grow, fueled by the high demand for exported products. Several parties are involved in the export business such as carriers, freight forwarders and suppliers, each performing a different set of activities in the logistical chain, thereby creating significant challenges to the maintenance of fast, high-quality services. Providers of air cargo services currently face considerable difficulties due to the lack of long-term customer relationships. Customers continue to demand a higher level of service and lower costs despite the existence of signed service contracts. Moreover, customers will not hesitate to employ a new service provider if the existing one fails to meet their demands.

This research focuses on the mitigation of such problems in order to ensure the sustainability of the logistics business by securing customer loyalty. The focal logistics company in this research is one of the top ten global providers with more than a hundred branches worldwide, without possessing their own aircraft, ships, or trucks. Therefore, as a Non-Vessel Owning Common Carrier (NVOCC) operating in several continents across the world, the company needs to be flexible in their approach to supply chain management, offer the best possible cost-effective shipping facilities in order to satisfy customers, and concentrate on increasing service efficiency to improve their competitive edge.

However, the focal company's historical data indicates that only the most profitable customers were likely to receive the highest standard of service by well-trained staff, and this can lead to an unfair allocation of resources, customer dissatisfaction, and a low competitive edge. Despite this, the focal company's strategy and management approach is based on the intention to build a network of strong positive, long-term customer relationships, regardless of whether or not they are high volume or highly profitable because both target groups can provide a continual flow of opportunities, generate consistent profit, expand market share, and increase the company's bargaining power with service providers.

In order to establish a successful logistics service, the company needs to put in place effective strategies and management system for allocating resources to enhance the company's capability to provide prompt and reliable responses to customer demands, eventually leading to increased customer satisfaction. This research is a

stepping stone towards such a system by presenting a methodology for improved logistical services according to customer expectations.

The first section identifies the problem statement, research objectives, and scope of the research. The second section presents the literature review of existing methodologies and case studies related to customer segmentation and service design. The third section contains a detailed information about the methodologies applied in this research. The fourth section reports and discusses the analysis results The last section provides conclusion and suggestion for further research.

1.2 Research Objectives

- To segment or classify customers into smaller groups according to their characteristics
- To design appropriate service for each group of customers and to improve service quality to increase customer satisfaction

1.3 Scope of the Research

This research deals only with ninety-two air customers in electronic industry which are commanding the largest share of the focal company's business.

1.4 Research Methodologies

- Classify customers into smaller groups according to characteristics, customer requirements, and distribution using K-mean methodology. Segmented groups are reviewed by experts who will ensure each customer is classified appropriately.
- Conduct interviews with a selected sample of customers, drawn from each customer group, who will prioritize customer preferences based on each service offered. They will also provide feedback on the current services provided by focal logistics company and their competitors. Average scores from each group of customers is used to categorize important levels of each service offered and compare the competitiveness efforts of each company.
- Design appropriate services using QFD methodology to respond to the needs addressed by air cargo customer groups and analyze their requirements according to the QFD results.

1.5 Expected Benefit

- Get segmented group of customers according to their characteristics
- Get proper designed service which is met with customer requirement

Chapter 2

Literature Review

2.1 Customer Segmentation

2.1.1 Concept of Customer Segmentation Which Related to CRM Strategy

Customer relationship management (CRM) refers to strategies, tactics, and technologies that have become indispensable in the modern economy. CRM must be viewed as a business system, or a systematic approach to life cycle management , which associates the most suitable technologies with customer-centric business requirements (Kumar & Reinartz, 2012). Girishankar (2000) suggests a holistic approach that places CRM at the heart of the organization, which integrates CRM systems with existing customer oriented business practices.

To anticipate customer needs, a coordinated marketing plan needs to render production activities more stable and programmable (Rajola, 2013). Additionally, all actions aimed at seeking new customers or attracting the attention of an existing customer need to be coordinated and balanced. This practice is particularly important when a new product or service is launched that enhances negotiations, transactions, and relationship management support activities. A customer-focused business plan can build maximum profitability by using a combination of personnel, process and technology to ensure customer needs are met.

The tendency to focus on CRM grew in 1990 with the belief that a relationship with customers may lead to loyalty and retention (Ngai, 2005). Customer relationship management has four dimensions:

a. Customer identification
b. Customer attraction
c. Customer retention
d. Customer development

The first two dimensions of CRM include customer identification and attraction, which are costly and confirm the monetary benefits of a company. Although the cost of customer retention is low, it provides great benefits for companies. Sin, Tse, and Yim (2005) identified four dimensions of CRM including customer-centric marketing, key customer lifetime value identification, personalization and CRM organization (organization structure, human resource management, knowledge management like knowledge learning and generation, knowledge sharing etc.).

Complex CRM systems are composed of three areas: CRM interactions, operations, and analytics. CRM interactions pertains to activities directly related to the relationship between employees and customers, which includes logging and transferring customer data to a central database. Business operations is responsible for establishing processes for the collection of all types data. Finally, business analytics is the area is responsible for analyzing data collected about customers. This process in aggregate is called the customer segmentation process (Lis, 2011).

2.1.2 Methodologies of Customer Segmentation

Market segmentation involves the grouping of customers or prospective customers who have similar responses to a product-market offer. The process of market segmentation includes an understanding of how and why customers buy, how a company can fit its competencies to customer needs, and how it can develop strategies and marketing programs to enhance customer benefits (Christopher, 1983). Stringfellow, Professor, and Bowen (2004) revealed that understanding the customer can be achieved via two channels, Lean and Rich channels. Lean channels include transactional records and surveys with the right questions. Rich channels include semi-structured interviews, storytelling and picture drawing, which can convey a considerable amount of information. Rich channel methods can provide more benefits than Lean, but it generally costs more.

Customer segmentation is usually carried out in accordance with certain standards that are based on available population statistics variables (often used in customer market), customer's purchase behavior variables or customer value. Presently, many academic circles agree that customer segmentation is the customer value-based theory of segmentation (Tao & Zhixiong). To better identify customers, allocate limited enterprise resources and improve core competitiveness, it is important to employ customer segmentation methods, which are the key to successful customer retention (He & Zhen, 2013). Segmentation methodologies applied to the Logistics field are described below.

2.1.2.1 K-means

K-Means divides a set of *n* objectives into *k* clusters and sets the distance between measurable objectives as a "degree of affinity" indicator. This process can group object that are very similar within a cluster, and those that are not in inter-clusters. A cluster is defined by its members, i.e., objects, and by its centroid. The centroid of a cluster is the point in the cluster whose mean distance from all objects within the cluster to the centroid is minimized. K-means uses an iterative approach to minimize the mean distance between each object and the cluster centroid. The objects are moved between clusters until the distance cannot be minimized further.

A set of clusters that are compact and well-separated from each other is achieved with this process. The details of the minimization can be controlled by using various optional input parameters to the K-means. For example, the initial values of the cluster centroids and the maximum number of iterations can be managed according to the requirements of the application (He & Zhen, 2013). Furthermore, they mention that applying the K-means method to customer segmentation has been constantly improved and used for differentiated marketing purposes in various industries, such as banking, telecommunications, retail, securities, aviation and other data-intensive industries.

2.1.2.1.1 The Algorithm of K-Means

Tikmani, Tiwari, and Khedkar (2015) defines the characterisation of 'K', which represents the number of clusters chosen. In a K-means algorithm, each observation in the data set is treated as an object that has some location in the data space. This is accomplished by establishing clear boundaries between objects in a cluster that are very close to each other (as close as possible) and those that are very far from objects belonging to other clusters (as far as possible). The K-means algorithm can be described as follows.

1. Start by picking the number of clusters i.e., 'K'
2. Assume the centroid of these clusters (any random object can be taken as the initial centroid, or the first object in a given cluster that can be treated as the initial centroid)
3. Repeat the following steps until stability is reached (i.e., there exists no object in any cluster that can be moved to another cluster):
    a. Determine the coordinates for each centroid.
    b. Find the distance between each object and each centroid.
    c. Group objects based on their minimum distance to every centroid.

The visual representation of the k-means algorithm can be seen in below figure.

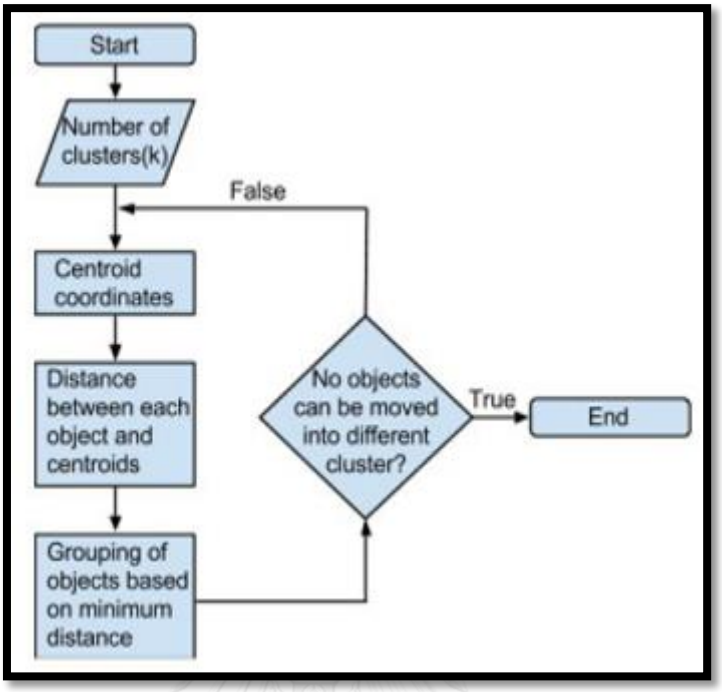


Figure 2.1: K-means algorithm

(Source: Tikmani et al. (2015))

2.1.2.1.2 Case Studies of Using K-means

T. Li, Chen, and Zhang (2012) deployed K-means to rate thirty logistics service providers by their revolving credit, financial capacity, customer evaluations, bank performance and discount availability.

The results indicate that there are five possible ratings of service providers. The rating scale of each group placed those in the best financial position as group 1 and while the cluster with the worst financial position is rated as group 5.

No	Number	No of provider	Proportion
1	4	3, 15, 20, 26	13%
2	5	1, 14, 18, 22, 27	17%
3	1	2	3%
4	6	6, 7, 15, 19, 24, 30	20%
5	14	4, 5, 8, 9, 10, 11, 12, 13, 17, 21, 23, 25, 28, 29	47%

Figure 2.2 : The Result of logistics service provider segmentation

(Source: T. Li et al. (2012))

He and Zhen (2013) applied K-means to classify 25 customers in an HK logistics enterprise by using 19 attributes: “yearly relative profit margins”, “yearly profit contribution rate”, “the number of distributed customers”, “transportation volume”, “frequency of transportation”, “profitability”, “scale”, “business environment”, “possibility of cross-marketing”, “business growth rate”, “profit margin rate”, “allocation rate”, “bank credit rating”, “average yearly debt rate”, “repetitive purchase rate”, “customer share”, “customer relationship intensity”, “customer price-sensitivity”, and “customer switching costs”.

The results reveal that there were five groups of customers generated. The category of each group refers to as the potential for becoming loyal customer. The least loyal customer is in group one, while the most valuable customer of an HK enterprise is in group 5. Moreover, the study indicates that the proposed methods and models for HK enterprises are feasible and are effective in identifying valuable customers. This rating system is supported in specific cases: when changing business models, when extensive change management is differentiated, to improve competitiveness, to manage customer-based demand, and when allocating reasonable service resources.

Category	Customer ID
1	C1, C4, C15, C21, C23
2	C8, C9, C10, C11, C13, C14
3	C22
4	C5, C7, C16, C18, C24
5	C2, C3, C6, C12, C17, C19, C20, C25

Figure 2.3: Customer segmentation result (Source: He and Zhen (2013))

2.1.2.2 ID3 Algorithms, Decision Tree

C. Li (2008) researched the process of customer segmentation by analysing its individual components (such as data warehouse, the point of the implementation and so on) to have some baseline reference before implementing CRM to the airline industry. The segmentation model begins by inputting customer data and purchases into a database to analyse the value, risk and tactics associated with the data. The segment based on data mining theory includes decision trees, Neural Networks, Association Rules and other models. The decision tree, as explained by (Cheng, 2015) , is one of the most frequently used data classification methods. It adopts a recursive process to make a comparison between a variable and an inner node, which estimates the downward branches of the node according to the various attributed values. Finally, a conclusion is made at the leaf node of the decision tree. The path from the root to leaf node corresponds to a set of guidelines that are accepted and rejected. Thus, the whole decision tree corresponds to a group of classification rules. Each non-leaf node corresponds to an unclassified attribute and each branch represents the attributed value. A leaf node represents a specific variable that is characterised by the path from root to leaf node. Each non-leaf node correlates to one of the n-classification attributes with the largest information quantity.

2.1.2.2.1 The ID3 Algorithms

Information entropy is based on a scattered random variable's entropy, which reflects the expectation value of the variable and generally includes unconditional and conditional entropy. Unconditional entropy is, or simply Entropy, can be expressed following formula:

$$H(X) = \sum_{i=1}^{n} p(x_i) log_2 \mathrm{p}(x_i)$$

In this formula, x_i (i = 1, 2…, n) are the components of X, n is the dimension, $p(x_i)$ refers to the probability that X = x_i, and the logarithm function takes 2 as the denominator because the entropy value uses a binary system of coding. H(X) reflects expectation value of X, under certain conditions, namely its uncertainty.

A scattered random variable X associated with the conditional entropy of a scattered random variable Y is recorded as H(X|Y), which can be expressed by the following formula:

$$H(X|Y) = \sum_{i=1}^{n}\sum_{j=1}^{m} p(x_i y_i) log_2 p(x_i|y_i)$$

In this formula, p ($X_i|Y_i$) is the joint probability of X = X_i, Y = Y_i, the partition Xi | Yi corresponds to the conditional probability of X = Xi when Y = Yi, where n and m is the component number (dimension) of X, Y. For the same reason, a logarithm function takes 2 as the denominator because the entropy value uses binary systems coding. The expression H (X|Y) refers to the uncertainty of X under certain conditions, which could prove that X could effectively reduce its uncertainty after increasing some conditions.

H (X ⏐ Y)ʹH(X)

So, the conditional entropy of X is often used to reduce uncertainty.

2.1.2.2.2 Case Study of Using ID3 Algorithm

Cheng (2015) applied ID3 algorithms to classify 10 sample customers using three indicators: customer type, customer values and customer satisfaction. This algorithm is equipped with analysis-based tools to better understand customers. The indicators include data (1) which is not easy to run off and that (2) which is easy to run off from a service provider.

The findings showed that for high and average degree satisfaction, customers were (1) not easy to run off while frequent shipper and bulk cargo shipper were (2) easy to run off. The study also indicated that the analytical CRM study, based on ID3 Algorithms, applied to China's air cargo industry could help to improve service efficiency. Moreover, adopting ID3 algorithms involves a series of segmentation rules that classify air cargo transport historical data, then links that knowledge of air cargo transport with warehouse data. Finally, the management rules are selectively applied a variety of customers and marketing services.

Below decision tree following ID3 algorithm following by conclusions from relevant regulation algorithms.

Figure 2.4: Air cargo customer segmentation and decision tree

Rules through mining	Measures (service)
The faithful customer is often a frequent shipper	This regulation has nothing to do with the subject, do not take measures
Generally speaking, frequent shipper requires visiting service	Provide the visiting service for frequent shipper. But not all frequent shipper can bring high profits, you can choose to provide visiting service only for those frequent shippers with high customer value
The general customer is bulk-cargo shipper	This regulation has nothing to do with the subject, do not take measures
Bulk-cargo shipper often require express service	Because bulk-cargo shipper cannot bring high profit for company, only consider to provide express service for loyal bulk-cargo shipper and the shipper with high customer value
Potential customers often require visiting service	Consider to provide visiting service to those with high customer value
The general customer requires express service	The general customer gives enterprise less profit, consider not to provide express for them

Table 1: Conclusions from relevant regulation algorithms
(Source: Cheng (2015))

2.1.2.3 Kohonen Self-Organizing Network, Neural Network Model

A Neural network model called SOM (Kohonen self-organizing network) is deployed to segment customers into homogenous groups. Several researchers have proven that SOM is an effective algorithm to cluster customers. SOM is an unsupervised learning neural network, which applies abstract algebra and topology to cluster associated data into a single group.

2.1.2.3.1 The Algorithm of Kohonen Self-Organizing Network

The Kohonen self-organizing network process is described below (Jang, Sun, & Mizutani, 1997)

Step 1. Select the winning output unit, which is the output with the largest similarity measure (or smallest dissimilarity measure), out of all the weight vectors w_i and the input vector x. If the Euclidean distance is chosen as the dissimilarity measure, then the winning unit c satisfies the following condition, where the index c refers to the winning unit.

$$\|x - w_c\| = min\|x - w_i\|$$

Step 2. Let NBc denote a set of indexes corresponding to a neighbourhood around winner c. The weights of the winner and its neighbouring units are then updated by the expression

$$\Delta w_i = \eta\gamma(i)(x - w_i),\ I \epsilon NB_c$$

where η is a small positive learning rate.

Instead of defining the neighbourhood of a winning unit, a neighbourhood function γ (i) around a winning unit c can be used. The Gaussian function can also be used as the neighbourhood function.

$$\gamma(i) = exp(-\|p_i - p_c\|^2/2\sigma^2)$$

The order of the weight updates on an individual layer is not important but it is necessary to calculate the error term as.

$$Ep = \frac{1}{2}\sum_{k=1}^{M} \delta \binom{2}{pk}$$

2.1.2.3.2 Case Study of Using Kohonen Self-Organizing Network

An online auction is a fast-growing business. Most online buyers face the problem of predicting seller and customer behaviour, e.g., to submit a reasonable price for winning a bid. Moreover, auction web sites, e.g., eBay, only provide a user ID or nickname to identify a consumer. The situation has put a barrier between users who want get to know each other. To deal with such a problem, Chan (2005) proposed the Kohonen Self-Organizing Network to segment online auction customers into homogenous groups. 1,470 records retrieved from the Taiwanese eBay were used to conduct an empirical study that demonstrates the feasibility of the proposed methodology. The result revealed that 39.3 % of eBay Taiwanese customers fell into the impulsive deals group; 27.8% of customers fell into the patient deals customer group; and 32.2% of customers fell into patient deals group.

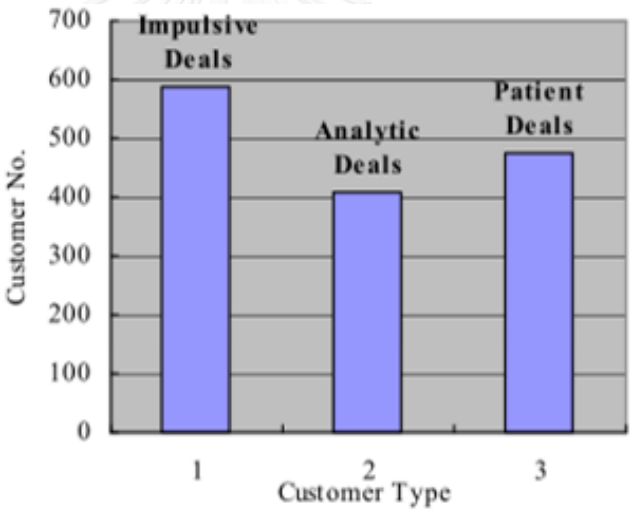


Figure 2.5: Customer distribution
(Source: Chan (2005))

2.1.2.4 ONE WAY ANOVA

Analysis of variance (ANOVA) refers to a set of statistical models and associated procedures. In ANOVA, the observed variance is partitioned into components according to the number of explanatory variables. It provides a statistical test if the means of these several groups are all equal.

One-way ANOVA is the simplest form, which involves only a single variable experiment. Typically, the one-way ANOVA is used to test differences among at least three groups. A two-group case can be handled conveniently by a t-test. When there are only two group means to compare, the t-test and the F-test are equivalent since $F = t^2$ (Wu, 2009). Typically, a fixed-effect model is assumed for this type of ANOVA, indicating that the responses follow normal populations, which may differ only in their means.

2.1.2.4.1 Case Study of Using ONE WAY ANOVA

Chao, Lirn, and Shang (2013) focused on the importance of market segmentation of air cargo covering the freight rate, cargo tracking and punctuality, along with the service attributes according to the service requirements of air freight forwarders. Factor analysis was performed to reduce variables; only a factor loading greater than 0.5 was extracted. Thus, the One-Way ANOVA was used to examine which service factors showed a significant difference among service segments.

A total of 1,126 questionnaires were sent out to air freight forwarders who were registered in Taiwan. Factor analysis with varimax was employed to reduce the 36 service attributes of airline cargo transportation and rotated to identify the key factors.

The results revealed that there were six key factors, including assurance services, promptness services, empathy services, convenience service, value-added service, and customization service. Each service had a factor loading value greater than 0.5. Service attributes were further classified into three markets, according to users of airline cargo. These included professional service oriented, empathy oriented and express service oriented markets.

2.2 Service Design

2.2.1 Concept of Service Design

Service design is the application of established design processes and skills to the development of new services. Service design, as proposed by (Peranginangin, Chen, & Shieh, 2009), is a creative and practical way to improve existing services and to innovate new ones. The main purpose of the Service Design stage of the life cycle is the design of new or improved services for live environments. A holistic approach to all aspects of design should be adopted so that when changing or amending any of the individual elements of design, all other aspects are considered. When designing and developing a new application, its implementation should not be done in isolation, but should also consider the impact on the overall service, the management systems and tools (e.g., Service Portfolio and Service Catalogue), the architecture, the technology, the Service Management processes, and the necessary measurements and metrics.

Every organization must define what constitutes 'significant' so that everyone within the organization is clear as to when the Service Design activity should be initiated. Therefore, the impact of all changes should be assessed. The Service Design process will assess activities to determine whether they are significant enough to a be part of the Change Management process. The impact assessment lies within the Service Transition. In recent decades, the production capacity of consumer products has increased exponentially. Thus, changes play a more important role than once thought; it may lead to shorter life cycles of products (Eisenhardt & Brown, 1998). One of the efforts that can deal with the sharply increasing competition is product or service design.

Zeithaml, Parasuraman, and Berry (1990) proposed that logistic companies must constantly and actively seek ways to provide better service to their customers. Thus, to assure the success of service design, one of the main determinants is information; this implies the detailed knowledge and understanding of customer needs. Designers always have insight into customer emotions; this suggests that they could design a new service that can meet customer expectations. The development of new service concepts enables LSPs to increase customer satisfaction and strengthen their own competitiveness (Wagner, 2008). The production of services usually requires the participation of customers.

Furthermore, introducing prototypes to convince customers of new developmental services is difficult. Hence, customer integration is a crucial success factor in the process of service innovation or design. Service innovation is delivered via the process of new service development (NSD), which encompasses various stages, from idea generation to market launch of new service offerings (Goldstein, Johnston,

Duffy, & Rao, 2002). When developing a new service, attention needs to be paid not only on the external design, but also the core service features and attributes of the service delivery process, which augments the value of novelty for its consumers (Papastathopoulou, Avlonitis, & Indounas, 2001).

2.2.2 Methodologies and Case Studies of Service Design

2.2.2.1 Kansei

Kansei is a Japanese term that is synonymous with sensibility, impression, and emotion. Kansei engineering (KE), proposed by (M. Nagamachi, 1989), is a proactive product development method that translates human impressions, feelings and requirements of existing products or concepts into design solutions and concrete design parameters (M. Nagamachi, 2002). For designing service purpose, Dahlgaard, Schutte, and Dahlgaard-Park (2008) indicated that Kansei engineering could be used to realize associated relationships between service elements and customer emotional perceptions. This could result in support for operators and designers in establishing a systematic procedure for the design of logistics services. The importance of including customer needs into service/product design was illustrated in previous studies. Mitsuo Nagamachi (1995) pointed out that Kansei engineering is one of the main areas of ergonomics (human factors); it is basically a customer-oriented product development method and it does not focus on the manufacturer's intention of the product (i.e. Kansei).

KE is mainly a catalyst for systematic development of new and innovative solutions, but can also be used as a tool to improve existing products and concepts. So far, many KE applications have focused on the design of physical products, such as automotive interiors, train interiors, kitchen faucets, real estate, mobile phones, CNC machine tools, beverage bottles, sport shoes, notebook computers, and digital cameras. The service design applications of KE are less common because it is difficult to clearly represent intangible service elements to test subjects, who are requested to express their affective perceptions. Chen, Hsu, Chang, and Chou (2015) indicated that there are previous studies that have shown that Kansei engineering is capable of applicability in conducting investigations of services; therefore, limited examples of KE research for service design can be found.

2.2.2.1.1 Kansei Methodology

When implementing Kansei-based approaches for service/product design, the conventional KE methodology may be described in three phases (Schütte, Eklund, & Nagamachi, 2004)

Phase 1 chooses the design domain (target service/product).

Phase 2 spans the semantic space (i.e., the collection of Kansei words which are used to describe the feelings for the service/product) and property space (i.e., the collection of service or product elements) of target service/product.

Phase 3 aims to build the relationship between semantic space and property space (i.e., customer reaction to Kansei service or product elements), which is accomplished by:

(1) Synthesizing the semantic space and property space

The semantic space and property space are linked to understand the relationship between service elements and Kansei-based descriptions by using a Likert scale of five points, where 1 = strongly disagree and 5 = strongly agree. These evaluations can be decomposed into service elements in the property space; this links the semantic space and property space from a customers' perspective.

(2) Testing the validity of semantic space and property space

A factor analysis is conducted from customer evaluation data to spot the words which have no effect on the Kansei methodology; factor loading greater than 0.5 will be selected. The key words are then fed back to the semantic space and if an iteration process is necessary, only the new words are used. Additionally, Cronbach's α is used to perform reliability analysis and to indicate whether the attribute used is applicable. If the Cronbach's α is greater than 0.70, this indicates the survey instrument is reliable. Theoretically, the same procedure can also be used to determine the service elements which are obsolete.

(3) Building models for the relationship analysis

Partial Least Squares (PLS) is a new technique that generalizes and combines features from principal component analysis and multiple regression. The goal of PLS is to analyse or predict a set of dependent variables from a set of independent variables. After being validated, models can be created to relate designed domain properties with Kansei words.

2.2.2.1.2 Case Study of using Kansei

A detailed case study that applies KE to home delivery services (HDS) transforms real customer voices into product and service design. In this study, (Chen et al., 2015) used the Partial Least Square (PLS) to analyse the relationships between customer emotions and characteristics of HDS. The HDS design procedure was developed and iss schematically illustrated Figure 2.6.

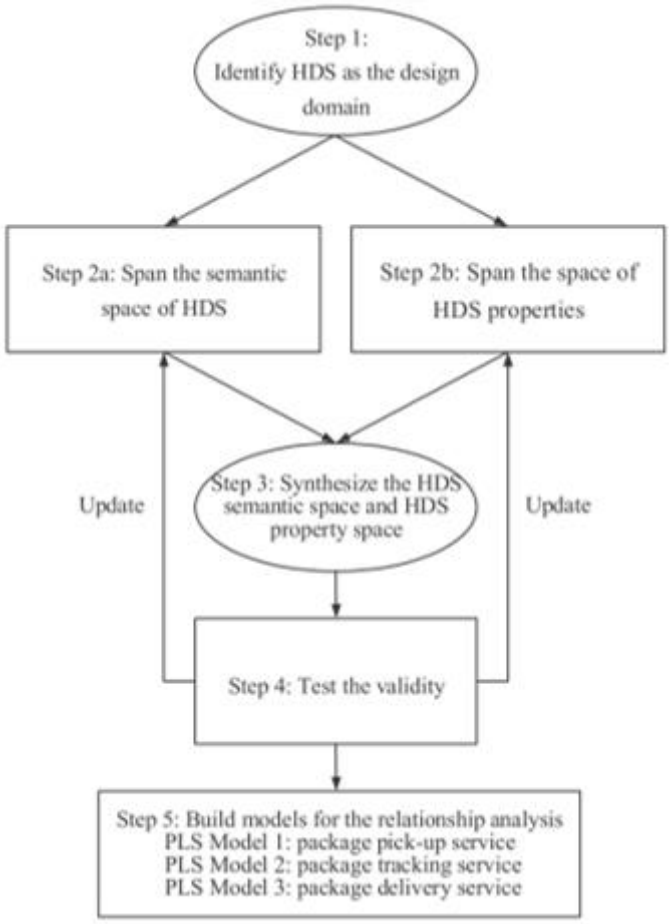


Figure 2.6: The HDS design procedure based on Kansei engineering (Source: Schütte et al. (2004)).

2.2.2.1.3 Procedures of Kansei for Home Delivery Service(HDS)

Step 1: Identify HDS as the design domain

In this study, we consider HDS of documents and packages from one customer to another customer. This customer to customer (C2C) trading pattern was selected as the service design field. HDSs for domestic drop-off locations or recipient addresses and other large or bulk HDSs were excluded.

Step 2: Build the semantic space and service property space of HDS

Step 2a: Span the semantic space of HDS

The researcher collects Kansei words from home delivery advertisements on television, internet videos, magazines. In the first screening phase, the researcher eliminates words that were repeated. In the second screening phase, the final set of Kansei words were evaluated by the professional senior manager from an HDS sector and who is an expert in logistics.

Step 2b: Span the space of HDS properties

Designed attributes from the HDS was collected. Some possible values were selected for each attribute. Attributes that could have an impact on the emotional response were selected by designers. This case study displayed a set of HDS terms with different service characteristics to survey participants. In addition to the Kansei-based engineering study, the collection of products was the output from this step. These HDS products had to change according to the properties just selected.

Step 3: Synthesize the HDS semantic space and HDS property space

By means of statistical method such as PLS, the relationship between Kansei words (i.e. semantic space) and HDS attributes (i.e. the space of properties) was created.

Step 4: Test validity

Factor analysis was used to identify and validate the key Kansei words. Additionally, Cronbach's α was used to quantify the reliability analysis.

Step 5: Build models for the relationship analysis

After being validated, three models were related the HDS properties with each Kansei word. These three models were associated with the three HDS stages: Model 1: package pick-up service, Model 2: package tracking service, and Model 3: package delivery service.

2.2.2.1.4 Result of Applying Kansei(KE) to HDS

The findings provided insight into the relationship between 32 service attributes (Kansei) and associated service characteristics after determining the cross loadings. The results revealed that HDS service characteristics had a significant influence on the comprehensive HDS Kansei variables. Hence, the service characteristics adopted in the service stimulation of this study effectively affected the Kansei variables in the questionnaire. The most crucial attributes of each HDS service is described below.

(1) C1, C9, C11, C17, C19, C23, C27 and C28 were the most crucial attributes of HDSs in Model 1 (Pick up service). The meaning of each attribute is described below.

C1: Sender sends a package to the receiving locations of service providers in person, or informs the service providers to pick-up a package in the designated site by using a telephone, computer or APP. A pick-up time to receive the package can also be scheduled here.
C9: Only convenience stores
C11: Have year-round service
C17: Provides privacy protection
C19: Provides electronic consignment note
C23: Provides a reusable package to reduce the shipping fee
C27: Uses cash to pay
C28: Sender or receiver pays the shipping fee

(2) The sender (C30) can track the package via telephone. This was the most crucial attribute to HDS in Model 2 (Tracking service)

(3) There was no attribute significantly related to HDS in Model 3 (Delivery service)

The study suggested that HD companies should include this concept into their service design process or develop the building of Kansei-based outcomes in company image. The most crucial six Kansei words include: “K1 (Rapid)”, “K2 (Familiar)”, “K3

(Specialized)", "K5 (High quality)", "K6 (Convenient)" and "K9 (Immediate)". Each word is associated with the package pick-up service stage. Additionally, "K16 (Familiar)", "K17 (Specialized)", "K18 (High quality)", "K19 (Convenience)", "K21 (Immediate)", and "K22 (Reliable)" are associated with the package tracking service stage.

2.2.2.2 Quality Function Deployment (QFD)

QFD considers, "how do we understand the quality that our customers expect and make it happen in a dynamic way" (Martins & Aspinwall, 2001). QFD is characterised as a "House of Quality (HOQ)" because the QFD matrix is shaped like a house (Kutucuoglu, Hamali, Irani, & Sharp, 2001). With the help of QFD (quality function deployment), customer requirements are easily determined. The service-based specifications are developed, while HOQ (house of quality) tools assist to develop the relationship between customer requirements and product capabilities. The benefits derived from QFD applications are listed below.

a. Preventive design

The biggest advantage of QFD is that it promotes the development of services in a proactive way. When applying QFD, more than 90% of service design changes are performed before the market entry takes place. These changes are less expensive since they are performed “in the worksheet”.

b. Reduction of development time

QFD applications allow the reduction of cost and the time needed to introduce a new service into the market.

c. Client satisfaction

QFD is the “voice of the customer”. QFD is not oriented to the “thoughts of the developer”. With the focus on the consumer, all decisions made during the service design is targeted at the customer.

Additionally, 3PLs should provide various customized services to satisfy customer needs. The capability to provide and manage service variety was identified by Harvey, Lefebvre, and Lefebvre (1997). The capacity for providing and managing product variety (Pil & Holweg, 2004) is required by manufacturing companies.

In general, service variety is provided to the customer by delivering options via the service process (Silvestro, 1999). Hence, the current proposed research on service design is mainly focused on the design of the service process (Kindström & Kowalkowski, 2009) and analysis of the service process by using the QFD methodology.

The QFD technique is based on the analysis of the client requirements, which is normally expressed in qualitative terms, such as: “easy to use”, “safe”, “comfortable” or “luxurious”.

To develop a service, the fuzzy requirements need to be “translated” into quantitative service design requirements; QFD makes this translation possible. The QFD methodology is based on the development of a series of matrices called “House of Quality”.

2.2.2.2.1 Procedures of QFD Integrated with AHP

Step 1. Identify customer requirements (WHAT) using expert experiences. WHAT defines what the customer wants. This step can take up to several weeks to perfect to ensure the application of unbiased and consistent customer views. The importance of WHAT will be evaluated in the left wall of the house by using the analytic hierarchy process technique (AHP) for prioritization and the fundamental scale was used in the AHP process.

Table 2: The fundamental Scale

Intensity of importance a_{ij}	**Definition**	**Explanation**
1	Equal importance	Two activities contribute equally to the objective
3	Moderate importance	Experience and judgement slightly favor one activity over another
5	Strong importance	Experience and judgement strongly favor one activity over another
7	Very strong importance	An activity is favored very strongly over another; its dominance demonstrated in practice
9	Extreme importance	The evidence favoring one activity over another is of the highest possible order of affirmation
2, 4, 6, 8	Compromise between the above values	Sometimes one needs to interpolate a compromise judgement numerically because there is no good word to describe it

(Source from SAATY (1987)).

Step 2. The competitiveness of the services will be compared in the right wall. The Likert scale of 1 to 5 were indicators used to provide a level of competitiveness from very weak to very strong

Step 3. Translate customer requirements into (HOWs) response services that are needed. This occurs just below the roof. The output from the first step is a structured list of requirements that may be vague or ambiguous. Therefore, the associated service design characteristics (HOWs) of the product are determined for each customer requirement (WHAT).

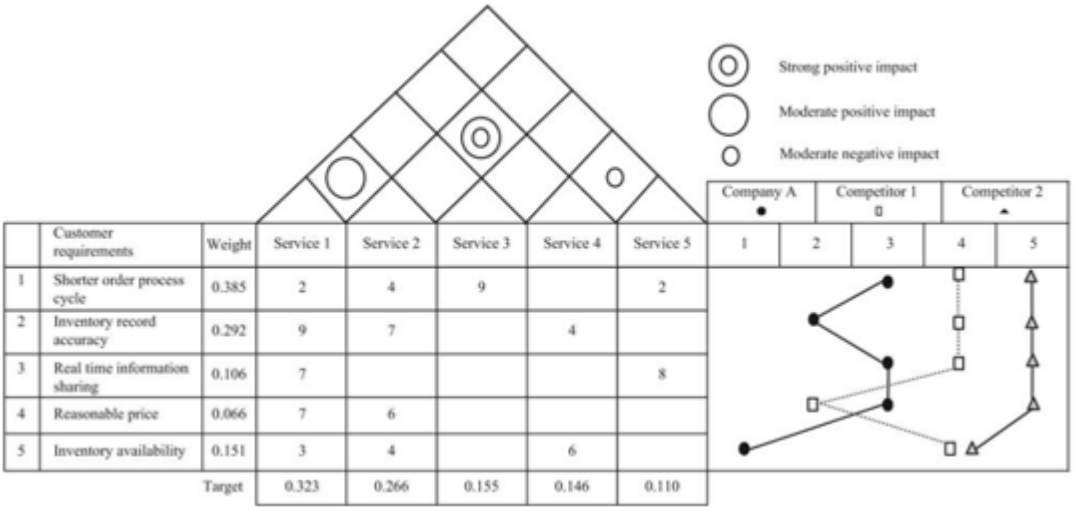
Step 4. Define the relationship between WHATs and HOWs in the central deployment matrix, called a relationship matrix, to evaluate the impact of design requirements on customer requirements using a four-point rating scale: 4 degrees of correlation were established by suitable factors: 3 represents strongly related; 2 represents moderately related; 1 represents low related; and 0 represents not related.

Step 5. Define the correlation between various service design characteristics in the correlation matrix (in the roof). A 3 symbols rating system was established to represent the degree of correlation: ++ represents strong related, + represents related and – represents not related.

Step 6. Design the target values of the service on the ground floor of the house, which are of absolute importance to each service design characteristic. This can be estimated according to an operator's experience or knowledge level, but it is quite difficult to exactly define quantitatively.

Target value or Weight $(HOW)_i$ = V of $(HOW)_{i1}$ x imp of $(WHAT_1)$ + … + V of $(HOW)_{in}$ x imp of $(WHAT_n)$, where $V(HOW)_{in}$ is the correlation value of HOW_i with $WHAT_n$, and $imp(WHAT_n)$ represents the importance or priority of $WHAT_n$

Figure 2.7: HOQ of a customer in apparel industry



	Customer requirements	Weight	Service 1	Service 2	Service 3	Service 4	Service 5
1	Shorter order process cycle	0.385	2	4	9		2
2	Inventory record accuracy	0.292	9	7		4	
3	Real time information sharing	0.106	7				8
4	Reasonable price	0.066	7	6			
5	Inventory availability	0.151	3	4		6	
		Target	0.323	0.266	0.155	0.146	0.110

(Source: Lin and Pekkarinen (2011))

2.2.2.2.2 Case Study of Applying QFD for Service Design

The main purpose of this research is to build a framework for a QFD-based modular logistic service design. Lin and Pekkarinen (2011) were the first researcher to apply a QFD-based modular logistic service design. Our design should measure service quality and variety. Combining QFD and modularity ensures that service design quality can have multiple layers. This study requires a modular logistic service platform with three layers (service, process, activity). This architecture can translate customer requirements into logistic service designs while maintaining the HOQ (house of quality) structure, which will be used as a planning tool in matrix form to capture what the customer requirement. The methods that the company can meet those requirements will include several phases: identifying customer requirements, comparing the competitiveness of the service, defining the correlation between various service design characteristics, and designing service-based target values. To achieve this target, the case study of a focal case company and three customer types were selected.

The criteria to select of Company A was based on its reputation as a top ten 3PL in China, with 65 years of experience offering a wide range of logistics services to customers from various industries, including the automotive, apparel, food, cargo, electric power, steel and home appliance industries. The high-quality of service and the recognized ability to satisfy customers were the highest strategic priority.

Three customer companies (from the automotive, apparel, and home appliance industries) were involved in service design process. Each customer was the best in their respective industries. Finally, the choice of the focal case company and its three customers all satisfy the requirements of statistical significance in terms of case selection. All companies were relevant to the conceptual research framework.

Data Collection

1.) Lin & Pekkarinen collected data during a field visit. Semi-structured interviews were used obtain information from the focal case company and its three customers. Secondary documentation was collected from the 2002 study by (Voss, Tsikriktsis, & Frohlich) to achieve data triangulation.

2) The primary data was collected from two types of semi-structured interviews

a) In-depth interview with 12 top-level managers to extract each manager's personal
opinions on how QFD and modularity could help logistic service design.

b) Interviews with 19 middle-level managers to identify how 3PL applies QFD/HOQ and modular logic tpo the logistic service design.

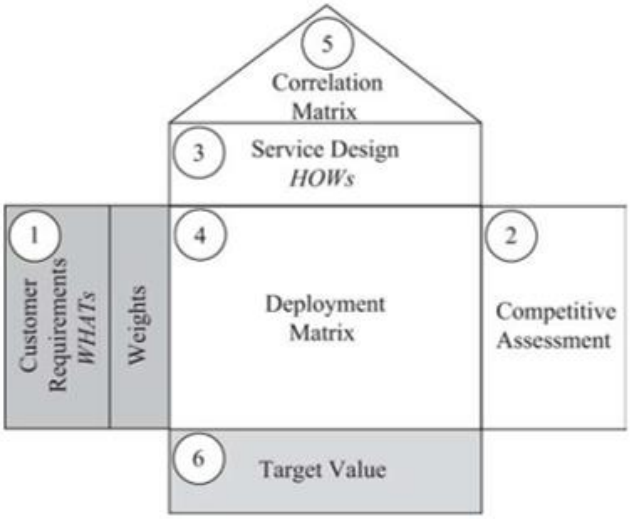
Data Analysis

1) The data collected from interviews and other resources were input into a database and then analysed.

2) The second analytical strategy adopted in this research was to develop the case description framework. We use a pre-designed descriptive framework because it was more effective to organize the case study within a diverse research team.

3) Finally, we developed a standardize case description to analyse the data and refine the results.

Figure 2.8: House of quality or HOQ



(Source: Lin and Pekkarinen (2011))

2.2.2.2.3 Result of Applying QFD for Service Design

Lin and Pekkarinen (2011) concluded that applying the QFD philosophy to the HOQ method was useful in the creation of customized, high-quality logistics services. By selecting and combining components of the modular logistics service platform, managers could design logistics services and find solutions based on individual customer requirements while delivering services in a cost-effective and flexible manner.

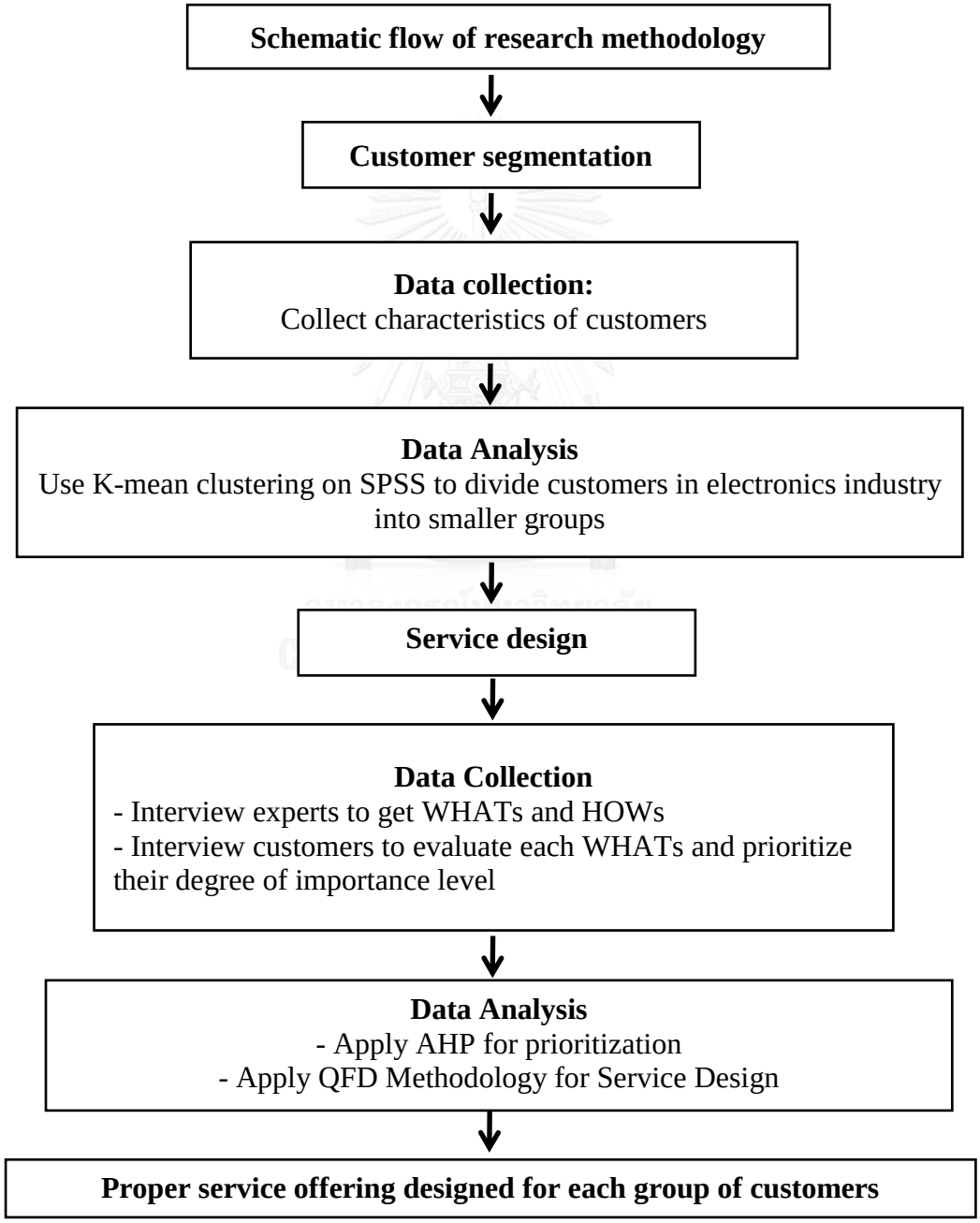
The framework proposed in this study could help 3PL providers by systematically transforming customer requirements into service characteristics, processes and activities. Through identifying customer requirements and generating a comprehensive and modular logistics service platform, 3PLs could competitively offer customized services and solutions not only to new customers from new industries, but also for existing customers with new service needs. Additionally, they the framework that integrates QFD (with HOQ tool) into the modular service platform was very complex and requires multi-disciplinary professional skills of managers and designers. Thus, there was also a need to develop a simpler tool for the smaller 3PLs to develop new customer-driven services.

Chapter 3

Methodology

Steps of research methodology will mainly be divided into two parts which are K-means methodology to segment group of customers and QFD integrated with AHP to design service which are described below.

Figure 3.1: Schematic flow of research methodology



3.1 Customer Segmentation

K-mean clustering, which is the easiest to understand and most effective segmentation method (He & Zhen, 2013) will be employed to divide customers in the electronics industry. Table 3 shows the list of specific factors related to the customer characteristics that are used to group the customers. These factors are selected by consulting executives of the focal company, including two sales managers, an air-freight manager, and an air-freight assistant manager. These selected executives have been working in logistics field for more than ten years and have a good understanding of customer requirements and demand through customer contacts in the past.

Table 3: Customer Characteristics for Segmentation

Characteristics	Source of data
1) Moved volume in 2016	Historical data
2) Total no. of shipments in 2016	
3) Percentage of margin/profit in 2016	
4) Cargo contribution: how customers contribute their cargo to company, classified as 1) Global contribution (contribute to many continents), 2) Regional contribution (contribute in South-east Asia only) or 3) Local contribution (only contribute in Thailand)	
5) Years of relationship until 2016	
6) Frequency of complaint issues: divided by 4 types consisting of (1) frequent hard complaint, (2) non-frequent hard complaint, (3) frequent soft complaint, (4) no complaint	
7) Financial status: classified as 3 groups which are (1) always has bad debt (more than 5 times per year, (2) sometimes has bad debt (1-5 times per year), and (3) never has bad debt	
8) Customer's price-sensitivity: will have sale team feedback on frequency of bargaining by customer which are (1) always, (2) sometimes, (3) never bargain.	Interview from customers or sales
9) Level of decision maker: (1) product staff level, (2) manager level and (3) senior management level	
10) Frequency of meetings: number of meeting arrangement which are (1) less than 5 times per year, (2)5-12 times per year, (3)12-15 times per year, and (4) above 15 times per years	

The “moved volume”, “total number of shipments” and “percentage of margin/profit” are factors typically adopted in segmenting customers. They are usually included as a measure of the degree of importance of customers to the company’s business.

The “cargo contribution” indicates the network reach of the customer’s demand and affects the corresponding types of sales personnel provided to serve the customer, for example the global sale team will be assigned to customers with global demand coverage.

The “years of relationship” reflects the level of customer loyalty. The customers who have long term relationship with the company tend to generate more profit than a new customer due to higher trust and confidence towards the company services. The company is required to continue providing proper services to retain their loyalty but they may not require investing much on providing new systems and training staffs.

The “frequency of complaints” indicates general customer satisfaction towards the service received. Complaints can be attributed to both the company’s inability to fulfill the customers’ needs and the irrational requests by the customers. Serving customers with more demanding requirements and complaints will likely requires more of the company’s resources.

The “financial status” is also one of factors commonly used to divide group of customers. It reflects degree of financial risks faced by the focal company and the company may have to impose strict credit policy for customers with financial problems.

The “customer’s price-sensitivity” measures how customers are sensitive to the service price, reflecting whether the customer is cost-concerned or service-concerned.

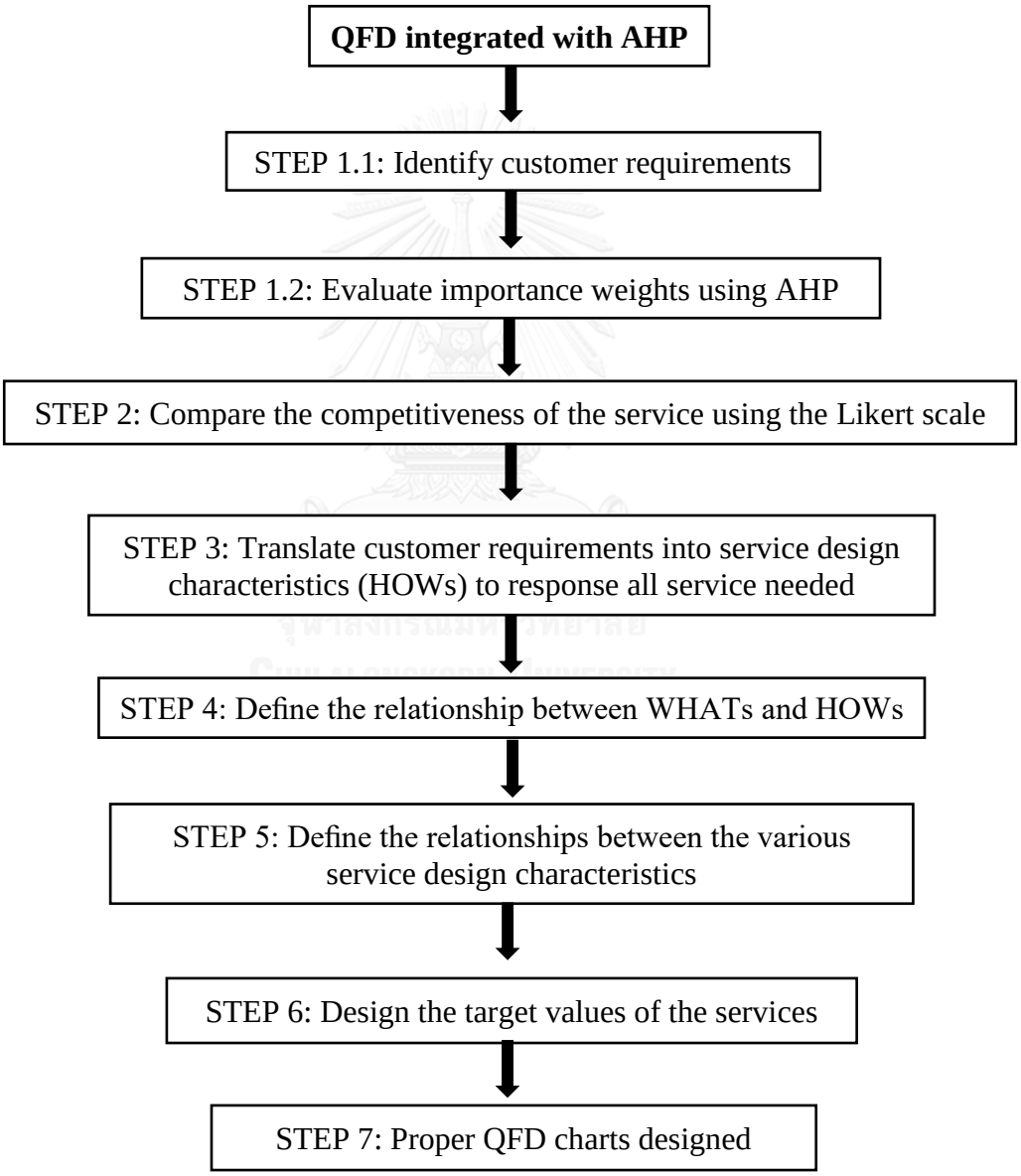
The “level of decision maker” determines the types of information and negotiation arranges the company should prepare. Managers or senior managers usually demands more insightful information than the general staff.

The “frequency of meetings” determines the level of resources the company must prepare in serving each customer.

3.2 Service Design

The service design steps in this research will be divided into 2 parts. The first part, step 1 of Figure 3.2, involves applying the AHP technique to prioritize customer preferences while the second part, steps 2-7 of Figure 3.2, applies QFD to design service which are described following.

Figure 3.2: QFD Integrated with AHP



3.2.1 AHP to Prioritize Service Requirements(WHATs)

A selected group in each segment will be interviewed to prioritize customer preference for each service element (WHATs). Table 4 lists the specific elements covered in the interview, which are extracted from the 2013 research by Chao et al. and reviewed by focal company experts to verify whether the elements are the most frequently requested services by air cargo customers.

Table 4: Service Requirements (WHATs)

Service Requirements (WHATs)	**Description**
1) Reasonable freight charge	Customers request a quote of the rate and accept it if there is a reasonable service offered
2) Professional staff	The staff members who can help customers by providing a good quality of service and assistance. They should be capable of dealing with all types of customers in any situation
3) Capability in complaint management	The ability to effectively handle cases with discrepancies or to deal with customer complaints and solve their problems in a timely manner
4) Fast in confirming space	To receive flight details within lead time agreed upon
5) Corrected invoice and AWB	To have accurate documentation that clarifies any possible financial concerns
6) On time cargo delivery	Cargo reaches the delivery location in accordance to the pre-arranged transit time and providing reliable service
7) Regular customer visit	Sales team visits customers regularly
8.) Delivery cargo in good condition	Capable staff handles cargo without any discrepancies
9.) Prompt response	Prompt responses to customer requests.
10.) Availability of EDI	Customer receives completed and accurate EDI data which is then input into the customer database

3.2.2 QFD to Design Logistics Service

QFD methodology is a popular way to translate customer requirements into service designs, compare a company's performance to competitors, etc. The service design steps according to QFD methodology is employed as follows.

Step 1: A selected group in each segment will be interviewed to determine the competitiveness of the service requirements (WHATs) using a Likert scale. Only an average score from each group of customers will be extracted so that prioritization becomes an important level of each service offered.

Step 2: Service requirements (WHATs) are translated into service design characteristics (HOWs) as seen in table 5. This was recommended by the focal company's experts since each has an influence on customer decision-making.

Table 5: Service Design Characteristics (HOWs)

Service Design Characteristics (HOWs)	Description
1. Open for negotiation	Open to negotiations to solve problems or allow customers to bargain for freight charges in case of a huge volume cargo
2. Fast response	Respond to customers in a timely manner
3. Compensation	Compensate for any damages or discrepancies
4. Operational Excellence	Have a great operational team and system to meet customer expectations and achieve business growth
5. Dedicated Manpower	Prepare enough professional manpower to support any customer request

Step 3: The relationship between service requirements (WHATs) and service design characteristics (HOWs) will be defined to reflect the impact level of each WHATs on each HOWs on the advice of consulting executives of the focal company. A 4-point scale will rate the correlation: 3 represents strongly related; 2 represents moderately related; 1 represents low related; and 0 represents not related.

Step 4: The correlation among various service design characteristics (HOWs) will be expressed using linguistic judgement of the focal company's experts. Correlations are represented by symbols that express the degree of relation between service design characteristics (HOWs). Symbols are translated into a three-value rating scale: ++ represents strongly related, + represents related and – represents not related.

Step 5: The target values of each service offered (HOWs) will be determined by the sum of each correlation value of each HOWs multiplied by each importance weight of WHATs per the formula below.

Target value or Weight $(HOW)_i$ = V of $(HOW)_{i1}$ x imp of $(WHAT_1)$ + … + V of $(HOW)_{in}$ x imp of $(WHAT_n)$, where $V(HOW)_{in}$ is the correlation value of HOW_i with $WHAT_n$, and $imp(WHAT_n)$ represents the importance or priority of $WHAT_n$

Table 6 : Working Schedule

ACTIVTIES	MAY'2017														JUNE'2017										DURATION
	WEEK 2					WEEK 3					WEEK 4				WEEK 1					WEEK 2					
	D8	D9	D10	D11	D12	D15	D16	D17	D18	D19	D22	D23	D24	D25	D26	D29	D30	D31	D1	D2	D5	D6	D7	D8	D9	DAYS
1.) Segmentation																										**10**
1.1) Collect customer's characteristics	X	X	X	X	X																					5
1.2) Using K-Mean clustering for customer segmentation						X	X																			2
1.3) Segmented groups will be reviewed by manager or company expertise.								X	X	X																3
2.) Service Design																										**15**
2.1) Discuss with manager what are main customer requirements											X	X														2
2.2) Interview around 10 customers in each segmented group													X	X	X	X	X	X	X	X						8
2.3) Calculate and Analyse customer data based on QFD methodology																					X	X	X	X	X	5

Chapter 4

Result and Discussion

4.1 Customer Segmentation

K-mean clustering was employed to classify ninety-two customers in the electronic industry of the focal company using the list of characteristics found in table 19. The result reveals that two customer groups were identified, namely the key customer and general customer. Four larger customers, including C18, C61, C67, C73 fell into the key customer groups. The remaining eighty-eight smaller customers, including C1-C17, C19-C60, C62-C66, C68-C72 and C74-C92 were regarded as the general customer group.

Table 23 displays the ANOVA results. Seven characteristics were found to differ significantly among two segments. They included: “level of distribution”, “no of shipment moved in 2016”, “moved volume in 2016”, “frequency of complaint”, “customer’s price-sensitivity”, “level of decision maker”, and “frequency of meeting”. There was no significantly difference in “gained profit in 2016”, “years of relationship”, and “financial status”. To randomly check the validity of the ANOVA result, we use C67 who always had bad debt as a sample. It is still grouped as key customer although other customers in the same group did not always have bad debt. This confirms that financial status did not have a significant effect on the segmentation of customers.

Finally, experts of the focal company were consulted to check the validity of segmentation results. They did agree with the clustering result because it was aligned with the company strategy to classify their customers into a few groups and it also supported the company focus on specific valuable customers who constantly contribute profit to the company, instead of unconditionally focusing on all customers. This result also indicated that using the customers from the same industry for segmentation might not allow the reviewer to see much differentiation since most air cargo customers in the same industry have similar characteristics and probably contribute equivalently to the logistics company. Thus, this is one of the reasons why only two groups were generated.

4.2 Service Design

4.2.1 AHP to Prioritize Service Requirements(WHATs)

During the survey phase, four customers in the key customer group and a selected group of the general customer group were asked to evaluate importance level of each service required. The average evaluation score of the key customers is listed in table 7. Table 7 reveals that “prompt response”, “professional staff” and “delivery cargo in good condition” have the highest impact on customer satisfaction, commanding 46% of total percentage importance.

Table 7: % Ratio Scale of Key Customers Preference Priority Wise

CTQ'S	% RATIO OF SCALE OF PRIORITY (C18)	% RATIO OF SCALE OF PRIORITY (C61)	% RATIO OF SCALE OF PRIORITY (C67)	% RATIO OF SCALE OF PRIORITY C73)	AVERAGE SCORE OF KEY CUSTOMERS
Prompt response	15.32%	16.72%	14.71%	24.02%	17.69%
Professional staff	16.23%	15.59%	18.35%	14.59%	16.19%
Reasonable freight charge	12.92%	9.83%	15.14%	11.79%	12.42%
Delivery cargo in good condition	15.50%	12.18%	14.70%	15.00%	14.35%
On time cargo delivery	11.95%	13.85%	13.36%	11.19%	12.59%
Capability in complain management	8.58%	13.17%	10.19%	11.22%	10.79%
Regular customer visit	4.44%	3.88%	6.82%	5.23%	5.09%
Availability of EDI	8.30%	10.38%	3.40%	3.47%	6.39%
Fast in confirming space	3.20%	2.75%	1.67%	2.13%	2.44%
Corrected invoice and AWB	3.57%	1.65%	1.67%	1.35%	2.06%
TOTAL	100%	100%	100%	100%	100%

The results from table 8 indicates that “prompt response”, “reasonable freight charge”, and “professional staff” have the highest impact on the satisfaction of the general customer group, representing 56% of total percentage importance.

Table 8 : % Ratio Scale of General Customers Preference Priority Wise

CTQ'S	% RATIO OF SCALE OF PRIORITY (C25)	% RATIO OF SCALE OF PRIORITY (C37)	% RATIO OF SCALE OF PRIORITY (C74)	% RATIO OF SCALE OF PRIORITY C80)	AVERAGE SCORE OF GENERAL CUSTOMERS
Prompt response	29.07%	20.12%	22.50%	21.11%	23.20%
Professional staff	13.70%	21.39%	12.41%	18.50%	16.50%
Reasonable freight charge	14.83%	7.81%	21.92%	21.65%	16.56%
Delivery cargo in good condition	8.14%	16.40%	9.59%	10.89%	11.25%
On time cargo delivery	7.90%	13.32%	9.16%	6.12%	9.12%
Capability in complain management	9.92%	9.19%	5.56%	7.10%	7.94%
Regular customer visit	5.36%	6.28%	5.80%	6.48%	5.98%
Availability of EDI	2.13%	1.60%	3.71%	4.30%	2.93%
Fast in confirming space	4.35%	2.38%	5.01%	2.01%	3.44%
Corrected invoice and AWB	4.62%	1.50%	4.35%	1.83%	3.07%
TOTAL	100%	100%	100%	100%	100%

The evaluation results reflect the difference in the focus of the two customer groups. Key customers are more service oriented, placed more emphasis on “delivery cargo in good condition” over the “freight charge”. On the other hand, general customers placed more emphasis on “reasonable freight charge” over the “service”. Table 9 provides the comparison of importance levels as evaluated by key customers and general customers.

Table 9 : The Comparison of Important Levels as Evaluated by Key Customers and General Customers

Order	Service required by key customers	% of importance	Service required by general customers	% of importance
1	Prompt response	17.69	Prompt response	23.2
2	Professional staff	16.19	Reasonable freight charge	16.56
3	Delivery cargo in good condition	14.35	Professional staff	16.5
4	On time cargo delivery	12.59	Delivery cargo in good condition	11.25
5	Reasonable freight charge	12.42	On time cargo delivery	9.12
6	Capability in complain management	10.79	Capability in complain management	7.94
7	Availability of EDI	6.39	Regular customer visit	5.98
8	Regular customer visit	5.09	Fast in confirming space	3.44
9	Fast in confirming space	2.44	Corrected invoice and AWB	3.07
10	Corrected invoice and AWB	2.06	Availability of EDI	2.93

4.2.2 QFD to Design Logistics Service

4.2.2.1 Comparison of the Competitiveness of WHATs

After conducting phone interviews with four customers in the key customer group and a selected group of customers in the general customer group, the results as shown in Table 10 reveal that from the viewpoint of key customers, the focal company provided six services including “professional staff”, “reasonable freight charge”, “delivery cargo in good condition”, “capability in complaint management”, “regular customer visit” and “availability of EDI” better than their competitors. The focal company was in par with the competitors as far as “prompt response” and “on time cargo delivery” services were concerned. The company scored lower than its competitors in the areas of “fast in confirming space” and “corrected invoice and AWB”.

From the viewpoint of general customers, the focal company provided only three better services than their competitors: “professional staff”, “on time cargo delivery” and “availability of EDI”. The company and its competitors were equal in satisfying the customers regarding the “capacity in complaint management” service. The company appeared to perform poorer than its competitors in the areas of “prompt response”, “reasonable freight charge”, “deliver cargo in good condition”, “regular customer visit”, “fast in confirming space”, and “corrected invoice and AWB”.

Table 10 : The Satisfaction Level Comparison of Both Key Customers and General Customers to Both Focal company and Competitors Company

Service required by key customers	% of important	Better Equal Worse	Service required by general customers	% of important	Better Equal Worse
Prompt response	17.69	Equal	Prompt response	23.2	Worse
Professional staff	16.19	Better	Reasonable freight charge	16.56	Worse
Delivery cargo in good condition	14.35	Better	Professional staff	16.5	Better
On time cargo delivery	12.59	Equal	Delivery cargo in good condition	11.25	Worse
Reasonable freight charge	12.42	Better	On time cargo delivery	9.12	Better
Capability in complain management	10.79	Better	Capability in complain management	7.94	Equal
Availability of EDI	6.39	Better	Regular customer visit	5.98	Worse
Regular customer visit	5.09	Better	Fast in confirming space	3.44	Worse
Fast in confirming space	2.44	Worse	Corrected invoice and AWB	3.07	Worse
Corrected invoice and AWB	2.06	Worse	Availability of EDI	2.93	Better
Score of better satisfaction level	65.23		Score of better satisfaction level	28.55	
Score of equal satisfaction level	30.28		Score of equal satisfaction level	7.94	
Score of worse satisfaction level	4.5		Score of worse satisfaction level	63.5	

4.2.2.2 The Relationship between WHATs and HOWs

The relationship between WHATs and HOWs was completed after a series of expert interviews. The results, shown in Table 11, indicate that the "operational excellence" had the highest relation score than other services required, followed by the "dedicated manpower" and "fast response".

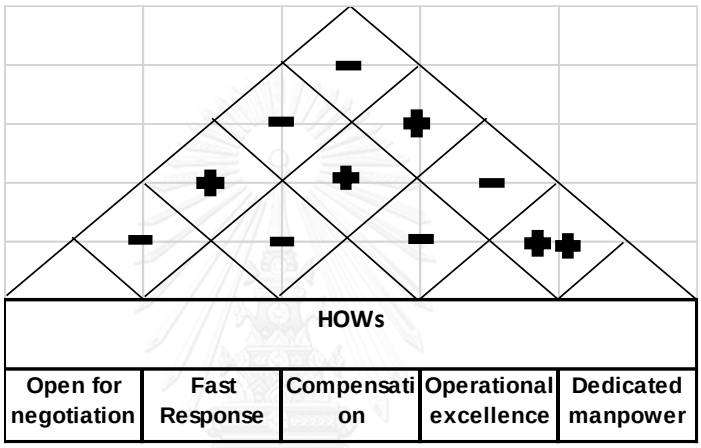
Table 11 : The Relationship between WHATs and HOWs

	HOWs				
WHATs	Open for negotiatio	Fast Response	Compens ation	Operation al	Dedicated manpowe
Prompt response	0	3	0	3	3
Professional staff	2	1	0	0	2
Reasonable freight charge	3	2	0	2	1
Delivery cargo in good condition	0	0	2	3	2
On time cargo delivery	0	0	0	3	1
Capability in complain management	3	3	3	3	2
Regular customer visit	0	2	0	2	3
Availability of EDI	0	2	0	3	3
Fast in confirming space	0	3	0	3	3
Corrected invoice and AWB	0	0	0	3	3

4.2.2.3 The Correlation between HOWs and HOWs

The correlation between HOWs and HOWs using linguistic judgement of the focal company's experts, which are represented by symbols that express the degree of relation, as seen in figure 4.1 reveal that "dedicated manpower" strongly affected "operational excellence" and moderately affected "fast response". "Open for negotiation" moderately affected "compensation", whereas "operational excellence" moderately affected "fast response".

Figure 4.1: The Correlation between HOWs and HOWs



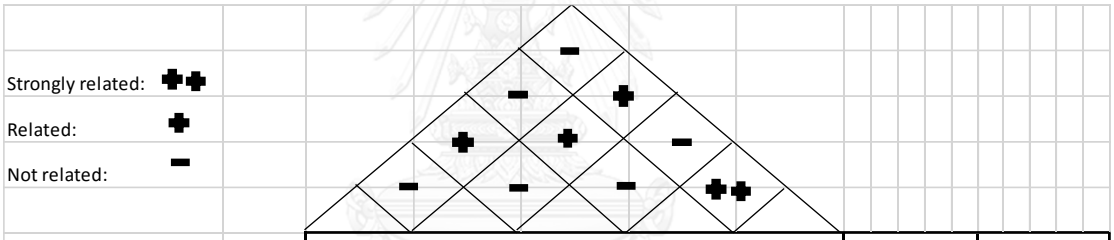
4.2.2.4 Target value and QFD charts designed

Target values of each service offered (HOWs) are determined for both group of customers, i.e., included the key customer group and general customer group by following the formula below.

Target value or Weight $(HOW)_i$ = V of $(HOW)_{i1}$ x imp of $(WHAT_1)$ + … + V of $(HOW)_{in}$ x imp of $(WHAT_n)$, where $V(HOW)_{in}$ is the correlation value of HOW_i with $WHAT_n$, and $imp(WHAT_n)$ represents the importance or priority of $WHAT_n$

They were indicated on the ground floor of the houses as seen in table 12 and 13. The study revealed that for both customer groups "operational excellence" had the highest target value score followed by "dedicated manpower" and "fast response". These are the areas of service capability that the focal company must concentrate on in improving its services to the customers.

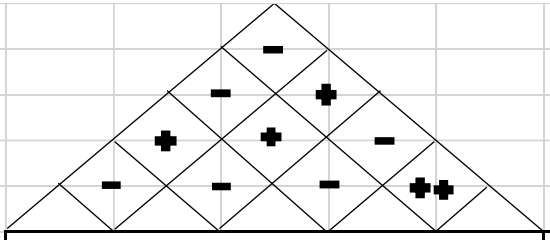
Table 12 : QFD chart of Key Customer Group



		HOWs					Focal company service			Competitors service	
WHATs	Weight of important	Open for negotiation	Fast Response	Compensation	Operational excellence	Dedicated manpower	1	2	3	4	5
Prompt response	0.18	0	3	0	3	3					★
Professional staff	0.16	2	1	0	0	2				★	★
Reasonable freight charge	0.12	3	2	0	2	1				★	★
Delivery cargo in good condition	0.14	0	0	2	3	2				★	★
On time cargo delivery	0.13	0	0	0	3	1					★
Capability in complain management	0.11	3	3	3	3	2				★	★
Regular customer visit	0.05	0	2	0	2	3				★	★
Availability of EDI	0.06	0	2	0	3	3				★	★
Fast in confirming space	0.02	0	3	0	3	3			★		★
Corrected invoice and AWB	0.02	0	0	0	3	3				★	★
	Target	1.02	1.57	0.61	2.34	2.09					

Table 13 : QFD chart of General Customer Group

Strongly related: ++
Related: +
Not related: −



		HOWs					Focal company service			Competitors service	
WHATs	Weight of important	Open for negotiation	Fast Response	Compensation	Operational excellence	Dedicated manpower	1	2	3	4	5
Prompt response	0.23	0	3	0	3	3				★	★
Professional staff	0.16	2	1	0	0	2				★	★
Reasonable freight charge	0.17	3	2	0	2	1				★	★
Delivery cargo in good condition	0.11	0	0	2	3	2				★	★
On time cargo delivery	0.09	0	0	0	3	1				★	★
Capability in complain management	0.08	3	3	3	3	2				★	
Regular customer visit	0.06	0	2	0	2	3				★	★
Availability of EDI	0.03	0	2	0	3	3				★	★
Fast in confirming space	0.03	0	3	0	3	3				★	★
Corrected invoice and AWB	0.03	0	0	0	3	3				★	★
	Target	1.06	1.71	0.46	2.28	2.13					

Chapter 5

Conclusion

The study was divided into two parts which are customer segmentation by K-means and service design by QFD integrated with AHP. The final clustering results derived from the K-means methodology analysis in SPSS indicated that two customer groups were generated. These two groups were the key customer and general customer. The validation of results was checked by experts. They agreed that less customer groups align with the focal company strategy.

According to AHP results, the study reveals that key customers are relatively service oriented while the general customers are price oriented. The QFD results suggest the focal companies to place priority to improving service efficiency in the areas of "prompt response" and "on time cargo delivery" for their key customers whose contribute to profit is about twenty-four times of that of general customers. The service efficiency can be enhanced by the following tactics:

- Create opportunities for constructive interaction between staffs and customers by arranging meetings to gain more understanding about customer demands
- Determine the service offered more precisely so that the company will be able to respond to the customers' specific demands in the consistent manner
- Provide proper guidelines and training to all staffs involved in service delivery
- Constantly monitor its operational performance and strive for improvement

Although, general customers have not generally contributed steady profit and have not hesitated to employ a new service provider once being dissatisfied with some of the focal company services, the study nevertheless shows the importance of high volume which contributed 53% of the focal company's overall cargo volume. This high volume allows the focal company to expand its market share and to increase its bargaining power with airlines. Therefore, the focal company is in need to seek service quality improvement in the areas of "prompt responses", "reasonable freight charges", "delivery of cargo in good condition", "regular customer visits", "fast in confirming space", and "corrected invoice and AWB", with which customers are quite less satisfied.

In the area of "prompt response" in which improvements must be made in serving both customer groups, the attempt to improve the process indiscriminately may result in wasted time, human resources and increase in the service cost. The focal company should give priority to their key customers when allocating their service time and resources.

The study finds that the benefits of employing QFD methodology integrated with AHP are:

- The application of AHP method enables the focal company to understand the difference in the concerns of key customers and general customers.
- The customer survey results provide information that sheds light on the strength and weakness of the focal company compared to its competitors.
- The study points out the areas for capability development that the focal company must focus on.

Limitation of this Research:

Based on the existing practice, the competitiveness results which compare the performance of the company against that of competitors from the customers' viewpoint are not directly incorporated in the analysis of the target areas of development. Future research may find a way to take these results into account by giving higher scores to the service areas that the company has scored poorer than its competitors.

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APPENDIX

APPENDIX A

Table 14 : Characteristics of Each Customers in Focal Company

No.	Cargo distribution (1/Global, 2/Regional, 3/Loca	Total no. of shipments in 2016	Moved volume in 2016 (in CBM)	Gained Profit in 2016 (%)	Relationship (yrs)	Frequency of complaint 1/frequent hard, 2/non-fre hard, 3/soft, 4/nev	Financial status 1/more than 5 bad debt/yr, 2/1-5 bad debt/yr, 3/never	Customer's price-sensitivity (1/always bargain, 2/sometimes, 3/never)	Level of decision maker (1/product staff, 2/mng, 3/senior managemen	Frequency of meeting (1/0-4 times, 2/5-11 times, 3/12 time
1	3	13	4058.00	30.98%	4	4	3	2	1	1
2	2	4	902.00	41.06%	14	4	3	2	2	1
3	3	4	2571.00	24.09%	5	3	2	3	2	3
4	3	12	6372.00	12.66%	2	2	2	2	1	2
5	2	6	246.00	53.57%	6	4	3	3	3	2
6	1	38	105043.00	31.13%	7	2	3	1	3	2
7	2	435	51684.80	24.73%	14	2	3	1	3	2
8	3	21	4879.00	20.25%	2	4	3	2	2	1
9	3	269	354409.00	29.44%	2	2	3	2	3	3
10	3	149	40733.00	5.30%	3	2	1	2	3	2
11	3	19	6114.00	50.18%	11	1	3	1	2	1
12	1	5	1934.50	37.94%	14	4	2	3	2	2
13	2	115	14981.00	48.44%	13	4	3	3	2	1
14	1	9	16664.50	29.54%	9	2	3	1	3	2
15	2	254	154125.00	32.80%	14	1	1	1	2	3
16	3	28	28308.50	37.54%	11	3	3	1	3	3
17	2	96	15921.00	54.05%	7	4	3	3	3	1
18	1	7124	2025435.30	44.18%	16	2	3	1	3	2
19	2	167	68744.00	25.76%	11	4	3	1	3	2
20	3	9	4970.00	32.40%	7	4	3	3	1	1
21	3	7	239.50	32.72%	8	4	2	3	1	1
22	2	102	41477.50	36.89%	11	2	2	3	1	1
23	3	87	116778.50	9.76%	13	1	1	1	1	3
24	1	144	264133.50	23.08%	12	3	3	3	1	2
25	2	441	272700.50	7.33%	14	1	2	1	2	3
26	3	59	4498.00	24.84%	14	4	3	3	2	1
27	2	14	2243.50	45.64%	2	4	3	3	2	1
28	2	152	136776.00	34.74%	5	3	3	3	2	2
29	3	2	307.00	52.04%	11	4	3	3	2	1
30	1	65	45320.50	16.65%	14	4	3	2	3	1
31	3	27	7273.00	50.94%	7	4	3	3	2	1
32	3	10	341.00	34.51%	2	2	1	2	3	1
33	2	189	93246.50	10.88%	14	1	1	1	3	3
34	3	129	67687.50	45.47%	11	3	3	2	2	2
35	1	339	28205.50	5.73%	2	1	3	2	3	2
36	1	131	10221.50	64.99%	13	2	3	3	2	1
37	3	14	4420.00	28.10%	8	3	3	2	3	1
38	3	10	2024.50	54.57%	14	3	3	2	3	2
39	1	61	89488.00	19.98%	12	2	1	1	3	2
40	1	1354	535313.50	26.72%	11	3	3	2	3	2
41	2	1042	185179.00	49.19%	10	2	3	3	1	2
42	2	199	113725.50	40.15%	14	4	3	2	2	1
43	1	569	177414.60	24.85%	14	3	3	2	3	1
44	1	140	23202.50	43.85%	14	4	3	2	3	1
45	3	42	20362.50	21.59%	3	2	3	2	2	3
46	3	16	3763.50	9.55%	6	4	2	1	1	1
47	3	8	7085.00	44.84%	8	4	2	2	1	1
48	3	2	426.00	50.30%	14	3	3	1	2	1

No.	Cargo distribution (1/Global, 2/Regional, 3/Loca	Total no. of shipments in 2016	Moved volume in 2016 (in CBM)	Gained Profit in 2016 (%)	Relationship (yrs)	Frequency of complaint 1/frequent hard, 2/non-fre hard, 3/soft, 4/nev	Financial status 1/more than 5 bad debt/yr, 2/1-5 bad debt/yr, 3/never	Customer's price-sensitivity (1/always bargain, 2/sometimes, 3/never)	Level of decision maker (1/product staff, 2/mng, 3/senior managemen	Frequency of meeting (1/0-4 times, 2/5-11 times, 3/12 time
49	3	17	6805.00	39.81%	3	4	3	3	2	1
50	3	42	1974.50	52.80%	5	1	1	1	3	3
51	1	116	60970.50	0.67%	9	2	1	1	3	3
52	3	3	2110.00	14.37%	14	3	2	1	3	1
53	2	1245	295453.60	52.49%	8	2	3	3	3	2
54	3	12	2614.00	58.36%	5	4	3	2	2	1
55	3	13	21389.00	15.62%	12	2	1	1	2	1
56	3	10	1520.50	23.11%	6	4	3	3	1	1
57	3	106	107418.00	30.70%	4	3	3	2	3	3
58	3	279	17046.00	7.48%	14	1	2	2	2	3
59	3	271	128053.00	15.78%	22	2	3	1	2	2
60	3	18	6455.00	14.04%	7	2	1	2	2	3
61	1	2313	871162.00	19.61%	9	2	3	2	3	3
62	3	6	1887.50	29.82%	3	3	3	2	2	2
63	3	38	9544.50	58.53%	9	4	3	2	1	1
64	1	208	225169.50	15.03%	15	4	3	3	3	2
65	2	332	69679.70	13.14%	13	3	3	2	2	3
66	3	21	2105.50	13.99%	12	4	3	3	2	1
67	3	1280	1237744.00	19.13%	10	1	1	1	3	3
68	3	204	265418.50	11.61%	3	4	2	2	3	1
69	3	21	11298.00	43.22%	3	4	3	2	2	1
70	3	32	6894.00	53.89%	9	3	3	2	2	1
71	3	14	13265.00	28.23%	2	4	3	3	2	2
72	3	38	53296.00	16.92%	9	2	3	1	2	3
73	1	2183	761901.80	33.67%	14	2	3	1	3	3
74	3	6	1496.00	29.35%	12	3	3	3	2	2
75	1	6	3673.00	33.74%	10	2	1	1	1	1
76	1	134	19460.90	29.49%	14	4	3	2	3	2
77	2	853	125405.00	32.45%	11	3	3	2	3	3
78	2	540	324355.00	9.60%	11	1	3	2	3	1
79	1	188	226438.50	22.04%	8	3	3	1	2	3
80	1	68	20266.00	37.10%	4	2	2	1	3	1
81	3	12	1332.50	25.23%	2	4	3	3	2	1
82	2	443	230774.60	25.47%	3	2	2	1	3	1
83	3	16	21574.00	15.04%	2	2	2	2	1	2
84	1	32	3962.50	48.19%	14	4	2	2	3	1
85	3	8	972.00	28.83%	6	4	2	3	1	1
86	1	19	10392.50	25.52%	12	4	3	3	2	1
87	3	10	11600.00	32.15%	15	4	2	3	1	2
88	3	43	54235.00	31.75%	6	3	3	3	3	2
89	3	15	31860.50	14.09%	12	2	2	1	3	3
90	2	44	2979.00	76.52%	11	4	3	2	2	1
91	3	84	38479.00	22.90%	8	4	3	3	3	2
92	3	42	28295.50	7.99%	11	3	2	1	3	3

Table 15 : Clustering Result

Case Number	Cluster	Distance	Case Number	Cluster	Distance
1	2	59628.884	**47**	2	56601.904
2	2	62784.896	**48**	2	63260.901
3	2	61115.901	**49**	2	56881.882
4	2	57314.896	**50**	2	61712.328
5	2	63440.893	**51**	2	2716.575
6	2	41356.393	**52**	2	61576.904
7	2	12005.487	**53**	2	231769.478
8	2	58807.870	**54**	2	61072.888
9	2	290722.286	**55**	2	42297.946
10	2	22953.759	**56**	2	62166.385
11	2	57572.878	**57**	2	43731.275
12	2	61752.396	**58**	2	46640.945
13	2	48705.752	**59**	2	64366.389
14	2	47022.433	**60**	2	57231.882
15	2	90438.327	**61**	1	352899.954
16	2	35378.429	**62**	2	61799.394
17	2	47765.769	**63**	2	54142.349
18	1	801384.010	**64**	2	161482.773
19	2	5057.320	**65**	2	5995.962
20	2	58716.895	**66**	2	61581.366
21	2	63447.388	**67**	1	13820.774
22	2	22209.280	**68**	2	201731.769
23	2	53091.794	**69**	2	52388.885
24	2	200446.759	**70**	2	56792.854
25	2	209013.973	**71**	2	50421.908
26	2	59188.802	**72**	2	10391.288
27	2	61443.379	**73**	1	462160.150
28	2	73089.260	**74**	2	62190.893
29	2	63379.901	**75**	2	60013.898
30	2	18366.416	**76**	2	44225.842
31	2	56413.864	**77**	2	61722.339
32	2	63345.882	**78**	2	260668.562
33	2	29559.803	**79**	2	162751.766
34	2	4000.804	**80**	2	43420.807
35	2	35481.792	**81**	2	62354.775
36	2	53465.252	**82**	2	167088.128
37	2	59266.882	**83**	2	42112.938
38	2	61662.389	**84**	2	59724.347
39	2	25801.394	**85**	2	62714.887
40	2	471628.313	**86**	2	53294.387
41	2	121495.583	**87**	2	52086.912
42	2	50038.791	**88**	2	9452.275
43	2	113728.656	**89**	2	31826.506
44	2	40484.243	**90**	2	60707.838
45	2	43324.362	**91**	2	25207.813
46	2	59923.381	**92**	2	35391.395

Table 16 : Distances between Final Cluster Centers

Cluster	1	2
1		1160378.126
2	1160378.126	

Table 17 : Number of Cases in each Cluster

Cluster	1	4.000
	2	88.000
Valid		92.000
Missing		.000

Table 18 : ANOVA

	Cluster		Error			
	Mean Square	Df	Mean Square	df	F	Sig.
Level of distribution	2.706	1	.675	90	4.007	.048
NO OF SHPT IN 2016	36334100.538	1	294120.363	90	123.535	.000
MOVED Volume IN 2016	5151703265710.09	1	20510039171.24	90	251.180	.000
GAINED PROFIT IN 2016	61.859	1	801.030	90	.077	.782
Year of relationship	39.291	1	19.717	90	1.993	.162
Frequency of complaint	5.344	1	1.093	90	4.891	.030
Customer's price-sensitivity	2.421	1	.606	90	3.993	.049
Level of decision maker	2.352	1	.521	90	4.514	.036
Financial status	.004	1	.521	90	.009	.927
Frequency of meeting	14.111	1	.924	90	15.266	.000

APPENDIX B

Table 19 : % Ratio Scale of Priority based on the Fundamental (Key Customer: C18)

CTQ'S	Prompt respons e	Profess ional staff	Reason able freight charge	Deliver y cargo in good conditi	On time cargo deliver	Capabil ity in compla in	Regula r custom er visit	Availab ility of EDI	Fast in confirm ing space	Correct ed invoice and
Prompt response	1	3	5	1	1	1	3	1	3	1
Professional staff	0.3333	1	3	1	3	3	7	1	9	5
Reasonable freight charge	0.2000	0.3333	1	1	3	3	5	1	7	7
Delivery cargo in good condition	1.0000	1.0000	1.0000	1	3	3	7	1	7	7
On time cargo delivery	1.0000	0.3333	0.3333	0.3333	1	5	5	1	7	7
Capability in complain management	1.0000	0.3333	0.3333	0.3333	0.2000	1	5	1	5	7
Regular customer visit	0.3333	0.1429	0.2000	0.1429	0.2000	0.2000	1	1	3	5
Availability of EDI	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.000	1	1	1
Fast in confirming space	0.3333	0.1111	0.1429	0.1429	0.1429	0.2000	0.333	1.0000	1	3
Corrected invoice and AWB	1.0000	0.2000	0.1429	0.1429	0.1429	0.1429	0.200	1.0000	0.3333	1
TOTAL	**7.200**	**7.454**	**12.152**	**6.095**	**12.686**	**17.543**	**34.533**	**10.000**	**43.333**	**44.000**

Table 20 : % Ratio Scale of Customer Preference Priority Wise (Key Customer: C18)

CTQ'S	Prompt respons e	Profess ional staff	Reason able freight charge	Deliver y cargo in good conditi	On time cargo deliver	Capabil ity in compla in	Regula r custom er visit	Availab ility of EDI	Fast in confirm ing space	Correct ed invoice and	CUMULATIVE SCORE	% RATIO OF SCALE OF PRIORITY
Prompt response	0.14	0.40	0.41	0.16	0.08	0.06	0.09	0.10	0.07	0.02	1.53	**15.32%**
Professional staff	0.05	0.13	0.25	0.16	0.24	0.17	0.20	0.10	0.21	0.11	1.62	**16.23%**
Reasonable freight charge	0.03	0.04	0.08	0.16	0.24	0.17	0.14	0.10	0.16	0.16	1.29	**12.92%**
Delivery cargo in good condition	0.14	0.13	0.08	0.16	0.24	0.17	0.20	0.10	0.16	0.16	1.55	**15.50%**
On time cargo delivery	0.14	0.04	0.03	0.05	0.08	0.29	0.14	0.10	0.16	0.16	1.19	**11.95%**
Capability in complain management	0.14	0.04	0.03	0.05	0.02	0.06	0.14	0.10	0.12	0.16	0.86	**8.58%**
Regular customer visit	0.05	0.02	0.02	0.02	0.02	0.01	0.03	0.10	0.07	0.11	0.44	**4.44%**
Availability of EDI	0.14	0.13	0.08	0.16	0.08	0.06	0.03	0.10	0.02	0.02	0.83	**8.30%**
Fast in confirming space	0.05	0.01	0.01	0.02	0.01	0.01	0.01	0.10	0.02	0.07	0.32	**3.20%**
Corrected invoice and AWB	0.14	0.03	0.01	0.02	0.01	0.01	0.01	0.10	0.01	0.02	0.36	**3.57%**
TOTAL	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**10**	**100%**

Table 21 : % Ratio Scale of Priority based on the Fundamental (Key Customer: C61)

CTQ'S	Prompt respons e	Profess ional staff	Reason able freight charge	Deliver y cargo in good conditi	On time cargo deliver	Capabil ity in compla in	Regula r custom er visit	Availab ility of EDI	Fast in confirm ing space	Correct ed invoice and
Prompt response	1	1	1	5	3	1	7	1	5	7
Professional staff	1.0000	1	3	3	3	1	1	1	5	7
Reasonable freight charge	1.0000	0.3333	1	1	1	1	5	1	5	5
Delivery cargo in good condition	0.2000	0.3333	1.0000	1	3	3	5	1	7	5
On time cargo delivery	0.3333	0.3333	1.0000	0.3333	1	5	7	3	5	7
Capability in complain management	1.0000	1.0000	1.0000	0.3333	0.2000	1	9	3	7	7
Regular customer visit	0.1429	1.0000	0.2000	0.2000	0.1429	0.1111	1	1	1	1
Availability of EDI	1.0000	1.0000	1.0000	1.0000	0.3333	0.3333	1.000	1	9	9
Fast in confirming space	0.2000	0.2000	0.2000	0.1429	0.2000	0.1429	1.000	0.1111	1	5
Corrected invoice and AWB	0.1429	0.1429	0.2000	0.2000	0.1429	0.1429	1.000	0.1111	0.2000	1
TOTAL	**6.019**	**6.343**	**9.600**	**12.210**	**12.019**	**12.730**	**38.000**	**12.222**	**45.200**	**54.000**

Table 22 : % Ratio Scale of Customer Preference Priority Wise (Key Customer: C61)

CTQ'S	Prompt response	Professional staff	Reasonable freight charge	Delivery cargo in good conditi	On time cargo deliver	Capability in complain	Regular customer visit	Availability of EDI	Fast in confirming space	Corrected invoice and	CUMULATIVE SCORE	% RATIO OF SCALE OF PRIORITY
Prompt response	0.17	0.16	0.10	0.41	0.25	0.08	0.18	0.08	0.11	0.13	1.67	**16.72%**
Professional staff	0.17	0.16	0.31	0.25	0.25	0.08	0.03	0.08	0.11	0.13	1.56	**15.59%**
Reasonable freight charge	0.17	0.05	0.10	0.08	0.08	0.08	0.13	0.08	0.11	0.09	0.98	**9.83%**
Delivery cargo in good condition	0.03	0.05	0.10	0.08	0.25	0.24	0.13	0.08	0.15	0.09	1.22	**12.18%**
On time cargo delivery	0.06	0.05	0.10	0.03	0.08	0.39	0.18	0.25	0.11	0.13	1.39	**13.85%**
Capability in complain management	0.17	0.16	0.10	0.03	0.02	0.08	0.24	0.25	0.15	0.13	1.32	**13.17%**
Regular customer visit	0.02	0.16	0.02	0.02	0.01	0.01	0.03	0.08	0.02	0.02	0.39	**3.88%**
Availability of EDI	0.17	0.16	0.10	0.08	0.03	0.03	0.03	0.08	0.20	0.17	1.04	**10.38%**
Fast in confirming space	0.03	0.03	0.02	0.01	0.02	0.01	0.03	0.01	0.02	0.09	0.28	**2.75%**
Corrected invoice and AWB	0.02	0.02	0.02	0.02	0.01	0.01	0.03	0.01	0.00	0.02	0.16	**1.65%**
TOTAL	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**10**	**100%**

Table 23: % Ratio Scale of Priority based on the Fundamental (Key Customer: C67)

CTQ'S	Prompt response	Professional staff	Reasonable freight charge	Delivery cargo in good conditi	On time cargo deliver	Capability in complain	Regular customer visit	Availability of EDI	Fast in confirming space	Corrected invoice and
Prompt response	1	1	1	3	3	1	1	5	7	7
Professional staff	1.0000	1	3	3	3	1	3	7	9	5
Reasonable freight charge	1.0000	0.3333	1	5	1	5	1	1	9	9
Delivery cargo in good condition	0.3333	0.3333	0.2000	1	3	5	9	3	7	7
On time cargo delivery	0.3333	0.3333	1.0000	0.3333	1	3	7	7	9	9
Capability in complain management	1.0000	1.0000	0.2000	0.2000	0.3333	1	3	5	7	7
Regular customer visit	1.0000	0.3333	1.0000	0.1111	0.1429	0.3333	1	5	3	3
Availability of EDI	0.2000	0.1429	1.0000	0.3333	0.1429	0.2000	0.200	1	1	3
Fast in confirming space	0.1429	0.1111	0.1111	0.1429	0.1111	0.1429	0.333	1.0000	1	1
Corrected invoice and AWB	0.1429	0.2000	0.1111	0.1429	0.1111	0.1429	0.333	0.3333	1.0000	1
TOTAL	**6.152**	**4.787**	**8.622**	**13.263**	**11.841**	**16.819**	**25.867**	**35.333**	**54.000**	**52.000**

Table 24 : % Ratio Scale of Customer Preference Priority Wise (Key Customer: C67)

CTQ'S	Prompt response	Professional staff	Reasonable freight charge	Delivery cargo in good conditi	On time cargo deliver	Capability in complain	Regular customer visit	Availability of EDI	Fast in confirming space	Corrected invoice and	CUMULATIVE SCORE	% RATIO OF SCALE OF PRIORITY
Prompt response	0.16	0.21	0.12	0.23	0.25	0.06	0.04	0.14	0.13	0.13	1.47	**14.71%**
Professional staff	0.16	0.21	0.35	0.23	0.25	0.06	0.12	0.20	0.17	0.10	1.84	**18.35%**
Reasonable freight charge	0.16	0.07	0.12	0.38	0.08	0.30	0.04	0.03	0.17	0.17	1.51	**15.14%**
Delivery cargo in good condition	0.05	0.07	0.02	0.08	0.25	0.30	0.35	0.08	0.13	0.13	1.47	**14.70%**
On time cargo delivery	0.05	0.07	0.12	0.03	0.08	0.18	0.27	0.20	0.17	0.17	1.34	**13.36%**
Capability in complain management	0.16	0.21	0.02	0.02	0.03	0.06	0.12	0.14	0.13	0.13	1.02	**10.19%**
Regular customer visit	0.16	0.07	0.12	0.01	0.01	0.02	0.04	0.14	0.06	0.06	0.68	**6.82%**
Availability of EDI	0.03	0.03	0.12	0.03	0.01	0.01	0.01	0.03	0.02	0.06	0.34	**3.40%**
Fast in confirming space	0.02	0.02	0.01	0.01	0.01	0.01	0.01	0.03	0.02	0.02	0.17	**1.67%**
Corrected invoice and AWB	0.02	0.04	0.01	0.01	0.01	0.01	0.01	0.01	0.02	0.02	0.17	**1.67%**
TOTAL	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**10**	**100%**

Table 25 : % Ratio Scale of Priority based on the Fundamental (Key Customer: C73)

CTQ'S	Prompt response	Professional staff	Reasonable freight charge	Delivery cargo in good conditi	On time cargo deliver	Capability in complain	Regular customer visit	Availability of EDI	Fast in confirming space	Corrected invoice and
Prompt response	1	5	7	1	3	1	7	7	9	7
Professional staff	0.2000	1	3	1	3	3	5	7	7	7
Reasonable freight charge	0.1429	0.3333	1	1	3	5	3	5	5	7
Delivery cargo in good condition	1.0000	1.0000	1.0000	1	7	3	1	3	7	7
On time cargo delivery	0.3333	0.3333	0.3333	0.1429	1	5	7	5	9	7
Capability in complain management	1.0000	0.3333	0.2000	0.3333	0.2000	1	7	7	9	9
Regular customer visit	0.1429	0.2000	0.3333	1.0000	0.1429	0.1429	1	5	3	3
Availability of EDI	0.1429	0.1429	0.2000	0.3333	0.2000	0.1429	0.200	1	5	5
Fast in confirming space	0.1111	0.1429	0.2000	0.1429	0.1111	0.1111	0.333	0.2000	1	5
Corrected invoice and AWB	0.1429	0.1429	0.1429	0.1429	0.1429	0.1111	0.333	0.2000	0.2000	1
TOTAL	**4.216**	**8.629**	**13.410**	**6.095**	**17.797**	**18.508**	**31.867**	**40.400**	**55.200**	**58.000**

Table 26 : % Ratio Scale of Customer Preference Priority Wise (Key Customer: C73)

CTQ'S	Prompt response	Professional staff	Reasonable freight charge	Delivery cargo in good conditi	On time cargo deliver	Capability in complain	Regular customer visit	Availability of EDI	Fast in confirming space	Corrected invoice and	CUMULATIVE SCORE	% RATIO OF SCALE OF PRIORITY
Prompt response	0.24	0.58	0.52	0.16	0.17	0.05	0.22	0.17	0.16	0.12	2.40	24.02%
Professional staff	0.05	0.12	0.22	0.16	0.17	0.16	0.16	0.17	0.13	0.12	1.46	14.59%
Reasonable freight charge	0.03	0.04	0.07	0.16	0.17	0.27	0.09	0.12	0.09	0.12	1.18	11.79%
Delivery cargo in good condition	0.24	0.12	0.07	0.16	0.39	0.16	0.03	0.07	0.13	0.12	1.50	15.00%
On time cargo delivery	0.08	0.04	0.02	0.02	0.06	0.27	0.22	0.12	0.16	0.12	1.12	11.19%
Capability in complain management	0.24	0.04	0.01	0.05	0.01	0.05	0.22	0.17	0.16	0.16	1.12	11.22%
Regular customer visit	0.03	0.02	0.02	0.16	0.01	0.01	0.03	0.12	0.05	0.05	0.52	5.23%
Availability of EDI	0.03	0.02	0.01	0.05	0.01	0.01	0.01	0.02	0.09	0.09	0.35	3.47%
Fast in confirming space	0.03	0.02	0.01	0.02	0.01	0.01	0.01	0.00	0.02	0.09	0.21	2.13%
Corrected invoice and AWB	0.03	0.02	0.01	0.02	0.01	0.01	0.01	0.00	0.00	0.02	0.13	1.35%
TOTAL	1	1	1	1	1	1	1	1	1	1	10	100%

Table 27 : % Ratio Scale of Priority based on the Fundamental (General Customer: C25)

CTQ'S	Prompt response	Professional staff	Reasonable freight charge	Delivery cargo in good conditi	On time cargo deliver	Capability in complain	Regular customer visit	Availability of EDI	Fast in confirming space	Corrected invoice and
Prompt response	1	5	3	3	9	5	3	7	5	7
Professional staff	0.2000	1	3	3	3	1	5	7	3	1
Reasonable freight charge	0.3333	0.3333	1	7	5	3	1	9	3	1
Delivery cargo in good condition	0.3333	0.3333	0.1429	1	1	1	1	9	3	3
On time cargo delivery	0.1111	0.3333	0.2000	1.0000	1	1	5	7	3	1
Capability in complain management	0.2000	1.0000	0.3333	1.0000	1.0000	1	5	7	3	3
Regular customer visit	0.3333	0.2000	1.0000	1.0000	0.2000	0.2000	1	5	1	1
Availability of EDI	0.1429	0.1429	0.1111	0.1111	0.1429	0.1429	0.200	1	1	1
Fast in confirming space	0.2000	0.3333	0.3333	0.3333	0.3333	0.3333	1.000	1.0000	1	3
Corrected invoice and AWB	0.1429	1.0000	1.0000	0.3333	1.0000	0.3333	1.000	1.0000	0.3333	1
TOTAL	**2.997**	**9.676**	**10.121**	**17.778**	**21.676**	**13.010**	**23.200**	**54.000**	**23.333**	**22.000**

Table 28: % Ratio Scale of Customer Preference Priority Wise
(General Customer: C25)

CTQ'S	Prompt response	Professional staff	Reasonable freight charge	Delivery cargo in good conditi	On time cargo deliver	Capability in complain	Regular customer visit	Availability of EDI	Fast in confirming space	Corrected invoice and	CUMULATIVE SCORE	% RATIO OF SCALE OF PRIORITY
Prompt response	0.33	0.52	0.30	0.17	0.42	0.38	0.13	0.13	0.21	0.32	2.91	**29.07%**
Professional staff	0.07	0.10	0.30	0.17	0.14	0.08	0.22	0.13	0.13	0.05	1.37	**13.70%**
Reasonable freight charge	0.11	0.03	0.10	0.39	0.23	0.23	0.04	0.17	0.13	0.05	1.48	**14.83%**
Delivery cargo in good condition	0.11	0.03	0.01	0.06	0.05	0.08	0.04	0.17	0.13	0.14	0.81	**8.14%**
On time cargo delivery	0.04	0.03	0.02	0.06	0.05	0.08	0.22	0.13	0.13	0.05	0.79	**7.90%**
Capability in complain management	0.07	0.10	0.03	0.06	0.05	0.08	0.22	0.13	0.13	0.14	0.99	**9.92%**
Regular customer visit	0.11	0.02	0.10	0.06	0.01	0.02	0.04	0.09	0.04	0.05	0.54	**5.36%**
Availability of EDI	0.05	0.01	0.01	0.01	0.01	0.01	0.01	0.02	0.04	0.05	0.21	**2.13%**
Fast in confirming space	0.07	0.03	0.03	0.02	0.02	0.03	0.04	0.02	0.04	0.14	0.43	**4.35%**
Corrected invoice and AWB	0.05	0.10	0.10	0.02	0.05	0.03	0.04	0.02	0.01	0.05	0.46	**4.62%**
TOTAL	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**10**	**100%**

Table 29 : % Ratio Scale of Priority based on the Fundamental
(General Customer: C37)

CTQ'S	Prompt response	Professional staff	Reasonable freight charge	Delivery cargo in good conditi	On time cargo deliver	Capability in complain	Regular customer visit	Availability of EDI	Fast in confirming space	Corrected invoice and
Prompt response	1	3	5	1	1	7	5	9	3	7
Professional staff	0.3333	1	7	3	7	7	1	7	9	7
Reasonable freight charge	0.2000	0.1429	1	1	3	1	1	5	5	5
Delivery cargo in good condition	1.0000	0.3333	1.0000	1	7	7	1	9	9	9
On time cargo delivery	1.0000	0.1429	0.3333	0.1429	1	5	7	9	9	9
Capability in complain management	0.1429	0.1429	1.0000	0.1429	0.2000	1	7	5	9	9
Regular customer visit	0.2000	1.0000	1.0000	1.0000	0.1429	0.1429	1	3	3	3
Availability of EDI	0.1111	0.1429	0.2000	0.1111	0.1111	0.2000	0.333	1	1	1
Fast in confirming space	0.3333	0.1111	0.2000	0.1111	0.1111	0.1111	0.333	1.0000	1	3
Corrected invoice and AWB	0.1429	0.1429	0.2000	0.1111	0.1111	0.1111	0.333	1.0000	0.3333	1
TOTAL	**4.463**	**6.159**	**16.933**	**7.619**	**19.676**	**28.565**	**24.000**	**50.000**	**49.333**	**54.000**

Table 30 : % Ratio Scale of Customer Preference Priority Wise
(General Customer: C37)

CTQ'S	Prompt response	Professional staff	Reasonable freight charge	Delivery cargo in good conditi	On time cargo deliver	Capability in complain	Regular customer visit	Availability of EDI	Fast in confirming space	Corrected invoice and	CUMULATIVE SCORE	% RATIO OF SCALE OF PRIORITY
Prompt response	0.22	0.49	0.30	0.13	0.05	0.25	0.21	0.18	0.06	0.13	2.01	**20.12%**
Professional staff	0.07	0.16	0.41	0.39	0.36	0.25	0.04	0.14	0.18	0.13	2.14	**21.39%**
Reasonable freight charge	0.04	0.02	0.06	0.13	0.15	0.04	0.04	0.10	0.10	0.09	0.78	**7.81%**
Delivery cargo in good condition	0.22	0.05	0.06	0.13	0.36	0.25	0.04	0.18	0.18	0.17	1.64	**16.40%**
On time cargo delivery	0.22	0.02	0.02	0.02	0.05	0.18	0.29	0.18	0.18	0.17	1.33	**13.32%**
Capability in complain management	0.03	0.02	0.06	0.02	0.01	0.04	0.29	0.10	0.18	0.17	0.92	**9.19%**
Regular customer visit	0.04	0.16	0.06	0.13	0.01	0.01	0.04	0.06	0.06	0.06	0.63	**6.28%**
Availability of EDI	0.02	0.02	0.01	0.01	0.01	0.01	0.01	0.02	0.02	0.02	0.16	**1.60%**
Fast in confirming space	0.07	0.02	0.01	0.01	0.01	0.00	0.01	0.02	0.02	0.06	0.24	**2.38%**
Corrected invoice and AWB	0.03	0.02	0.01	0.01	0.01	0.00	0.01	0.02	0.01	0.02	0.15	**1.50%**
TOTAL	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**10**	**100%**

Table 31 : % Ratio Scale of Priority based on the Fundamental (General Customer: C74)

CTQ'S	Prompt response	Professional staff	Reasonable freight charge	Delivery cargo in good conditi	On time cargo deliver	Capability in complain	Regular customer visit	Availability of EDI	Fast in confirming space	Corrected invoice and
Prompt response	1	7	3	1	9	5	1	9	1	1
Professional staff	0.1429	1	1	3	1	5	3	9	5	3
Reasonable freight charge	0.3333	1.0000	1	7	5	7	9	9	9	3
Delivery cargo in good condition	1.0000	0.3333	0.1429	1	1	3	5	7	5	1
On time cargo delivery	0.1111	1.0000	0.2000	1.0000	1	5	1	7	7	3
Capability in complain management	0.2000	0.2000	0.1429	0.3333	0.2000	1	3	9	1	3
Regular customer visit	1.0000	0.3333	0.1111	0.2000	1.0000	0.3333	1	7	3	1
Availability of EDI	0.1111	0.1111	0.1111	0.1429	0.1429	0.1111	0.143	1	1	7
Fast in confirming space	1.0000	0.2000	0.1111	0.2000	0.1429	1.0000	0.333	1.0000	1	5
Corrected invoice and AWB	1.0000	0.3333	0.3333	1.0000	0.3333	0.3333	1.000	0.1429	0.2000	1
TOTAL	**5.898**	**11.511**	**6.152**	**14.876**	**18.819**	**27.778**	**24.476**	**59.143**	**33.200**	**28.000**

Table 32 : % Ratio Scale of Customer Preference Priority Wise (General Customer: C74)

CTQ'S	Prompt response	Professional staff	Reasonable freight charge	Delivery cargo in good conditi	On time cargo deliver	Capability in complain	Regular customer visit	Availability of EDI	Fast in confirming space	Corrected invoice and	CUMULATIVE SCORE	% RATIO OF SCALE OF PRIORITY
Prompt response	0.17	0.61	0.49	0.07	0.48	0.18	0.04	0.15	0.03	0.04	2.25	**22.50%**
Professional staff	0.02	0.09	0.16	0.20	0.05	0.18	0.12	0.15	0.15	0.11	1.24	**12.41%**
Reasonable freight charge	0.06	0.09	0.16	0.47	0.27	0.25	0.37	0.15	0.27	0.11	2.19	**21.92%**
Delivery cargo in good condition	0.17	0.03	0.02	0.07	0.05	0.11	0.20	0.12	0.15	0.04	0.96	**9.59%**
On time cargo delivery	0.02	0.09	0.03	0.07	0.05	0.18	0.04	0.12	0.21	0.11	0.92	**9.16%**
Capability in complain management	0.03	0.02	0.02	0.02	0.01	0.04	0.12	0.15	0.03	0.11	0.56	**5.56%**
Regular customer visit	0.17	0.03	0.02	0.01	0.05	0.01	0.04	0.12	0.09	0.04	0.58	**5.80%**
Availability of EDI	0.02	0.01	0.02	0.01	0.01	0.00	0.01	0.02	0.03	0.25	0.37	**3.71%**
Fast in confirming space	0.17	0.02	0.02	0.01	0.01	0.04	0.01	0.02	0.03	0.18	0.50	**5.01%**
Corrected invoice and AWB	0.17	0.03	0.05	0.07	0.02	0.01	0.04	0.00	0.01	0.04	0.43	**4.35%**
TOTAL	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**10**	**100%**

Table 33 : % Ratio Scale of Priority based on the Fundamental (General Customer: C80)

CTQ'S	Prompt response	Professional staff	Reasonable freight charge	Delivery cargo in good conditi	On time cargo deliver	Capability in complain	Regular customer visit	Availability of EDI	Fast in confirming space	Corrected invoice and
Prompt response	1	3	3	3	3	5	5	5	5	5
Professional staff	0.3333	1	5	3	7	5	1	5	9	3
Reasonable freight charge	0.3333	0.2000	1	7	5	9	9	9	9	7
Delivery cargo in good condition	0.3333	0.3333	0.1429	1	3	5	3	3	9	9
On time cargo delivery	0.3333	0.1429	0.2000	0.3333	1	1	1	5	3	7
Capability in complain management	0.2000	0.2000	0.1111	0.2000	1.0000	1	3	5	9	5
Regular customer visit	0.2000	1.0000	0.1111	0.3333	1.0000	0.3333	1	3	5	7
Availability of EDI	0.2000	0.2000	0.1111	0.3333	0.2000	0.2000	0.333	1	9	5
Fast in confirming space	0.2000	0.1111	0.1111	0.1111	0.3333	0.1111	0.200	0.1111	1	3
Corrected invoice and AWB	0.2000	0.3333	0.1429	0.1111	0.1429	0.2000	0.143	0.2000	0.3333	1
TOTAL	**3.333**	**6.521**	**9.930**	**15.422**	**21.676**	**26.844**	**23.676**	**36.311**	**59.333**	**52.000**

Table 34 : % Ratio Scale of Customer Preference Priority Wise
(General Customer: C80)

CTQ'S	Prompt response	Professional staff	Reasonable freight charge	Delivery cargo in good conditi	On time cargo deliver	Capability in complain in	Regular customer visit	Availability of EDI	Fast in confirming space	Corrected invoice and	CUMULATIVE SCORE	% RATIO OF SCALE OF PRIORITY
Prompt response	0.30	0.46	0.30	0.19	0.14	0.19	0.21	0.14	0.08	0.10	2.11	**21.11%**
Professional staff	0.10	0.15	0.50	0.19	0.32	0.19	0.04	0.14	0.15	0.06	1.85	**18.50%**
Reasonable freight charge	0.10	0.03	0.10	0.45	0.23	0.34	0.38	0.25	0.15	0.13	2.17	**21.65%**
Delivery cargo in good condition	0.10	0.05	0.01	0.06	0.14	0.19	0.13	0.08	0.15	0.17	1.09	**10.89%**
On time cargo delivery	0.10	0.02	0.02	0.02	0.05	0.04	0.04	0.14	0.05	0.13	0.61	**6.12%**
Capability in complain management	0.06	0.03	0.01	0.01	0.05	0.04	0.13	0.14	0.15	0.10	0.71	**7.10%**
Regular customer visit	0.06	0.15	0.01	0.02	0.05	0.01	0.04	0.08	0.08	0.13	0.65	**6.48%**
Availability of EDI	0.06	0.03	0.01	0.02	0.01	0.01	0.01	0.03	0.15	0.10	0.43	**4.30%**
Fast in confirming space	0.06	0.02	0.01	0.01	0.02	0.00	0.01	0.00	0.02	0.06	0.20	**2.01%**
Corrected invoice and AWB	0.06	0.05	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.02	0.18	**1.83%**
TOTAL	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**10**	**100%**

Table 35 : Summary of Key Customers Satisfaction Score to Focal Company and Competitors Company

Customers name	Key customers																				
Competition Situation/Customer Satisfaction																					
Service elements	Performance of Focal company					Performance of Focal company					Performance of Focal company					Performance of Focal company					Average score of Focal company
	1	**2**	**3**	**4**	**5**	**1**	**2**	**3**	**4**	**5**	**1**	**2**	**3**	**4**	**5**	**1**	**2**	**3**	**4**	**5**	
1) Prompt response				x					x					x						x	**4.25**
2) Professional staff					x				x					x						x	**4.50**
3) Reasonable freight charge				x					x					x						x	**4.25**
4) Fast in confirming space			x					x				x						x			**2.75**
5) Corrected invoice and AWB			x						x				x						x		**3.50**
6) On time cargo delivery				x					x					x						x	**4.25**
7) Availability of EDI				x						x					x					x	**4.75**
8) Delivery cargo in good condition					x				x					x						x	**4.50**
9) Capability in complain management				x						x					x				x		**4.50**
10) Regularity of customer visit			x						x						x					x	**4.25**
score per column	0	0	9	20	10	0	0	3	28	10	0	2	3	20	15	0	0	3	8	35	
total score	**39**					**41**					**40**					**46**					
Service elements	Performance of Competitors					Performance of Competitors					Performance of Competitors					Performance of Competitors					Average score of Competitors
	1	**2**	**3**	**4**	**5**	**1**	**2**	**3**	**4**	**5**	**1**	**2**	**3**	**4**	**5**	**1**	**2**	**3**	**4**	**5**	
1) Prompt response				x					x						x				x		**4.25**
2) Professional staff					x			x						x					x		**4.00**
3) Reasonable freight charge				x				x							x				x		**4.00**
4) Fast in confirming space					x				x						x				x		**4.50**
5) Corrected invoice and AWB				x						x			x						x		**4.00**
6) On time cargo delivery				x						x				x					x		**4.25**
7) Availability of EDI		x							x					x				x			**3.25**
8) Delivery cargo in good condition				x					x						x				x		**4.25**
9) Capability in complain management				x					x				x							x	**4.00**
10) Regularity of customer visit					x				x				x						x		**4.00**
score per column	0	2	0	24	15	0	0	6	24	10	0	0	9	12	20	0	0	3	32	5	
total score	**41**					**40**					**41**					**40**					

Table 36 : Summary of General Customers Satisfaction Score to Focal Company and Competitors Company

Customers name	General customers																				
Competition Situation/Customer Satisfaction																					
Service elements	Performance of selected					Performance of selected					Performance of selected					Performance of selected					Average score of Focal company
	1	**2**	**3**	**4**	**5**	**1**	**2**	**3**	**4**	**5**	**1**	**2**	**3**	**4**	**5**	**1**	**2**	**3**	**4**	**5**	
1) Prompt response		x						x						x						x	**3.50**
2) Professional staff					x				x					x				x			**4.00**
3) Reasonable freight charge			x						x						x				x		**4.00**
4) Fast in confirming space		x							x					x				x			**3.25**
5) Corrected invoice and AWB			x						x					x					x		**3.75**
6) On time cargo delivery					x				x					x					x		**4.25**
7) Availability of EDI				x						x				x					x		**4.25**
8) Delivery cargo in good condition					x				x					x				x			**4.00**
9) Capability in complain management				x				x						x						x	**4.00**
10) Regularity of customer visit			x					x						x						x	**3.75**
score per column	0	4	9	8	15	0	0	9	24	5	0	0	0	36	5	0	0	9	16	15	
total score	**36**					**38**					**41**					**40**					
Service elements	Performance of competitors					Performance of competitors					Performance of competitors					Performance of competitors					Average score of Competitors
	1	**2**	**3**	**4**	**5**	**1**	**2**	**3**	**4**	**5**	**1**	**2**	**3**	**4**	**5**	**1**	**2**	**3**	**4**	**5**	
1) Prompt response				x					x						x				x		**4.25**
2) Professional staff			x						x					x					x		**3.75**
3) Reasonable freight charge				x						x					x					x	**4.75**
4) Fast in confirming space				x						x			x					x			**3.75**
5) Corrected invoice and AWB					x				x						x			x			**4.25**
6) On time cargo delivery			x						x				x				x				**3.00**
7) Availability of EDI			x						x				x					x			**3.25**
8) Delivery cargo in good condition					x					x				x				x			**4.25**
9) Capability in complain management			x						x					x						x	**4.00**
10) Regularity of customer visit			x						x					x						x	**4.00**
score per column	0	0	15	12	10	0	0	0	28	15	0	0	9	16	15	0	2	12	8	15	
total score	**37**					**43**					**40**					**37**					

VITA

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Working experience

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Educational attainment

Degree	Institute name	Year of graduation
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