IDENTIFYING TECHNIQUES FOR IMPROVING CHINESE GUANXI QUALITY OF OCEAN FREIGHT FORWARDERS IN TAIWAN

Tsung-Yu Chou

Department of Distribution Management, National Chin-Yi University of Technology, Taichung, Taiwan, R.O.C.,
arthur@ncut.edu.tw

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ABSTRACT

In this study, quality function deployment (QFD) and gray relational analysis (GRA) were combined to develop a gray QFD approach to determine the techniques for improving the Chinese guanxi quality (CGQ) of ocean freight forwarders in Taiwan. The first step was to identify the consignors' needs and technical requirements of improving the CGQ. Then, a relationship matrix was constructed to link technical requirements and consignor's CGQ needs based on cross-functional expertise. Finally, the grey relational analysis was employed to determine the execution priority of technical requirements. The results revealed that the top five technical requirements to improve the CGQ with consignors are as follows: find a common topic, listen to customers' needs, greet each other regularly, meet for pleasurable meals, and participate in customers' social and business events. Furthermore, recommendations regarding the top five technique solutions are presented in this paper.

I. INTRODUCTION

Strengthening the quality of customer relations by enhancing product quality or improving delivery punctuality can help enterprises improve their competitiveness, attract new customers, retain old customers, and improve customer profitability despite the pressure of intense competition. "Guanxi," a term representing the social networks that facilitate business, is required for achieving these goals. Chinese thinking and behavior are affected by guanxi mainly because of the importance of Confucianism in China. Chinese society pays considerable attention to ethics and mutual exchange; thus, "humane feeling" is crucial in Chinese circles. When opportunities for mutual assistance arise, connections between people are strengthened. In the future, if

reverse situation arises, people try to reciprocate in a manner equivalent to the assistance previously provided to them. Human consciousness exists in bilateral interactions; hence, resource providers must be empathetic if they are to identify the best time to "give." Recipients then necessarily follow the social norm of reciprocity. Guanxi is extended continuously when both sides consider their empathy and mutual benefits (Wong and Chan, 1999).

In general, Chinese social relationships can be categorized into three levels, namely family, acquaintances, and strangers. Family guanxi refers to the relationships between individuals and their family members such as parents, children, and siblings; guanxi between acquaintances refers to relationships between individuals and their acquaintances such as distant relatives, friends, neighbors, teachers, students, colleagues, and classmates; and guanxi between individuals and strangers refers to relationships between people without any direct or indirect persistent social relations (Huang, 2002). Guanxi comprises three stages, namely the initial phase, intensive phase, and maintenance phase (Kalakota and Robinson, 1999). Marketers design marketing strategies dependent on the different stages of guanxi. During the initial period, while establishing first contact with new customers, service providers must attract the attention of the customers and form guanxi to create a positive first impression on them. During the intensive phase, both sides develop a deeper understanding. Some degree of exposure, engagement in risky behavior, and seeking approval or support are observed in this phase. The maintenance phase is used by service providers to adapt their service. The customer will then decide to maintain their guanxi despite the availability of other options.

Freight forwarder business representatives and consignors usually progress from being strangers to becoming acquaintances. Hence, their interaction is usually based on humane feeling and conditional mutual dependence. The side that receives a favor is expected to repay in the future; thus the favor represents a form of debt. This creates guanxi because both sides are under continuous reciprocal obligation to help each other. During the initial stages, establishing guanxi speeds up the development of the relationship between the representatives and consignors. Guanxi between the representatives and the consignors can progress in the shortest possible period to the maintenance phase.

Subsequently, the consignor becomes a loyal customer. Therefore, improving the quality of guanxi was the main topic in this research.

"Guanxi" management is a fundamental concern for the service industry. Guanxi can be initially formed between people and later extended to that between businesses. Thus, the methods used to maintain a long partnership between the service provider and customer are the primary focus of service marketing. The freight forwarder represents a bridge between the shipper (exporter or seller) and the carrier. Forwarders help importers and exporters to order space; however, their service items are more extensive than those of shipping companies; for example, intermodal transport. Hence, guanxi between carriers and shippers is crucial for freight forwarders. Hence, freight forwarders play a vital intermediary role between carriers and consignors, particularly when the forwarder businesses are small- and medium-sized enterprises because they provide unloading systems, consolidating containers, and an integration of diversified delivery services. These services provide cost-effective and convenient solutions for businesses. Therefore, freight forwarders need to enhance guanxi with carriers and consignors.

The Taiwanese government has allowed foreign industries to establish offices in Taiwan after it joined the World Trade Organization. Freight forwarders face intense competition, which contributes to the deterioration of the business environment. In addition to maintaining long-term relationships, creating opportunities to attract new customers is also extremely critical for freight forwarders (Murphy and Li, 1997). Because of the increasing competitiveness of business and increasing demand for high customer service quality, customer demand and changing trends tend to become more personal. Thus, maintaining the loyalty of existing customers is difficult. Chang et al. (2014) indicated that because of corporate globalization, relevant customer information management is becoming increasingly complex. Customer relationship management has become the focus of corporate concerns. The strategies used by freight forwarders to improve guanxi with consignors to maintain the transport volume are key factors influencing the company's successful operation. Therefore, this study explored the improvement of Chinese guanxi quality (CGQ) between ocean freight forwarders and consignors and identified the factors affecting the maintenance of strong long-term partnerships between them.

Numerous methods for improving customer service quality are available. However, a systematic approach that is simple and practical easy to understand will be easily accepted by freight forwarders. The common research method named quality function deployment (QFD) covers various areas; for example, vendor selection (Bevilacqua et al., 2006), service quality improvement (Liang et al., 2006; Dinarvandi et al., 2014), and the solution of logistics service selection problems (Liao and Kao, 2014). Gray relational analysis (GRA) is a method used for analyzing relationship degrees within discrete sequence data. It can be used to compare the correlation between variables under different factors to identify the correlation between the compared variables and a reference variable. GRA requires only a small amount of data to process, which overcomes the shortcomings of traditional mathematical analysis methods. GRA has been widely used in decision analysis, feasibility assessment, advantage analysis, traffic transportation, management, and many other areas such as supplier selection (Davood and Mahour, 2012) and vendor selection analysis (Dou et al., 2015). To perform a systematic analysis, this study used the GRA method to determine the execution priority of technique requirements for improving CGQ.

Because the improved technologies of QFD are determined by experts and professionals in the industry, only a small number of cases could be included in the questionnaire survey in this study. Hence, analysis by using traditional statistical methods was not possible. Consequently, the GRA method was needed. Furthermore, only a few studies have used a combination of QFD and GRA to determine how quality of guanxi can be increased. Therefore, in this study, a combination of GRA and QFD was used to identify a method of enhancing CGQ between freight forwarders and consignors in Taiwan.

II. LITERATURE REVIEW

1. Ocean Freight Forwarders and the Current Market Situation

Freight forwarders are key specialized providers in the logistics network. A freight forwarder is a firm that organizes or plans shipments for other individuals or firms, transporting the goods to the appropriated estimation safely and on time. Lin and Chang (2014) stated that freight forwarding comprises air and sea cargo forwarding. Forwarders without a fleet of ships are classified as non-vessel operating common carriers (NVOCCs). This paper examined the risk criteria associated with imports and exports by NVOCCs. Freight forwarders do not need to transport goods themselves, but instead plan shipping projects by contracting carriers for the transportation. Freight forwarders also assist with customs processing and other documentation for imports and exports and interact with the relevant government agencies.

Because of the rapid adjustment of the structure of industry and the decrease in the number of labor-intensive industries, import and export cargo growth is slowing in Taiwan. Many manufactures have moved to other countries because their positions in their respective supply chains have changed and the cost of labor has increased. Hence, volume reduction is a crucial factor affecting the shipping industry and is intensifying competition. By interviewing managers, analyzing the current market situation of freight forwarders in Taiwan, and using the five competitive forces tool (Lin and Chang, 2014), we obtained the following results:

(1) Threat of new entrants:
    The barrier to entry into the freight forwarding industry is not high. Approximately 75% of ocean freight forwarders entered the industry with a capital of less than NTD10 million in 2012.

(2) Threat of substitutes:
Many shipping companies (e.g., Evergreen and Yang Ming) have their own freight forwarding subsidiaries.

(3) Intensity of competitive rivalry:
Data in the Ministry of Transportation and Communication Report indicate that the total number of registered freight forwarder companies was approximately 830 in 2012, compared with 776 in 2011, a 1-year increase of 7%.

(4) Bargaining power of buyers:
Because of the development of information technology, customers are now well aware of the market condition. Therefore, the bargaining power of customers is increasing.

(5) Bargaining power of suppliers:
There is a reduction in cargo, but shipping companies have to fill their available space to minimize costs; hence, the shipping companies have less bargaining power.

From this analysis, we concluded that the ocean freight forwarding industry is facing severe challenges. Thus, to avoid price competition, strategies that enable the building of strong relationships with partners represent a viable solution.

2. Chinese Guanxi

Guanxi is often considered the Chinese adaptation of and a unique form of relationship management (Yau et al., 2000; Wang, 2007; Shaalan et al., 2013; Badi, et al., 2017). The primary concept of guanxi is ubiquitous in Chinese society, and it is a vital element of Chinese social culture. It is also a form of sharing, repeated contact, and frequent direct communication between people. In Chinese commercial activities, guanxi plays a critical role and its use is considered a necessary skill for integration into Chinese society. Yeung and Tung (1996) stated that Chinese market operations require a focus on the existence of guanxi. An inexperienced salesperson can use relationships for assistance in breaking the ice with strangers. In particular, small- and medium-sized businesses often obtain favorable arrangements and resources from their guanxi network.

From a sociological perspective, guanxi includes personal relationships and personal connections. In addition, it includes direct relationships between individuals as well as other larger contact networks (Hwang, 1987; Yang, 1994). It can ensure benefits and the achievement of personal goals (Luo, 1997). Developing guanxi is recommended for establishing relationships. Guanxi is also an extremely broad type of relatively long-term and voluntary business association. It involves a degree of emotional commitment, trust, intimacy, collaboration, and interdependence and is based on expectations of reciprocity and the fulfillment of promises in interactive marketing exchanges for mutual benefit. This is not a simple exchange, such as a transaction or barter; it is a long-term relationship in which the participants quickly cement their ties through exchanges of respect and affection as well as material objects or specific favors (Lovett et al., 1999; Biljana et al., 2005). Thus, guanxi differs from relationship management. Relationship management ties are usually more impersonal than those of guanxi and are pri-

marily felt at the organization level (Morgan and Hunt, 1994). In Western countries, trading relationships between suppliers and demanders are established such that trade is prioritized and personal relationships develop subsequently. In Chinese society, the tendency is to develop a personal relationship before making transactions (Yau, et al., 2000). Chinese society relies on personal relationships to conduct economic transactions and maintain social contacts. As Davies et al. (1995) noted, guanxi is a special type of personal relationship and social tie based on mutual interest and benefit. These ties mediate contact and exchange through mutual obligations and preferential treatment by the two sides. Therefore, Chinese guanxi is different from purely personal relationships or friendships. It involves reciprocal obligations and an ongoing exchange of goodwill (Luo, 2008) and can be regarded as continuous humane exchange. Through mutual relations, a stable network can be constructed. Moreover, the risk of uncertainty can be minimized (Wong and Chan, 1999). Therefore, guanxi can be termed the lubricant of the Chinese market, reducing transaction costs and mitigating institutional threats (Peng and Luo, 2000).

According to Park and Luo (2001), guanxi has the following six characteristics: it is utilitarian, reciprocal, transferable, personal, long-term, and intangible. Long-term contact and relationships strengthen actions and deepen feeling between people. Thus, feeling can be found within the three dimensions of ganqing, renqing, and xinren (GRX). Considerable existing literature suggests that the concept of guanxi can be discussed using GRX. They are considered to reflect the quality of guanxi most effectively (Jacobs, 1979; Hwang, 1987; Kipnis, 1997; Wang, 2007; Berger et al., 2015). The GRX scale contains a total of 11 components to measure GRX (Yen et al., 2011; Li et al., 2016). Ganqing is defined as an emotional awareness and connection and the sharing of a degree of feeling (Chen and Chen, 2004). Chinese people refer to concern and feeling of love for people or things using the term ganqing, and it is usually used to describe the quality of a relationship between two parties. Commercially, management of ganqing requires a variety of emotional and social communications. As Mavondo and Rodrigo (2001) state, ganqing is linked to society. It is used to describe the quality of guanxi between parties (Yen et al., 2011). The dimension renqing represents feeling and friendships between people, and it is the instinctive feeling for contact between people. It is also used to refer to the exchange of benefits between people, such as help or gifts (Kipnis, 1997, Yen et al., 2011). When recipients receive help, they owe the helper a favor, which should be repaid in the future when circumstances permit (Wang, 2007). Thus, methods for the establishment of renqing include providing gifts or helping each other when needed. This is a complex communicative art that if abused, could be mistaken for a bribe; however, when used properly, it is regarded as establishing good guanxi (Gu et al., 2008; Berger and Herstein, 2012). This demonstrates that if there are proper norms for reciprocity in interpersonal interaction, guanxi can provide a critical advantage. Xinren is a Chinese word that is similar to trust or belief (Chen and Chen, 2004). It refers to belief and the courage

to commit. In business, trust is developed through constant exchanges of benefits between network members (Wong and Chan, 1999). Trust is a behavioral intention or action that reflects the dependence of a business partner, which attributes the principal uncertainty to the consignor (Moorman et al., 1993). Crosby (1990) argued that trust is necessary for the other party, such as confidence in the honesty and integrity of sales staff.

III. RESEARCH METHODS

In this section, some concepts and methods used in this study are briefly introduced.

1. QFD

QFD is a series of activities employed for product development, process planning, and production planning that is customer-demand oriented. In general, the QFD processes, which are based on production, consist of the following four levels (Hauser and Clausing, 1988): product planning, spare parts planning, process planning, and production planning. QFD uses the costumer's needs to direct the improvement of service quality or development of new products. It was established using the House of Quality (HoQ) tool. QFD is a systematic technical method for understanding customer's needs, setting standards in product design, and then systematically expanding the design quality to include that of various functions and elements correlated with manufacturing engineering. These steps guarantee the quality of the product during preproduction and ensure its suitability with regard to the customer's expectation. QFD is also a structured technical approach, which presents the business functions of quality design or designs based on purpose, means, and a detailed account of the necessary steps. These steps ensure that the customer's needs are satisfied. QFD mainly uses the HoQ tool as an interface tool for expansion. The basic structure of the HoQ tool is divided into the following six parts: customer demand, engineering analysis, competitive analysis, correlation analysis, technology assessment, and the relationship matrix.

This study used a literature review and questionnaire survey results as the main basis for a HoQ-based quality development and relationship strengthening strategy. An interactive comparison of CGQ can be used to identify gaps between consignor's needs and satisfaction and thus direct quality improvement. Furthermore, HoQ and interviews with experts were used to build the relationship matrix between the assessment of CGQ and quality improvement. Finally, GRA was used for sorting analysis related to the execution priority of steps for the enhancement of CGQ.

The systematic steps of the QFD approach are as follows:

Step 1: Identify the consignor's needs.
Step 2: Calculate the priorities of the consignor's needs.
Step 3: Develop the technique requirements that meet the consignor's needs.
Step 4: Construct the relationship matrix to link the technique requirements and consignor's needs.

Step 5: Confirm the contribution of each technique requirement relative to each consignor need.
Step 6: Use GRA to prioritize the technique requirements.

2. GRA

Gray system theory, proposed by Deng (1982), can be used to solve the relational analysis, prediction, control, and decision-making problems of a system in which the model is unreliable or the information is incomplete. It provides an efficient solution to uncertain, multi-input, and discrete data problems.

GRA is one of the methods based on gray theory. The relationship between machining parameters and machining performance can be determined by GRA. Additionally, GRA can be used to indicate the relational degree between two sequences.

GRA uses small amounts of data (little data and no confirmation) and subsequently employs multi perspective analysis and quantification to obtain the relationship sequence between data. This study attempted to improve the correlation between "improve technology" and "customer needs." A small number of experts were interviewed for this study; consequently, the data did not exhibit a normal distribution when traditional statistical methods were used. Therefore, the improved technologies were sorted using GRA.

The GRA procedure can be summarized as follows:

Step 1. Identify the Original Sequence

Suppose there are n indicators (factors) and m series. The ith original sequence y_i can be denoted as follows:

$$y_i = (y_i(1)), y_i(2), \ldots, y_i(k), \ldots, y_i(n)), i = 1, 2, \ldots, m,$$

where $y_i(k)$ is the observation value of y_i at the kth index.

Step 2. Normalize the Data of the Original Sequence

A few formulas can be used to normalize the data of the original sequence. The selection of formula depends on the characteristics of the indicators. In this study, the following normalization rules were used:

(1) For benefit index:

$$x_j(k) = (y_i(k) - \min_i y_i(k) / \max_i y_i(k) - \min_i y_i(k));$$

(2) For cost-index:

$$x_j(k) = (\max_i y_i(k) - y_i(k) / \max_i y_i(k) - \min_i y_i(k));$$

(3) For objective-index:

$$x_j(k) = 1 - \frac{|y_i - y_{ob}(k)|}{\max\left\{\max_i y_i(k) - y_{ob}(k), y_{ob}(k) - \min_i y_i(k)\right\}}.$$

Step 3. Identify the Reference Series and Comparison Series

Let

Table 1. Results of demographic variable analysis.

Profile		Percent	Profile	Percent
Gender	M	44%	F	56%
Age	< 25	20.8%	36-45	20.8%
	26-35	50.7%	46-55	5%
			> 55	2.7%
Marital status	Married	26.4%	Unmarried	73.6%
Education	Master	6%	University	94%
Personal annual income	< 300 K	37.7%	460-600K	11.3%
	310-450 K	30.2%	610-750K	7.6%
			> 760K	13.2%
Years of service	< 1	22.6%	5-7	20.8%
	2-4	30.2%	> 8	26.4%

$$x_0(k) = \left\{ \overset{max}{j} x_j(k) \right\}.$$

Let

$$x_0 = (x_0(1), x_0(2), \ldots, x_0(k), \ldots, x_0(n)),$$

and

$$x_j = (x_j(1), x_j(2), \ldots, x_j(k), \ldots, x_j(n)), i = 1, 2, \ldots, m.$$

Use x_0 as the reference series and x_i as the compared series.

Step 4. Calculate the Sequence Difference $\Delta_{0i}(k)$

Let $x_0(k)$ and $x_j(k)$ be the observation values of x_0 and x_i at the kth index.

The sequence difference $\Delta_{0i}(k)$ can be calculated as follows:

$$\Delta_{0i}(k) = \left| x_0(k) - x_j(k) \right|$$

Step 5. Calculate the Gray Relational Coefficient $\Gamma_{0i}(k)$

Define the gray relational coefficient $\Gamma_{0i}(k)$ of x_0 and x_i at the kth index as follows:

$$\Gamma_{0i}(k) = \left(\Delta_{min} + \xi\Delta_{max} \right) / \left(\Delta_{0i}(k) + \xi\Delta_{max} \right),$$

where $\Delta_{max} = \overset{max}{i} \overset{max}{k} \Delta_{0i(k)}$, $\Delta_{min} = \overset{min}{i} \overset{min}{k} \Delta_{0i(k)}$, and ξ is the distinguished coefficient. The coefficient ξ ($\xi \in [0, 1]$) can be used to clearly distinguish between the normalized reference series and normalized comparative series. In general, $\xi = 0.5$ provides optimal results when the relative conditions among series and elements are uncertain.

Step 6. Calculating the Gray Relational Grade (GRG)

Let w_k be the weight of kth index. The GRG Γ_{0i} of reference series x_0 and compared series x_i can be calculated as follows:

$$\Gamma_{0i} = \sum_{k=1}^{n} \left[w_k \times \Gamma_{0i}(k) \right].$$

Step 7. Sort All Compared Series

A large GRG indicates that the series x_0 and x_1 are highly related. Thus, based on the GRG of all reference series and compared series, the gray relational ordinal of m compared series can be obtained.

IV. EMPIRICAL STUDY

This section details the empirical study conducted to identify techniques for the improvement of CGQ for ocean freight forwarders in Taiwan and demonstrates the computational process and effectiveness of the proposed gray QFD.

1. Questionnaire Design and Survey

In this study, two types of questionnaires were designed to determine the consignor's needs for CGQ and how the technique requirements for improving CGQ can be met. The questions in the stage 1 survey were designed using GRX relationship quality as the basis (Berger et al., 2015), and 20 consignor's needs for CGQ were used to design the questionnaire. All responses were ranked using a 5-point Likert scale anchored by level of importance (satisfaction), such that 1 = very unimportant (very unsatisfied) and 5 = very important (very satisfied). The survey was distributed to 300 consignors, and 220 copies were returned. After examination, a total of 208 valid questionnaires were recovered. The effective return rate was thus 69.33%. The results of demographic variable analysis are listed in Table 1.

This study used Cronbach's α to measure the internal consistency of the variables. According to Guilfold (1971), if Cronbach's α is higher than 0.7, the scale being assessed has very high reliability. In this study, the Cronbach's α for each scale was at least 0.80. Thus, each scale had very high reliability (Table 2). The dimensions and questions of the questionnaire were reviewed using relevant literature and interviews with experts in related fields as references. Before the questionnaire was distributed, a total of 30 consignors, freight forwarder industry operators,

Table 2. Constructs, scale items, and standard weights.

Constructs	scale items	Important	Satisfaction	weight	Std. weight
Ganqing ($\alpha = 0.909$)	R1 Interact with sales on a social basis outside of work	3.285	3.352	8.70086	0.04676
	R2 My sales and I are able to talk openly as friends	3.500	3.407	9.07410	0.04877
	R3 If I were to change this business supplier, I would lose a good friend	3.1700	3.234	8.76838	0.04713
	R4 Sales is almost as close to me as family	2.973	3.187	8.36391	0.04495
	R5 I would consider whether my sales feelings would be hurt before I made an important decision	3.482	3.383	9.11196	0.04897
	R6 Have a brotherhood feeling towards this sales	3.107	3.224	8.62438	0.04635
	R7 Try my best to help out this sales when he/she is in need because he/she is a friend of mine	3.6607	3.4393	9.37395	0.05038
Renqing ($\alpha = 0.888$)	R8 Feel a sense of obligation to this sales for doing him/her a favor	3.527	3.318	9.45958	0.05084
	R9 "calling in" favors is part of doing business with this sales	3.696	3.486	9.29275	0.04995
	R10 "give and take" of favor is a key part of the relationship between my sales and me	3.777	3.514	9.38913	0.05046
	R11 I would feel embarrassed if I was unable to provide a requested favor to my sales	3.554	3.402	9.23261	0.04962
	R12 Return favors to this sales	3.500	3.299	9.45315	0.05081
	R13 happy to do a favor for this sales	3.866	3.561	9.43058	0.05069
Xinren ($\alpha = 0.875$)	R14 sales has been frank in dealing with us	3.705	3.402	9.62700	0.05174
	R15 sales does not make false claims	3.768	3.421	9.71892	0.05224
	R16 sales is completely open in dealing with us	3.705	3.439	9.48842	0.05100
	R17 not only concerned about himself/herself	3.741	3.467	9.47508	0.05093
	R18 concern with my needs	3.839	3.486	9.65200	0.05188
	R19 my firm trust this sales	3.938	3.439	10.08276	0.05419
	R20 sales is trustworthy	4.009	3.570	9.74123	0.05236

and academics were invited to revise the questions. Therefore, the questionnaire of this has content validity.

When designing the stage 2 survey, the first step involved examining relevant literature (Yang and Wang, 2011; Berger and Herstein, 2012; Berger et al., 2015), actual interviews with experts in related fields, and identifying the technology (the 14 technique requirements listed in Table 3) that can be used to improve CGQ. Finally, by combining the needs of 20 consignors and entrepreneurs with 14 technique requirements, a relationship matrix table was constructed to evaluate relationship strength.

Six freight forwarders and transport industry scholars assigned the relationship degree. This study defined 10 grades of relationship degree, ranging from 0 to 9. Table 1 shows that women accounted for 56% of all respondents and that the proportion of respondents aged 26 to 35 years was 50.7%. This proportion decreased with an increase in age. In most cases, the respondents had received a university education, thus indicating a high level of education in the industry. A period of 2-4 years of service was observed in 30.2% of the respondents. Most respondents were unmarried (73.6%), and the highest number had personal annual incomes of NTD 300,000 and below (37.7%).

2. QFD Description

Based on the steps described in Section III.1, the study procedure and results are summarized as follows:

Step 1: Identify the Consignor's Needs for CGQ

By following the three facets (GRX) of guanxi proposed by Yen et al. (2011), a total of 20 scale items were used to characterize the CGQ needs of consignors.

Step 2: Calculate the Priorities of Consignor's Needs

The importance and satisfaction levels for each consignor CGQ need were rated using a 5-point Likert scale. Then, the weight of each need ((6-Satisfaction mean)* Importance mean) was calculated and converted into a standardized weight. The results are presented in Table 2. The five items with the highest standardized weights were "R19: my firm trust this sales," "R20: sales is trustworthy," "R15: sales does not make false claims," "R18: concern with my needs," and "R14: sales has been frank in dealing with us."

Step 3: Develop the Technique Requirements to Meet the Consignor's Needs

Based on the relevant literature (Yang and Wang, 2011; Berger and Herstein, 2012; Berger et al., 2015) and interviews, the technologies that can be used to improve CGQ were identified. The results are listed in Table 3.

Table 3. Techniques for meeting the consignor's needs.

Guanxi Quality Improvement Technical Specifications	Description
T1 Organize various recreational activities	Organize recreational activities or performances with customers
T2 Invite leaders to visit	Arrange high-level bilateral visits
T3 Meet for pleasurable meals	Regular gatherings and communication
T4 Build customer profiles	Understand the needs of each individual customer to provide full service
T5 participating in customers' social or business events	Blend into the customer's life
T6 Festival visits	Maintain relations
T7 Greetings Regularly	Understanding the needs, establish a rapid and effective response
T8 Gifts	Small gifts to keep emotions
T9 Meet legitimate needs	Help deal with personal matters or to provide various types of knowledge
T10 Finding a common topic	Increase communication opportunities and to ingratiate themselves
T11 Listening to the customers' needs	Win favor, get trust
T12 Do not over-promise	Control of the customer's expectations, understand the consequences of dishonesty
T13 Identify with the customers	Polite service
T14 Quick Response	Establish quick response capability

Table 4. Relationship matrix.

	T1	T2	T3	T4	T5	T6	T7	T8	T9	T10	T11	T12	T13	T14
R1	7.7	3.7	7.7	3.0	8.3	4.3	6.0	4.0	2.7	7.7	7.7	3.0	3.7	3.3
R2	8.0	3.3	7.0	2.3	7.7	4.0	3.0	3.0	2.7	8.0	7.7	2.0	6.3	3.0
R3	6.0	2.7	3.0	2.0	6.7	3.3	6.0	2.7	3.0	7.0	7.0	2.7	5.7	1.7
R4	6.0	3.3	5.0	1.7	6.0	4.3	7.0	4.0	6.0	7.3	6.3	3.3	6.0	3.3
…														
R18	2.7	2.7	5.3	2.3	5.0	3.7	6.3	3.0	3.3	7.0	6.3	5.3	3.3	3.3
R19	3.3	6.0	5.3	3.0	5.3	2.7	6.0	4.3	6.7	7.3	6.7	6.0	5.0	6.3
R20	3.0	6.0	5.3	2.7	6.0	3.3	6.3	2.7	3.7	7.0	7.0	6.7	4.0	6.0

Table 5. Data normalization $x_i(k)$.

	T1	T2	T3	T4	T5	T6	T7	T8	T9	T10	T11	T12	T13	T14
R1	0.88	0.18	0.88	0.06	1.00	0.29	0.59	0.24	0.00	0.88	0.88	0.06	0.18	0.12
R2	1.00	0.22	0.83	0.06	0.94	0.33	0.17	0.17	0.11	1.00	0.94	0.00	0.72	0.17
R3	0.81	0.19	0.25	0.06	0.94	0.31	0.81	0.19	0.25	1.00	1.00	0.19	0.75	0.00
R4	0.76	0.29	0.59	0.00	0.76	0.47	0.94	0.41	0.76	1.00	0.82	0.29	0.76	0.29
…														
R18	0.07	0.07	0.64	0.00	0.57	0.29	0.86	0.14	0.21	1.00	0.86	0.64	0.21	0.21
R19	0.14	0.71	0.57	0.07	0.57	0.00	0.71	0.36	0.86	1.00	0.86	0.71	0.50	0.79
R20	0.08	0.77	0.62	0.00	0.77	0.15	0.85	0.00	0.23	1.00	1.00	0.92	0.31	0.77

Step 4: Construct the Relationship Matrix to Link Technique Requirements and Consignor's Needs

The purpose of constructing the relationship matrix was to link the technique requirements and consignor's needs. The relationship matrix obtained using the results of CGQ development and quality technology development is shown in brief in Table 4. The left column lists the 20 consignor's needs, and the 14 technique requirements are listed on the top row.

Step 5: Confirm the Contribution of Each Technique Requirement in Relation to Each Consignor Need

Based on the relationship matrix, each technique requirement was correlated individually with each consignor need by considering the contribution of each technique requirement in relation to each entrepreneur need. 6 freight forwarders and transport industry scholars assigned degrees of the relationship by using 10 grades. The total average was used to calculate

Table 6. Deviation sequences $\Delta_{0i}(k)$.

	T1	T2	T3	T4	T5	T6	T7	T8	T9	T10	T11	T12	T13	T14
R1	0.12	0.82	0.12	0.94	0.00	0.71	0.41	0.76	1.00	0.12	0.12	0.94	0.82	0.88
R2	0.00	0.78	0.17	0.94	0.06	0.67	0.83	0.83	0.89	0.00	0.06	1.00	0.28	0.83
R3	0.19	0.81	0.75	0.94	0.06	0.69	0.19	0.81	0.75	0.00	0.00	0.81	0.25	1.00
R4	0.24	0.71	0.41	1.00	0.24	0.53	0.06	0.59	0.24	0.00	0.18	0.71	0.24	0.71
	…													
R18	0.93	0.93	0.36	1.00	0.43	0.71	0.14	0.86	0.79	0.00	0.14	0.36	0.79	0.79
R19	0.86	0.29	0.43	0.93	0.43	1.00	0.29	0.64	0.14	0.00	0.14	0.29	0.50	0.21
R20	0.92	0.23	0.38	1.00	0.23	0.85	0.15	1.00	0.77	0.00	0.00	0.08	0.69	0.23

Table 7. Gray relational coefficients Γ_{0i}.

	T1	T2	T3	T4	T5	T6	T7	T8	T9	T10	T11	T12	T13	T14
R1	0.81	0.38	0.81	0.35	1.00	0.42	0.55	0.40	0.33	0.81	0.81	0.35	0.38	0.36
R2	1.00	0.39	0.75	0.35	0.90	0.43	0.38	0.38	0.36	1.00	0.90	0.33	0.64	0.38
R3	0.73	0.38	0.40	0.35	0.89	0.42	0.73	0.38	0.40	1.00	1.00	0.38	0.67	0.33
R4	0.68	0.42	0.55	0.33	0.68	0.49	0.90	0.46	0.68	1.00	0.74	0.42	0.68	0.42
R17	0.52	0.33	0.36	0.48	0.52	0.38	0.58	0.33	0.38	1.00	0.38	0.41	0.41	0.73
	…													
R19	0.37	0.64	0.54	0.35	0.54	0.33	0.64	0.44	0.78	1.00	0.78	0.64	0.50	0.70
R20	0.35	0.68	0.57	0.33	0.68	0.37	0.77	0.33	0.39	1.00	1.00	0.87	0.42	0.68

Table 8. Priority of technique requirements.

Techniques	T1	T2	T3	T4	T5	T6	T7	T8	T9	T10	T11	T12	T13	T14
Γ_0	0.57	0.46	0.60	0.36	0.60	0.51	0.64	0.47	0.48	0.79	0.69	0.52	0.49	0.56
Rank	6	13	*4*	14	*5*	9	*3*	12	11	*1*	*2*	8	10	7

the relevance. These results are depicted in the central part of relationship matrix shown in Table 4.

Step 6: Use GRA (Described in the Next Section) to Prioritize the Technique Requirements

Because the number of experts was small, GRA was used to prioritize the technique requirements. The reference series x_0 and compared series x_1 were obtained from the correlation matrix calculated in Step 5 that is based on the experts' evaluations. The benefit index was used to normalize the data of the original sequence. The results are shown in brief in Table 5. Following normalization, the sequence differences $\Delta_{0i}(k)$ obtained and are presented in Table 6. The gray relational coefficients are listed in Table 7.

Finally, we assigned priorities to the CGQ-improving techniques by integrating the weight of the criteria (shown in Table 8). The technique requirement "finding a common topic" was given the highest priority. That with second-highest priority was "listening to the customers' needs," which enhances the interaction between businesses and customers to ensure that enterprises improve, enhance guanxi, and gain xinren (trust). The third highest priority was obtained by "greeting regularly." Through

simple greetings every day, businesses can understand a customer's demands and build a rapid and effective response system. The fourth most crucial technique was " meet for pleasurable meals." Interaction in a relaxed setting allows effective communication. This was followed by "participating in customers' social or business events." Such participation enables businesses to become involved in the lives of their customers, thus allowing both sides to enhance each other's ganqing. The aforementioned 5 technique requirements are the top five priorities according to our results. Companies can develop strategies accordingly.

V. CONCLUSIONS AND RECOMMENDATIONS

This study used an emphasis on CGQ and degree of satisfaction to understand the gaps between customer needs and satisfaction. By using a combination of QFD and GRA, this study proposed methods for improving technology and enhancing the quality of guanxi between freight forwarders and consignors.

In the analysis of crucial guanxi quality needs, consignors emphasized the following five needs: "R19: my firm trust this sales," "R20: sales is trustworthy," "R15: sales does not make false claims," "R18: concern with my needs," and "R14: sales has

been frank in dealing with us."

To enhance cooperation, enterprises should focus on training their employees to enhance the good feeling of customers. This is achieved by the development of social interaction. Working and socializing together results in the formation of reliable relationships and the development of cooperation (Berger et al., 2015). The QFD analysis performed in this study was designed to assess the quality of guanxi, which must meet the needs of consignors. The top five techniques to improve guanxi were identified as the following: finding a common topic, listening to the customers' needs, greeting regularly, meet for pleasurable meals, and participating in customers' social or business events.

Recommendations for these quality improvements are as follows:

(1) Finding common topics
Identifying a communication point while communicating with customers is necessary to achieve resonance on both sides. Communication points include common hobbies, interests, food, and work. Therefore, in addition to business communication and dialog, private chat and interaction can be used to gain trust.

(2) Listening to customers' needs
Apart from socializing, providing help and support is considered a gesture of good will and is also regarded as a method of enhancing the customer's feeling of being understood. In addition, service is similar to empathy; hence, understanding a customer's needs and ideas will give the company a competitive advantage. After receiving feedback from customers, enterprises must respond rapidly and effectively to the consumer feedback to ensure customer confidence.

(3) Greeting regularly
To develop confidence, many companies encourage the investment of time and effort for maintaining long-term relationships with customers to implement commitments that are agreed on orally and in writing. Building trust requires time because customers tend to trust only those who have been judged as being reliable. Therefore, we expect that through regular greetings and communication, businesses can become caring, compassionate, ensure mutual benefit, pay close attention to the customer, and resolve disputes in order to reduce service failures.

(4) Meet for pleasurable meals
Interaction using wine and good food is a simple method of enhancing feeling (Berger and Herstein, 2012). Ina relaxed situation, such as meeting for dinner, communication is easily achieved and can enhance feeling between parties. This provides a means to learn whether the customer has new requirements, to discover new sales opportunities, and to promote new products to customers, thus creating new sales.

(5) Participating in customers' social or business events
Visiting and participating in each other's social and business activities also helps to promote an emotional connection and expand relations in order to influence customers.

This enables businesses to establish an ongoing relationship with their target customers and become integrated into the customers' lives. Forming an acquaintance and drawing the attention of other participants during activities also has multiple effects on target customers.

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