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The Influence of Perceived E-service on Service Quality, Relationship Quality, and Customer Loyalty in Container Shipping Companies

貨櫃船公司之感知電子化服務對服務品質、關係品質和顧客忠誠度的影響

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電信管理研究所

碩士論文

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Abstract

The literature has extensively verified that service quality plays a critical role in the process of consumption, with the initial focus on quantifying the service characteristics. However, these studies have paid less attention to the effects of relationship quality and e-service on customer loyalty. Relationship quality makes customers feel that products/services are reliable and acceptable, so they do not worry about mistakes. Despite the fact that the link between service quality and satisfaction has been extensively explored, the relationships among service quality, trust, and commitment have been ignored in container shipping services. To fill these two gaps in the literature, this study is aimed toward measuring the linkage between service quality and customer loyalty by integrating them with relationship quality (e.g., satisfaction, trust, commitment) and perceived e-service (e.g., usefulness, ease of use). Through integrating electronic customer relationship management and the expectation conformation theory, a quantitative focus group study is conducted in the container shipping industry. Empirical data are obtained using a mail questionnaire survey collected from 233 forwarder liner operators from the member list of "International Ocean Freight Forwarders and Logistics Association" in Taiwan.

An ANOVA is used to determine whether the service quality, relationship quality, customer loyalty, and perceived e-service levels of the respondents vary with their demographic characteristics. A factor analysis is used to confirm whether the service quality items presented in the questionnaire fit the structures. A descriptive statistics analysis and a confirmatory factor analysis (CFA) are conducted to provide a basic summary of the sample data and to examine discrepancies among the hypotheses and the empirical data in order to test whether the proposal theoretical model fits the empirical data. Finally, a structural equation model (SEM) and regression analysis are used to examine whether the hypotheses are accepted or rejected.

The results of the study are summarized as follows: At the level of statistical significance, service quality had a positive effect on relationship quality and customer loyalty; relationship quality had a positive effect on customer loyalty, and relationship quality was found to have partial mediating effect on the relationship between service quality and customer loyalty. Specifically, this study found not only satisfaction but also trust and commitment had significant effect on relationship quality. Perceived e-service was found to have a moderating effect on the relationship between service quality and customer loyalty, but it had no significant moderating effect on the relationship between service quality and relationship quality, indicating that the electronization of shipping services increases work efficiency and performance but does not enhance the connection

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and relationship between customers and the company. Even so, from the perspective of forwarders e-services are essential but do not provide a competitive edge in a container shipping company.

Further, the ANOVA results showed differences among e-service items and service quality, the number of workers in the company/e-service items and relationship quality, the number of workers in the company and customer loyalty, and the shipping company that the respondent mainly cooperates with/e-service items and perceived e-service. Finally, managerial suggestions are provided for container shipping companies to help them increase their perceived e-service, service quality, and relationship quality in order to promote customer loyalty.

Keywords: Ocean freight forwarder, Service quality, Relationship quality, Customer loyalty, Perceived e-service

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摘要

許多文獻已經證實服務品質在消費過程中具有舉足輕重的地位。然而，這些文獻卻較少關注關係品質和電子化服務對客戶忠誠度的影響。關係品質可以讓顧客感到產品或服務是可靠與可接受的，不須擔心會出現錯誤。在貨櫃船服務中，服務品質和滿意度之間的關係已被過去文獻廣泛的探索，但是在服務品質、信任和承諾之間的連結卻總是被忽略。本研究藉由「電子化顧客關係管理」和「預期期望理論」，將關係品質(滿意度，信任，承諾)和感知電子化服務(有用性，易用性) 相結合來衡量服務品質和顧客忠誠度之間的關聯。此次主要針對台灣的「國際海運貨運代理和物流協會」中的成員名單發放郵件問卷，最後回收的有效樣本數共為 233 份。藉由 ANOVA 檢驗服務品質、關係品質、顧客忠誠度和感知電子化服務是否會因受訪者的社經特性而有顯著的差異，再透過因素分析確認服務品質的屬性是否適用於此架構。所收集到的資料先進行敘述性統計以及驗證性因素分析之後，接著運用結構方程模式來檢視實證分析結果是否與研究假設相符。

研究結果顯示，服務品質對關係品質和顧客忠誠度有顯著的正向關係，關係品質對顧客忠誠度有顯著的正向關係，在服務品質與顧客忠誠度中，關係品質也具有部分中介效果。具體而言，本研究發現除了滿意度，信任與承諾也對關係品質產生重要影響。在服務品質和顧客忠誠度中，感知電子化服務具有正向干擾的效果，但在服務品質和關係品質中，感知電子化服務卻沒有正向干擾，說明了航運的電子化服務可以增加顧客的工作效率及績效，但不代表可以增加顧客和公司之間的關係與連結，從貨運承攬業者的角度來看，提供電子化服務給顧客是必要的服務項目，但不一定會為貨櫃船公司帶來競爭優勢。

此外，研究發現電子化服務項目的多寡與服務品質，電子化服務項目的多寡及承攬業者員工數量與關係品質，承攬業者員工數量與顧客忠誠度，承攬業者主要合作對象及電子化服務項目的多寡與感知電子化服務之間具有顯著關係。最後，根據實證數據分析的結果，本研究提出相對應的管理意涵，幫助貨櫃船公司提高感知電子化服務、服務品質、關係品質來提升顧客忠誠度。

關鍵字：海運承攬業者、服務品質、關係品質、顧客忠誠度、感知電子化服務

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Table of Contents

Table of Contents ..... **vii**
List of Figures ..... **x**
Introduction **1**
1.1 Background and Motivation 1
1.2 Research Objectives 7
Theoretical Background **9**
2.1 Electronic Customer Relationship Management 9
2.2 Expectation Confirmation Theory 11
Hypothesis Development **13**
3.1 Service Quality 13
3.2 Relationship Quality 19
3.3 Customer Loyalty 21
3.4 Perceived E-service 24
3.5 Moderating Role of Perceived E-service 27
Methodology **29**
4.1 Research Model 29
4.2 Measurement Development 30
4.3 Data Collection and Sampling 34
4.4 Analytical Procedure 34
4.4.1 Descriptive Statistic Analysis 35
4.4.2 Factor Analysis 36
4.4.3 Confirmatory Factor Analysis 36
4.4.4 Structural Equation Modeling 38
4.4.5 Regression Analysis 39
Empirical Results **41**
5.1 Descriptive Statistics Analysis 41
5.1.1 Respondent Profile 41
5.1.2 Mean and Standard Deviation of Items 44
5.1.3 Analysis of Variance Analysis 47
5.2 Factor Analysis 54
5.3 Confirmatory Factor Analysis 56
5.4 Structural Equation Modeling 60
5.5 Mediation Analysis 62
5.6 Moderation Analysis 63
Discussion and Conclusion **66**
6.1 Summary of the Results 66

doi:10.6844/NCKU201900868

6.2 Managerial Implications 68
6.3 Limitations and Future Research 69
References 71
Appendix A: Items in Questionnaire 84
Appendix B: Items in Chinese Questionnaire 87

doi:10.6844/NCKU201900868

List of Tables

Table 1 The evolution of carriers operated fleets and market shares in 2010-2019 ... 2
Table 2 Potential cost savings from B2B e-commerce in the US. ... 5
Table 3 Online or in-store shopping preference for selected product categories by consumers worldwide as of 2017. ... 6
Table 4 The service attributes of the container shipping industry. ... 17
Table 5 Definition and measurement of the variables ... 33
Table 6 Acceptable model fits ... 38
Table 7 Demographic characteristics ... 43
Table 8 The mean and standard deviations of the questionnaire items ... 45
Table 9 Test of homogeneity of variances in service quality ... 48
Table 10 Test of homogeneity of variances in relationship quality ... 48
Table 11 Test of homogeneity of variances in customer loyalty ... 48
Table 12 Test of homogeneity of variances in perceived e-service ... 49
Table 13 ANOVA results in service quality (Scheffe) ... 51
Table 14 ANOVA results in service quality (Games-Howell) ... 51
Table 15 ANOVA results in relationship quality (Scheffe) ... 52
Table 16 ANOVA results in customer loyalty (Scheffe) ... 53
Table 17 ANOVA results in customer loyalty (Games-Howell) ... 53
Table 18 ANOVA results in perceived e-service (Scheffe) ... 54
Table 19 ANOVA results in perceived e-service (Games-Howell) ... 54
Table 20 Principal component analysis with varimax ... 55
Table 21 Model fit of CFA estimates ... 58
Table 22 Convergent validity estimates ... 59
Table 23 Discriminant validity estimates ... 59
Table 24 Model fit of SEM estimates ... 60
Table 25 Standardized path coefficients and significance of path ... 61
Table 26 The partial mediation of relationship quality on the relationship between service quality and customer loyalty. ... 63
Table 27 Collinearity statistics of relationship quality ... 64
Table 28 Collinearity Statistics of customer loyalty ... 64
Table 29 Moderator statistics of relationship quality ... 65
Table 30 Moderator statistics of customer loyalty ... 65

doi:10.6844/NCKU201900868

List of Figures

Figure 1 Expectation confirmation theory..... 12
Figure 2 Proposed research model 29
Figure 3 Analysis procedure 35
Figure 4 Confirmatory factor analysis model..... 57
Figure 5 Path analysis with standardized path coefficients and *t*-value..... 60

doi:10.6844/NCKU201900868

Chapter One

Introduction

1.1 Background and Motivation

In recent decades, the competition for container shipping services has been fierce due to the fast changing supply and demand. The rankings of the top twenty shipping companies in 2019 changed dramatically in the past eight years, as shown in Table 1 (Alphaliner, 2019). Lower global demand and unstable fuel prices triggered by the global financial crisis in 2008 weakened seaborne trade and increased the uncertainty of the container shipping market (UNCTAD, 2008). In particular, the increase in the size of container ships enabled large companies to engage in a race to lower freight rates and created pressure on the market. The subsequent oversupply of container ships caused freight rates to drop dramatically, causing a dilemma for the container shipping market. Container shipping companies have endeavored to overcome this hardship by pursing efficient ways of reducing bunker costs through simultaneously cleaning the hull and propellers of vessels, slowing cruising speed, and pursuing economies of scale.

The state of the world economy slightly revived in 2016, and demand for shipping services demand increased moderately as a result. World seaborne trade volumes expanded by 2.6%, up by 1.8%. Specifically, digitalization and electronic commerce trends within maritime transport continued to prosper, and container shipping companies adopted these methods in conducting their businesses (UNCTAD, 2017). In the last decade, universal internet connections and advanced online services have made transactions much easier. Electronic service is a web-based service transacted through the Internet. Container shipping customers (e.g., forwarder, cargo owner) connect to other container shipping companies online through email and social media (e.g., LINE, Facebook) internet applications and utilize e-commerce platforms designed by the companies to check sailing schedules, booking, and track cargo, among other applications. All the network services that are electronic services and applications significantly decrease service costs and allow for possible service differentiation and segmentation in terms of service contracts (i.e., each customer has different usage rights) (De Ruyter, Welzels, & Kleijnen, 2001).

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Table 1 The evolution of carriers operating fleets and market shares from 2010-2019
Source: Alphaliner (2010; 2019)

		March 2019		January 2010	
		TEUs	Share	Rank	TEUs
1	APM-Maersk	4,150,917	18.0%	1	2,056,742
2	Mediterranean Shg Co	3,361,528	14.6%	2	1,496,139
3	COSCO Group	2,905,528	12.6%	7	453,867
4	CMA CGM Group	2,666,496	11.6%	3	1,032,087
5	Hapag-Lloyd	1,694,897	7.4%	6	471,779
6	ONE (Ocean Network Express)	1,546,001	6.7%	-	
7	Evergreen Line	1,274,528	5.5%	4	556,289
8	Yang Ming Marine Transport Corp.	644,620	2.8%	15	312,962
9	Hyundai M.M.	427,058	1.9%	18	274,529
10	PIL (Pacific Int. Line)	379,908	1.6%	20	195,695
11	Zim	315,717	1.4%	17	308,371
12	Wan Hai Lines	279,030	1.2%	22	125,060
13	KMTC	157,739	0.7%	28	37,007
14	IRISL Group	154,415	0.7%	73	8,389
15	Antong Holdings (QASC)	148,264	0.6%	-	
16	Zhonggu Logistic Corp.	137,513	0.6%	-	
17	X-Press Feeders Group	124,004	0.5%	-	
18	SITC	113,108	0.5%	31	34,393
19	TS Lines	82,955	0.4%	27	48,925
20	SM Line Corp.	77,866	0.3%	-	

There are five physical steps and two documentation steps that must be followed by each individual shipment when selling goods to consignees (Transporteca, 2018). If shippers have clear agreement on these seven steps, extra expenses and unnecessary delays/losses can be avoided. These seven steps in international shipping are export haulage, origin handling, export customs clearance, ocean freight, import customs clearance, destination handling, and import haulage. Export haulage refers to the movement of the cargo from shippers to the freight forwarder. Origin handling covers all

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physical handling and inspection of the cargo from receiving it at the origin warehouse to loading it on a ship in a container. Export customs clearance defines all the procedures and formalities that must be followed. The forwarder decides on a shipping line to carry ocean freight from its origin to its destination in order to meet the required timeline for the shipments. The forwarder and the shipping line have a contract of carriage for the container, and the shipper or the consignee in this case is not subject to any direct interaction with the shipping line. Import customs clearance is a formality, where a declaration is developed and submitted together with relevant documents enabling the authorities to register and levy any customs duty on the shipment. Destination handling includes transfer of the container from the ship to shore and from the port to the forwarder's destination warehouse. It also includes un-stuffing of the container and preparing the cargo for the consignee to collect. The last one, import haulage, is the actual delivery of the cargo to the consignee. It can either be performed by the freight forwarder or a local transportation company appointed by the consignee.

The freight forwarder contracted the container shipping company through their electronic service pipelines, such as e-mail, website and e-commerce, social network sites (e.g. Facebook, Line, Instagram, Plurk, Twitter), i-bill of lading (B/L) and i-dispatch, and electronic data interchange (EDI) to search and book sailing schedules, make the bill of lading, track vessels and cargoes, and clear customs. Despite the fact that container shipping companies endeavor to provide their customers with various e-services, the e-services provided by the companies are not the same. APM-Maersk, the world's largest container shipping company, provides many e-services for customers including e-mail, an official website, electronic commerce, social media (e.g. Facebook, Line, Instagram, Plurk, Twitter), and electronic data interchange (EDI). Both Evergreen and Yang Ming, the seventh and eighth container shipping companies, focus on e-services to promote their automatic services for customers and to create competitive advantage. Evergreen provides a website and e-commerce and i-B/L and i-dispatch e-services, and EDI and Yang Ming provide e-services including e-mail, official websites, electronic commerce, and social media (e.g. Facebook, Line, Instagram, Plurk, Twitter). Customers are informed via Line in the case of an emergency situation, where the Line BOT replies to the customer's questions automatically and immediately, and the official website provides sailing schedules, booking, the bill of lading process, and vessel tracking.

In general, e-commerce and e-service are not the same. E-commerce refers the merchandises and services trading on the webpage, but e-services include information technology (IT) that provides a superior experience including electronic communication, information gathering, transaction processing, and data interchange within and between

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businesses across time and space (Featherman & Pavlou, 2003). Gefen and Straub (2004) considered that the one-time nature of traditional business transactions and the relative paucity of regulations and customs on the Internet make consumer familiarity and trust especially important in the case of e-commerce and e-service remedies the lack of such interpersonal exchanges. E-service is important in e-commerce for its ability to manage customer relations and enhance sales, thus improving customer's online experiences, including such things as search support, e-responses to customer queries, orders and transactions, e-payment options, e-transaction record management, e-assurance and trust, e-help, and other online support in the e-space (Singh, 2002). Overall, e-service is a channel or tool that assists companies with conducting their businesses online. However, the attributes of e-services in different industries vary. For example, a travel agency provides the information related to service quality, price, and availability via its website and applications (APPs) such that customers may search and book a tour and comment about their experience after consumption. A manufacturing retailor further provides the document exchange, logistics choices, and electronic procurement via a website such that customers may follow up the shipment status of a purchased product instantly. The above transaction interactions among sellers and buyers reduce information asymmetry related to the products/services.

The advantage of business-to-business (B2B) e-commerce for companies is that it offers almost perfect market information and the opportunity to reallocate the vast purchasing power of firms. The cost reduction potential of this kind of e-commerce has been estimated to be tremendous. A widely recognized study by Goldman Sachs established that B2B ecommerce is likely to contribute to cost reductions of up to 40% of corporate expenses in selected U.S. industries (Brooks & Wahhaj, 2001). This study estimated that the freight transport industry will be able to mobilize cost reductions amounting to between 15% and 20% of their current expenses (see Table 2). This rate is only exceeded by the savings available to electronic components industries (29% to 39%) and forest products (15% to 25%) industries.

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Table 2 Potential cost savings from B2B e-commerce in the US.

Industries	Cost savings (%)
Electronic components	29-39
Machining (metals)	22
Forest products	15-25
Freight transport	15-20
Life sciences	12-19
Computing	11-20
Industries	Cost savings (%)
Media and advertising	10-15
Aerospace and related parts	11
Steel	11
Chemicals	10
Oil and gas	5-15
Paper	10
Health care	5
Food ingredients	3-5
Coal	2

Source: Brooks and Wahhaj (2001).

The business-to-customer (B2C) electronic commerce has gained more public attention recently. People became familiar with the idea of home delivery of consumer goods from the very beginning. Among e-commerce products, those that were predominant were either well suited for mail-order and delivery (e.g., books and CDs, computers, airline tickets, or hotel reservations), or were ordered both frequently and in bulk (e.g., groceries). It is no coincidence that among the most important B2C on-line retailers were, for example, the book-and-more-store Amazon.com, the personal computer and devices manufacturer and retailer Dell. The Statista website estimated the online or in-store shopping preference for selected product categories by consumers worldwide as of 2017, as shown in Table 3.

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Table 3 Online or in-store shopping preference for selected product categories by consumers worldwide as of 2017.

Category	Online (%)	In-store(%)
Books, music, movies and video games	60	28
Toys	39	37
Consumer electronics and computers	43	51
Sports equipment/outdoor	36	44
Health and beauty(cosmetics)	37	47
Clothing & footwear	40	51
Jewelry/watches	32	49
Household appliances	33	56
DIY/home improvement	30	52
Furniture & homeware	30	59
Grocery	23	70

Source: Statista (2018).

The literature has extensively verified that service quality plays a critical role in the process of consumption, with the initial focus on quantifying service characteristics including reliability, assurance, tangible, empathy, and responsiveness (Parasuraman, Zeithaml, & Berry, 1985). In particular, service quality has been found to have a significantly positive effect on service value (whereas sacrifice has a negative effect) and positively influences consumer behavioral intention (Cronin, Brady, & Hult, 2000; Bolton & Drew, 1991), satisfaction (Spreng & Mackoy, 1996; Yee, Yeung, & Cheng, 2010; Caruana, 2002; Cronin et al., 2000), word of mouth (Chaniotakis & Lymperopoulos, 2009; Carpenter, & Fairhurst, 2005; Ghodrati, & Taghizad, 2014; Arasli, Mehtap-Smadi, & Turan Katircioglu, 2005), and customer loyalty (Wong & Sohal, 2003). In turn, these constructs directly affect the company's reputation and its profit. The above causal relationships have been investigated in the airline industry (Ostrowski, O'Brien, & Gordon, 1993; Chen & Hu, 2013), the mobile telephone sector (Santouridis & Trivellas, 2010), health centers, city theatres, fast food restaurants, supermarkets, amusement parks (De Ruyter, Wetzels, & Bloemer, 1998), and advisory services (Bell, Auh, & Smalley, 2005). A high level of quality service keeps customers satisfied and even further, increases customer satisfaction, which contributes to numerous behavioral outcomes (e.g., commitment, word of mouth, loyalty) (Carpenter & Fairhurst, 2005; Ghodrati, & Taghizad, 2014). Offering better service quality is often a useful way to build a close relationship with customers and to attain a competitive advantage in the market.

However, these studies have paid less attention to the roles of relationship quality and

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e-service as they relate to customer loyalty. Relationship quality (i.e., satisfaction, trust, and commitment) will make customers feel safe, assured, and accepting, and they will not worry about mistakes. Despite the fact that the link between service quality and satisfaction has been extensively explored (e.g., Cronin et al., 2000), the relationships among service quality, trust, and commitment have been ignored in container shipping services. Further, in the container shipping industry, the advantages of e-commerce, where trading transactions are conducted only on the webpage or IT was explored (Featherman & Pavlou, 2003). The e-service connects customers via e-mail, website and e-commerce, social network, i-B/L and i-dispatch, and EDI to search and book sailing schedules, make the bill of lading, track vessel and cargo, and clear customs in an efficient and convenient way.

Therefore, to fill two gaps in the literature, this study is aimed toward measuring the link between service quality and customer loyalty by combining them with relationship quality (e.g., satisfaction, trust, and commitment) and perceived e-service (e.g., usefulness and ease of use). Through integrating electronic customer relationship management and the expectation conformation theory, a quantitative focus group study is conducted and targeted at the route operators of container shipping companies.

1.2 Research Objectives

Universal internet connections and advanced online services have made transactions easy and in real time. In the container shipping industry, businesses and customers acquire service information and place an order online. Based on electronic customer relationship management and the expectation confirmation theory, the research objectives include the following:

1. To understand how perceived e-service, service quality, and relationship quality can enhance customer loyalty by building the construct of relationship quality to include satisfaction, trust, and commitment and the construct of perceived e-service to include perceived usefulness and perceived ease of use.

2. To measure the levels of the constructs and investigate the causal relationships among perceived e-service, service quality, relationship quality, and customer loyalty.

3. To examine the mediating role of relationship quality on the linkage between service quality to customer loyalty and the moderating role of perceived e-service on the linkages of service quality to relationship quality and service quality to customer loyalty.

4. To provide practical strategies drawn from the results for container shipping

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companies to apply when they are developing new services.

The aim of this study is, based on electronic customer relationship management and the expectation confirmation theory, to understand how perceived e-service, service quality, and relationship quality can enhance customer loyalty. In the theoretical framework, the construct of relationship quality is considered based on three factors: satisfaction, trust and commitment, and the construct of perceived e-service is considered based on two factors: perceived usefulness and perceived ease of use. The levels of the constructs are measured and the causal relationships among perceived e-service, service quality, relationship quality, and customer loyalty are investigated. Also, the mediating role of relationship quality on the linkage between service quality and customer loyalty and the moderating role of perceived e-service on the linkage between service quality and relationship quality and that between service quality and customer loyalty are examined. This study is intended to provide a clear picture of how the trend of digitalization impacts service quality, relationship quality, and customer loyalty. Finally, practical strategies drawn from the results are provided for container shipping companies that can be applied when they are developing new services.

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Chapter Two

Theoretical Background

This chapter explores electronic customer relationship management (e-CRM) and the expectation confirmation theory, which are used in the research model to demonstrate the linkages among E-service, service quality, relationship quality, and customer loyalty. E-CRM is used to explain why e-services are effective for enhancing relationship quality and why e-services have moderating effects on the linkages of service quality to relationship quality and customer loyalty. The expectation confirmation theory is used to explain the linkage between relationship quality and customer loyalty.

2.1 Electronic Customer Relationship Management

The rapid growth of internet technology has facilitated traditional customer relationship management in an effective manner by providing enormous opportunities for enterprises to improve relationships and build strong interactivity with customers (Roh, Ahn, & Han, 2005). The use of internet technology to support this approach, known as electronic customer relationship management (e-CRM), is a relatively new area and serves as a new marketing paradigm to solidify customer relationships and increase overall customer satisfaction. Malik and Kumar (2013) asserted that e-CRM is a strategic technology-centric relationship marketing business model that combines traditional CRM with e-business market place applications. E-CRM has enabled organizations, via the use of the Internet, to attract new customers, analyze their preferences and behaviors, and customize support services (Mekkamol, Piewdang, & Untachai, 2013).

In general, there are three phases within an e-CRM transaction cycle: pre-service, during service, and post-service. The pre-service features (e.g., customized alerts, local search engines, customized sites, chats) provide information that potential customers are able to find during a search and thereafter make a decision to purchase or use a service (Abdulfattah, 2012). To fulfill a transaction, service suppliers and customers agree on certain conditions based on their negotiations. The service features (e.g., browsing record, friendly and customized layout, Secure Sockets Layer (SSL)) facilitate customers' knowledge of the service, product, and procedure that influences online transaction completion while guaranteeing their security and privacy (Ramavhona & Mokwena, 2016). Finally, the post-service features of the e-transaction cycle basically revolve around customer services (e.g., online self-help functionality, frequently asked questions (FAQs)

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tool, complaints ability feature, and online communities). The use of online service platforms help with all consumer problems related to the service or product, thereby creating "personal" interactions with the organization. In sum, E-CRM manages customer relationships using electronic methods to enable their organizations to provide appropriate services and products that satisfy customer needs and reduce the number of complaints via online communication.

The widely accepted concept of e-CRM defines it as a business strategy that applies the technological power to tie together all aspects of a company's business to build long-term customer relationships and customer loyalty. Lee-Kelley, Gilbert, and Mannicom (2003) defined e-CRM as "the marketing activities, tools and techniques delivered over the internet (using technologies such as web sites and e-mail, data capture, ware housing and mining) with a specific aim to locate, build and improve long term customer relationships and enhance their individual potential." Compared to CRM, e-CRM emphasizes that uses the Internet as a tool or medium (Al-Momani, Noor, & Azila, 2009), where the "E" in e-CRM not only stands for "electronic," but can also be explained as electronic channels, enterprise, empowerment, economics, and evaluation. In general, the concept of e-CRM has been extensively applied to customer approaches employed in business management processes that incorporate personalization of communication through the use of the Internet while helping to efficiently increase customer-company relationships and support final purchase decisions (Lam, Cheung, & Lau, 2013).

Many companies have adopted e-CRM to improve their relationship with customers, to achieve customer satisfaction and loyalty, and to increase revenue and profits. The validity of the e-CRM theory has been demonstrated in a wide range of relationship quality contexts (including trust, satisfaction, commitment, retention, loyalty, and willing to recommend) in the banking industry (Maroofi, Darabi, & Torabi, 2012; Sivaraks, Krairit, & Tang, 2011), retail Web sites (Feinberg & Kadam, 2002), and hotel industry (Luck & Lancaster, 2003). It serves as a business and technology discipline that helps companies acquire and retain their most profitable customers. Abdulfattah (2012) suggested that the use of e-CRM will increase the level of online features (e.g., site customization, membership, site information, privacy, security, product or service customization) and reinforce established customer relationships by promoting online customer satisfaction and service quality. Abu-Shanab and Anagreh (2015) found the positive influence of e-CRM capabilities on e-CRM benefits (e.g., enhancing customer service and loyalty) in the banking sector based on a bank side framework (e.g., public relations, marketing), a customer side framework (e.g., systems, transactions), and a market side framework (e.g., market forces, regulations). Although the Internet has likely changed the customer

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purchase process, it hasn't changed the fact that addressing customer needs leads to sustainable profit. To summarize, the emergence of e-CRM has created new business opportunities.

2.2 Expectation Confirmation Theory

The expectation confirmation theory (ECT) is widely used in research on marketing and customer behavior, in particular, for the purpose of discussing the status and development of customer psychology when interpreting customer satisfaction, repurchase intentions, and complaint behavior (Tse & Wilton, 1988; Anderson & Sullivan, 1993; Dabholkar, Shepherd, & Thorpe, 2000; Bhattacherjee, 2001; Bhattacherjee & Premkumar, 2004). Oliver (1980) proposed customer repurchase intentions to occur through five steps: (1) customers form an initial expectation of a specific product or service prior to purchase; (2) customers use the service and form a perception of its performance via their actual experience; (3) customers assess their perceived performance via their original expectation and determine the extent to which their expectation is confirmed; (4) customers build a level of satisfaction that is based on their initial expectation and their level of confirmation, and (5) satisfied customers intend to continue using or to repurchase the service. It has been suggested that the expectation confirmation theory is determined by pre-purchase expectation, post-purchase experience, and customer satisfaction with the service process (Oliver, 1980; Anderson & Sullivan, 1993; Susarla, Barua, & Whinston, 2003). In addition, customers are satisfied when their perceptions are higher than their expectations of their consumption experiences, while they were dissatisfied when their perceptions are less than their expectations for their consumption experiences. Hence, customer intention to repurchase and continually use a product or service is based in their satisfaction with the use of the product or service, and satisfaction acts in the direction of confirmation (Anderson & Sullivan, 1993). To summarize, repurchase intentions and subsequent continuance to use are in accordance with the level of disconfirmation and satisfaction of customers.

ECT has been widely used to understand the linkages among customer satisfaction, identification, brand preference, and repurchase intention in marketing studies of information and communication technology (ICT) services. The validity of this theory has been demonstrated in a wide range of service continuance and product repurchase contexts, including food packaging advertising (Schifferstein, Kole, & Mojet, 1999), local public services in England (James, 2007), automobile repurchase (Oliver,1993; Oliver & Westbrook, 1993), institutional repurchase of photographic products (Dabholkar et al., 2000), and an online banking information system (Bhattacherjee, 2001). It has been

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suggested that customers are likely to be satisfied when the actual service performs better than their prior expectations. Customers experience satisfaction and offer word-of-mouth evaluations when service performance is higher than their expectations, and they experienced dissatisfaction and provide negative word-of-mouth evaluation when the service performance is lower than their expectations (Hennig-Thurau, Gwinner, & Gremler. 2002).

While exploring the factors that influence customers' e-loyalty, Valvi and West (2013) found new variables (e.g., perceived value, price, trust) and asserted that they should be taken into account by practitioners and academics when developing marketing strategies and behavioral models. Shiau, Huang, and Shih (2011) used the theory of expectation and confirmation and flow theory and found that confirmation, perceived usefulness, flow, challenge, and arousal positively affected bloggers' satisfaction with using blogs. To summarize, the application of ECT is critical when investigating perceived performance and customer satisfaction because it illustrates the increase in customer satisfaction when perceived performance is higher than expectations (Bhattacherjee, 2001). Unless customers have a better choice, they will continuously support the original company, which will gradually generate customer loyalty. Figure 1 illustrates the causal flow of ECT.

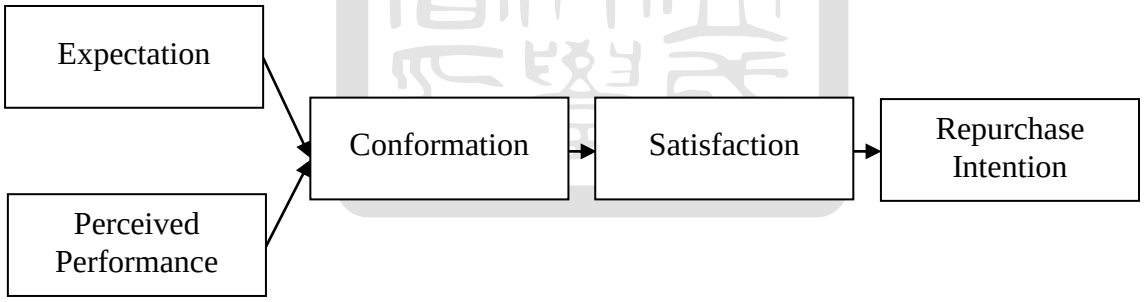

Figure 1 The expectation confirmation theory

Source: Bhattacherjee (2001)

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Chapter Three

Hypothesis Development

This chapter reviews the related studies and builds theoretical support for the hypotheses. The theoretical research framework is constructed based on the hypothesis development.

3.1 Service Quality

Service quality is one of most widely investigated phrases in the management literature. It has been extensively studied in industries including travel and tourism (Fick & Brent Ritchie, 1991), the airline industry (Ostrowski et al., 1993), hospitality (Saleh & Ryan, 1991), retailing (Dabholkar, Thorpe, & Rentz, 1996), health care (Chaniotakis & Lymperopoulos, 2009), insurance (Ghodrati, & Taghizad, 2014) and banking (Angur, Nataraajan, & Jahera, 1999; Arasli et al., 2005), among others. Since services have different attributes and characteristics, the definition and measurement of service quality vary in the literature. There are two widely adopted conceptualizations of service quality in service management studies. The Nordic perspective proposed by Grönroos (1984) regarded the main dimensions of perceived service quality in numerous contexts to be generically applicable to services, and the American perspective suggested by Parasuraman, Zeithaml, and Berry (1985; 1988) used a SERVQUAL scale to describe service encounter characteristics including reliability, assurances, tangibles, empathy, and responsiveness. Grönroos (1984) defined service quality as the cognitive judgment of perceived quality produced by customer's evaluation process comparing the services they have experienced with their expectations. Perceived service quality and expected service gap were determined by two dimensions of technical quality (i.e., what is received by customers) and functional quality (i.e., how a service is provided). In an exploratory study, Parasuraman et al. (1985) investigated the construct of service quality and its determinants through focus group interviews in four service businesses (retail banking, credit card, securities brokerage, and product repair and maintenance) and defined service quality as "the degree of discrepancy between customers' normative expectations for the service and their perceptions of the service performance." Along with their previous study, Parasuraman et al. (1988) developed a 22-item instrument (i.e., SERVQUAL) evaluated on five dimensions for assessing customer perceptions of overall service quality in service and retailing organizations. These two studies deeply influenced the definition of service quality in subsequent studies (Boulding, Kalra, Staelin, & Zeithaml, 1993; Bolton & Drew,

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1991; Cronin & Taylor, 1992). In this study, service quality refers to a cognitive judgment related to the superiority of a service that measures how well a delivered service matches customer expectations compared with some explicit or implicit standard.

Service quality plays a critical role in consumption behavior, and it has been found to significantly influence consumer attitude and behavioral intention (Cronin, et al., 2000; Bolton & Drew, 1991), satisfaction (Spreng & Mackoy, 1996; Yee et al., 2010; Cronin, et al., 2000), loyalty (Wong & Sohal, 2003), and word of mouth (Chaniotakis & Lymperopoulos, 2009; Carpenter, & Fairhurst, 2005; Ghodrati, & Taghizad, 2014; Arasli et al., 2005). Because of the nature of services, it is difficult for customers to evaluate and test them before purchasing. Cronin et al. (2000) found that service quality has a direct effect on customers' behavioral intentions in spectator sports, participative sports, entertainment, and the fast food industry and that it accounted for a greater share of the variance in consumer behavioral intentions. Satisfaction commonly refers to the pleasurable fulfillment obtained when customers perceive a service or product as fulfilling their needs, desires, or goals and feel pleasure about their consumption experiences (Blanchard & Galloway, 1994). Expected quality for a good or service is based on customers' ideals or perceptions of excellence and forms satisfaction judgements (Taylor & Baker, 1994). When a company provides good service quality that leaves customers in a satisfied state, service quality will in turn enhance customer satisfaction. It is believed that improvements in service quality will increase service performance and significantly contribute to customer satisfaction (Parasuraman et al., 1988). Specifically, when perceived quality is equal to expected quality, the perceived quality is deemed satisfactory; when perceived quality is higher than expected quality, it is more than satisfactory and tends towards being viewed as ideal quality, and when perceived quality is less than expected quality, it tends to be perceived as being unacceptable.

Further, Carpenter and Fairhurst (2005) asserted that the effects of hedonic shopping benefits are reflected in the perceived emotional or psychological worth of a purchase, which affects satisfaction and in turn has an indirect effect on word of mouth and loyalty. Strong competition raises customer expectations for high quality services that keep them satisfied. This increase in customer satisfaction leads to positive behavioral outcomes (e.g., commitment, intent to stay/customer retention) (Ghodrati, & Taghizad, 2014). A mutually rewarding relationship between firms and customers will be created, and customer tolerance for service failures and positive word of mouth about the company will increase (Arasli et al., 2005). Ostrowski et al. (1993) also asserted that customer loyalty will develop when perceived experience is excellent at a level far exceeding the service of other companies in the commercial airline industry, especially in terms of food quality and

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quantity, baggage delivery promptness, and service during the flight, which were found to be the most important factors leading to customer loyalty. To summarize, service quality is a significant differentiator and the most powerful competitive weapon in a service organization. Offering better service quality is a useful way to build a close relationship with customers and attain a competitive advantage in the market.

In the shipping industry, a number of studies have evaluated service quality by selecting adequate service attributes. While investigating the determinants affecting shipper choices of a container shipping company in the U.S. market, Brooks (1985) found there were fifteen attributes: freight rate, carrier's goodwill, number of voyages, direct destination, fast transit time, schedule accuracy, carrier's cooperation with shipper, carrier's capacity, carrier's flexibility, service attitude of cargo clerk, attitudes toward shipper complaints and claiming, carrier's past loss record, number of ports docked, signing a long-term contract, and reliable content. In the examination of the criteria used by Canadian shippers to evaluate ocean container carriers under changing competitive conditions in the global marketplace from 1982 to 1989, Brooks (1990) confirmed the new set of sixteen service attributes: cost of services, sailing frequency, transit time, directness of sailing, on-time pick-up and delivery, next ship leaving to shipper's destination, cooperation between carrier and shipper personnel, carrier flexibility to bypass port problems, carrier's reputation for reliability, tracing capability of carrier, fast claim response, long-term commitment by carrier, sales representative service, past loss and damage experiences, pressure from customer, informational nature of advertising.

Matear and Gray (1993) found that the most important service items for freight transport shippers were fast response to problems, on-time collection and delivery, value for money, and good relationships with carriers, but the most important service attributes for freight carriers were punctuality of sea service, availability of freight space, high frequency of sea service, and fast response to problems. Kent and Parker (1999) investigated the impacts of service attributes on import shippers, export shippers, and container shipping companies and found that container shipping companies assign higher importance to special equipment, linehaul services, and carrier salesmanship than import shippers and assign higher importance to reliability, transit time, carrier salesmanship, special equipment, rates, pickup and delivery service, loss and damage, and linehaul services than export shippers. This implied that the importance levels of attributes toward import shippers, export shippers, and container shipping companies are different and that the most important service attributes are special equipment, pick-up and delivery service, carrier salesmanship, rates, loss and damage, transit time, claims, expediting, linehaul services, financial stability, and equipment availability. Maloni, Gligor, and Lagoudis (2016) linked

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ocean container carrier capabilities to shipper-carrier relationships using the attributes of willingness to negotiate rates, freight rates, customer service responsiveness, equipment availability, employee competence, vessel on time reliability, accessorial rates, transit times, condition of equipment, financial stability, duration of relationship, shipment free days, sailing frequency, freight damage and loss, ports called, systems (booking, tracking), shipment expediting, inland network-North America, environmental practices, and inland network-International.

Lu (1999) classified the strategic groups of shipping companies, shipping agencies, and ocean freight forwarders in the Taiwanese shipping industry on the basis of the key strategic factors obtained from a factor analysis. Lu (2000) evaluated a large number of service attributes and a small number of underlying strategic dimensions (factors) of logistics services in Taiwanese maritime firms using a factor analysis and a principal components analysis and revealed that the most important strategic dimension was value-added service, followed by promotion, equipment and facilities, as well as speed and reliability. Lu (2003) used structural equation modeling to investigate the impact of carrier service factors, including timing related, pricing, warehousing, and sales services on shipper satisfaction with shipper–carrier partnering relationships and indicated that timing-related services influence shippers' satisfaction in such relationships, and shipper satisfaction positively influences partnering. The service attributes commonly adopted in the three studies discussed above were availability of cargo space, courtesy of inquiry, prompt response to shipper complaints, prompt response to claims, short transit time, high sailing frequency, on-time pick-up, reliability of advertised sailing schedules, accurate documentation, ability to provide door-to-door service, ability to provide customs clearance service, ability to provide consolidation service, good condition of containers, ability to provide non-standard equipment, low damage or loss record, tariffs simplified, pricing flexibility in meeting competitors' rates, knowledgeability of sales personnel, frequency of sales representative calls to shippers, ability of sales representative to handle problem, and long-term contractual relationship with inland container depots. Table 2 shows the service attributes of the container shipping industry.

doi:10.6844/NCKU201900868

Table 4 The service attributes of the container shipping industry.

Study	Subject	Object	Service attributes
Brooks (1985)	Investigated factors affecting carriers' available alternatives	Canadian containerized cargo exporters	Freight rate, carrier's goodwill, number of voyages, direct destination, fast transit time, schedule accuracy, carrier's cooperation with shipper, carrier capacity, carrier flexibility, service attitude of cargo clerk, attitudes toward shipper complaints and claims, carrier's past loss record, number of ports docked, signing a long-term contract, reliable content
Brooks (1990)	Changes in ocean container carrier criteria under competitive conditions	Canadian shippers	Cost of services, sailing frequency, transit time, directness of sailings, on-time pick-up and delivery, next ship leaving to shipper's destination, cooperation between carrier and shipper personnel, carrier flexibility to bypass port problems, carrier's reputation for reliability, tracing capability of carrier, fast claims response, long-term commitment by carrier, sales representative service, past loss and damage experience, pressure form customer, informational nature of advertising
Matear and Gray (1993)	The criteria employed by shippers and freight forwarders in air and sea transport service	Irish shippers and freight service suppliers	Fast response to problems, avoidance of loss or damage, on-time collection and delivery, value for price, good relationship with carrier, ability to perform unanticipated urgent deliveries, short transit time, low price, ability to handle shipments with special requirements, arrival time at destination, high service frequency, documents completed by carrier, departure time from origin, special offers or discounts for transport, transport preference of trading partner, proximity of port/airport to destination of goods, proximity of port/airport to origin of goods, knowing which port/airport is used
Kent and Parker (1999)	Factors affecting selection of import shippers, export shippers, and containership carriers	Import shippers, export shippers, containership carriers	Reliability, equipment availability, service frequency, rate changes, operating personnel, transit time, financial stability, loss and damage, expediting, tracing, service changes, rates, scheduling flexibility, carrier salesmanship, linehaul services, special equipment, PU and D, claims

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Study	Subject	Object	Service attributes
Maloni et al. (2016)	Linking ocean container carrier capabilities to shipper–carrier relationships	U.S. and Canadian shippers	Willingness to negotiate rates, freight rates, customer service responsiveness, equipment availability, employee competence, vessel on time reliability, accessorial rates, transit times, condition of equipment, financial stability, duration of relationship, shipment free days, sailing frequency, freight damage and loss, ports called, systems (booking, tracking), shipment expediting, inland network-North America, environmental practices, inland network-International
Lu (1999), Lu (2000), Lu (2003)	Lu (1999): classifying strategic groups of shipping companies, shipping agencies, and ocean freight forwarders Lu (2000): linking the relationship between performance and logistics services in maritime firms Lu (2003): the impact of carrier service factors on shipper satisfaction with shipper-carrier partnering relationships	shipping companies, shipping agencies, ocean freight forwarders, shippers	The common attributes adopted in three studies: availability of cargo space, courtesy of inquiry, prompt response to shipper complaints, prompt response to claims, short transit time, high sailing frequency, on-time pick-up, reliability of advertised sailing schedules, accurate documentation, ability to provide door-to-door service, ability to provide customs clearance service, ability to provide consolidation service, good condition of containers, ability to provide non-standard equipment, low damage or loss record, low tariff, pricing flexibility in meeting competitors' rates, knowledgeability of sales personnel, frequency of sales representative calls to shippers, ability of sales representative to handle problems, long-term contractual relationship with inland container depots (Inland transportation)

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3.2 Relationship Quality

Relationship quality has been extensively studied in industries such as hotels (Kim & Cha, 2002), financial services (Rajaobelina & Bergeron, 2009), the airline industry (Pi & Huang, 2011), retail banking (Itani & Inyang, 2015), tourism (Su, Swanson, & Chen, 2016) and small-to-medium enterprises (Rauyruen & Miller, 2007), among others. Because relationships cannot be produced or improved through physical objects, relationship quality refers to intangible value resulting in an expected long-term relationship between related parties (Levitt, 1981; Zineldin, 2000). Hennig-Thurau and Klee (1997) described relationship quality between customers and firms as the degree to which a customer needs to be provided appropriate assistance, resulting in a close relationship between both sides. Garbarino and Johnson (1999) and Smith (1998) considered relationship quality as a higher-order construct comprised of a variety of positive relationship outcomes that reflect the overall strength of relationship and the extent of needs and expectations of the parties. Kim and Cha (2002) referred to relationship quality as customer perceptions and evaluations of individual service employees' communication and behavior, such as respect, courtesy, warmth, empathy, and helpfulness. In this study, relationship quality refers to an overall assessment of the strength of a relationship between a container shipping company and its customers that meets the needs and expectations of the customers.

Relationship quality is a multidimensional construct comprising satisfaction, trust, and commitment. This intangible asset plays a critical role in long-term relationship maintenance. Customer satisfaction refers to a customer's emotional state resulting from an overall evaluation of a company (Crosby, Evans, and Cowles, 1990; Liang & Wang, 2006) or an emotional state taking into consideration an evaluation of all aspects of a working relationship (Jap, 2001). In this study, it refers to customers' cognitive and affective evaluation of their experiences across all service consumption processes. It is conceptualized as a customers' fulfillment response, where a service provides a pleasurable level of consumption-related fulfillment. Next, trust is a critical component of attitudes and behavior toward a seller (Dwyer, Schurr, & Oh, 1987). It was introduced as a factor in successful service relationships in which customers feel safe with supplier services, and their interaction with suppliers is confidential and secure (Parasuraman, et al., 1985). It has also been viewed as an important factor in the building and development of quality relationships through making and keeping promises (Dwyer et al., 1987; Grönroos, 1990). Here, trust refers to the willingness of customers to rely on the ability of a service to perform its stated function. Finally, commitment refers to customers' psychological attachment to a service that develops before they are be able to determine whether or not their repeated purchase behavior will be derived from a sense of loyalty (Beatty & Kahle,

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1988). Storbacka, Strandvik and Grönroos (1994) defined commitment as the parties' intention to act and their attitude towards interacting with each other, where a high relationship value will positively affect commitment. In this study, customer commitment refers to customers' psychological and affective attachment to maintain a behavioral direction and a valuable ongoing relationship with a company.

The relationships among service quality and relationship quality have been examined in the context of life insurance, health care, hospitality, and service environments. Crosby et al. (1990) collected data from 296 U.S. life insurance households who owned at least one whole life policy, aged between 25 and 44, and were the household's primary insurance decider while investigating how to promote the service quality of salespersons and its impact on relationship quality with customers. When salespersons continued to meet customer expectations, their perceptions of the salespersons' expertise, attractiveness, and competence appeared to have influenced sales success and thus, the customers were willing to continue building the relationship with these salespersons. In the end, salesperson-related service quality was found to be positively related to relationship quality. Chumpitaz Caceres and Paparoidamis (2007) investigated the linkages among service quality, relationship satisfaction, trust, commitment and business-to–business loyalty by collecting data from 234 companies that were engaged in relationships with advertising agencies in a range of media advertising. It was found that service quality (including technical quality and functional quality) had a positive effect on relationship quality (including satisfaction, trust, commitment), which in turn had a positively effect on loyalty.

Lee, Lee, and Kang (2012) empirically tested the effects of high-performance work systems on service quality, customer satisfaction, and customer loyalty in health care organizations based on data collected from 196 pairs of employee-customer respondents (care team members including doctors, nurses, pharmacists, administrators, and technicians who have frequent contact with patients, and the patient or the patient's family member) in four selected hospitals with more than 500 beds. The results indicated that the improvement in service quality measured by the SERVQUAL model of Parasuraman et al. (1988) reduced medical error and prevented diseases, thus increasing customer satisfaction and loyalty. Cronin et al. (2000) assessed the direct and indirect effects of service quality and satisfaction on behavioral intention using 1,944 customers in service environments and found that service quality indirectly affected customers' behavioral intention through value attributions and customer satisfaction (or equivalently, service quality positively affected customer satisfaction). Kim and Cha (2002) investigated the relationships among the antecedents and consequences of relationship quality using data from customers of 12 five-star hotels and found that better service provider attributes resulted in higher

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relationship quality and that higher relationship quality resulted in a higher share of purchases and better relationship continuity. Sharma and Patterson (1999) found that both the technical and functional quality of personal financial planners led to the development of customer trust in an adviser to a large extent over time since a satisfactory experience with recurring interaction with an adviser strengthened confidence in the adviser, and where the delivery process and service creation were shown to be important factors related to the formation of trust. Also, it was found that the greater the trust in the adviser, the stronger the relationship commitment. Similar results were found in information technology (IT) services in a study by Park, Lee, Lee, and Truex (2012), where functional service quality was investigated with the use of SERVQUAL to assess the relationship between service performance and technical service quality and between perceived system quality (e.g., response time, reliability) and information quality (e.g., completeness, ease of understanding, security) assessing delivered information systems.

In this study, it is posited that excellent service quality on the part of a container shipping company will make customers feel that the service is reliable and acceptable and that they will not have to worry about the cargo delivery process. Thus, customers' levels of satisfaction, trust, and commitment toward the service will be built, and the relationship quality between the company and customers will be improved. Hence, the following hypothesis is proposed

H1: Service quality is positively related to relationship quality.

3.3 Customer Loyalty

The 80-20 rule, known as the old adage Pareto Principle, is applied to marketing, where it states that 20 percent of customers represent 80 percent of sales. Therefore, a heavy investment in customer retention is necessary because loyal customers are critical to business success. This issue was extensively studied in industries including hotels (Kandampully & Suhartanto, 2000; Bowen & Chen, 2001), retail banking (Hallowell, 1996; Beerli, Martin, & Quintana, 2004; Lewis & Soureli, 2006), airline companies (Zins, 2001; Chen & Hu, 2013), telecommunications (Khatibi, Ismail, & Thyagarajan, 2002; Kim, Park, & Jeong, 2004; Eshghi, Haughton, & Topi, 2007), courier delivery service (Rauyruen & Miller, 2007), health-care (Lee et al., 2012), and restaurants (Haghighi, Dorosti, Rahnama, & Hoseinpour, 2012) etc.

Customer loyalty is commonly referred to as a deeply held commitment to re-buy or re-patronize a preferred product or service consistently in the future despite situational influences and marketing efforts having the potential to cause switching behavior (Oliver, 1997). Similarly, McIlroy and Barnett (2000) suggested that customer loyalty is a

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customer's commitment to do business with a particular organization, purchasing their goods and services repeatedly and recommending the services and products to friends and associates. Liang and Wang (2006) investigated the determinants of customer loyalty in mobile commerce contexts by defining customer loyalty as customer's favorable attitude toward an e-commerce website resulting in repeated purchasing behavior. Bowen and Chen (2001) suggested that loyal customers are those who hold favorable attitudes toward a company, are committed to repurchase the products or the services, and will recommended them to others (word-of-mouth advertising). Wong and Sohal (2003) suggested that customer loyalty can be generally described as occurring when customers repeatedly purchase a good or service over time and hold favorable attitudes towards a good or service or towards the company supplying the good or service. In this study, customer loyalty is defined as customers' commitment to do business with a particular company, purchasing its goods and services repeatedly and recommending the services and products to friends and associates.

De Ruyter et al. (1998) investigated the relationships among perceived service quality, loyalty (i.e., preference loyalty, price indifference loyalty), and switching costs within five service industries, including health centers, city theatres, fast food restaurants, supermarkets, and amusement parks, in Belgium and found positive relationships among perceived service quality, preference loyalty, and price indifference loyalty. Bell et al. (2005) investigated advisory services designed to build and maintain personalized investment strategies for customers with 514 usable responses. It was found that the effects of technical service quality and functional service quality on customer loyalty were significant and positive and that the effect of technical service quality on customer loyalty is much greater than that of functional service quality on customer loyalty. While exploring the role of relational benefits between service quality and loyalty with 403 passengers in the airline industry, Chen and Hu (2013) found that service quality had positive impacts on both relational benefit and customer loyalty and that relational benefit directly influenced customer loyalty. Ostrowski et al. (1993) examined issues related to service quality and customer loyalty in the commercial airline industry using the empirical data of customers from two air carriers. It was found that the current levels of perceived service quality were below the potential of these air carriers; customer loyalty to air carriers was low, and the relationship between service quality and customer loyalty was significant. Santouridis and Trivellas (2010) investigated crucial factors leading to customer loyalty in the mobile telephone sector in Greece using residential non-business mobile phone users. Service quality was found to have a significant positive influence on customer satisfaction, which in turn had a significant positive influence on customer loyalty, and the mediation role of customer satisfaction on the service quality and customer loyalty relationship was also

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confirmed.

In this study, it is posited that excellent service quality on the part of a container shipping company will involve providing customers with satisfactory transit time reliability/length, quality sales personnel, and freight rates, among others, and this will be positively related to customers' attitudes, satisfaction, and behavioral intention toward the service and the company. Customers will be willing to build a long-term relationship with the company, engage in more business with it, and will recommend friends and peer firms to do business with the firm. Hence, it is posited that a high level of service quality would positively develop a high level of customer loyalty behavior. Thus, the following hypothesis is proposed:

H2: Service quality is positively related to customer loyalty.

Pi and Huang (2011) investigated the effect of relationship-orientated promotion on customer loyalty after subsuming the intermediate factor of relationship quality in the airline industry and found that customers with high relationship quality had positive feelings toward the company and believed that they were one of its members; therefore, they exhibited positive behavior leading to customer loyalty. Rauyruen and Miller (2007) provided a picture of how relationship quality (including trust, commitment, and satisfaction) influences customer loyalty in the business-to-business (B2B) context in Australian small-to-medium enterprises (SMEs) using 306 usable respondents and found that only the organizational level (but not the employee level) of relationship quality played a significant role in influencing B2B customer loyalty. Liu, Guo, and Lee (2011) found that relationship quality (e.g., satisfaction and trust) and switching barriers have positive effects on loyalty in the case of mobile telecommunications service firms and suggested that service providers should improve relationship quality and create switching barriers that would reduce the possibility of defection and in turn enhance customer loyalty. Giovanis, Athanasopoulou, and Tsoukatos (2015) explored the linkages among service fairness, service quality, relationship quality, and customer loyalty using 408 customers of auto repair and maintenance services and found that relationship quality (including satisfaction, trust, affective commitment) was the main determinant of customer loyalty. Lai (2014) investigated the role of service quality, perceived value, and relationship quality on customer loyalty with 270 usable responses of tourists and found that service quality and perceived value of a travel package were antecedent factors affecting relationship quality with a travel agency and that the three components (e.g., satisfaction, trust, commitment) of relationship quality significantly influenced customer loyalty to that agency. Luarn and Lin (2003) explored the antecedents of trust, customer satisfaction, attitudinal commitment, and perceived value on loyalty in an e-service context using 180

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respondents who used online traveling services and video on demand (VOD) in Taiwan and found that separate constructs of trust, customer satisfaction, perceived value, and commitment combined to determine loyalty and that commitment exerted a stronger influence than trust and customer satisfaction.

In this study, it is posited that excellent customer relationship quality on the part of a container shipping company will create the perception that the company will meet their needs and expectations. This in turn will reduce communication errors and make them feel that the company is reliable in terms of being trustworthy and keeping their best interests in mind when making important decisions. Thus, these customers will be willing to build long-term relationship with the company, engage in more business with it, and recommend that their friends and peer firms to do business with the firm. Hence, it is posited that a high level of relationship quality (including satisfaction, trust, and commitment) will positively develop a high level of customer loyalty behavior. The following hypothesis is thus proposed:

H3: Relationship quality is positively related to customer loyalty.

3.4 Perceived E-service

The advantages of the Internet as a transaction and communication channel include providing new opportunities for business. E-service is an interactive, content-centered, and internet-based customer service, driven by customers and integrated with related organizational customer support processes and technologies with the goal of strengthening the customer-service provider relationship (De Ruyter et al., 2001). It includes electronic communication, information gathering, transaction processing, and data interchange within and between businesses across time and space, and it is used by various industries to remain competitive in terms of cost and service quality. The role of e-service has been extensively applied in travel organizations (De Ruyter et al., 2001), airlines (Lee & Wu, 2011), internet services (Cristobal, Flavian, & Guinaliu, 2007), online shipping (Lee & Lin, 2005), the online market (Chang, Wang, & Yang, 2009) retailing (Trabold, Heim, & Field, 2006), university systems (Liao, Chen, & Yen, 2007) online retail financial services (Featherman, Miyazaki, & Sprott, 2010) and banking (Herington & Weaven, 2009). The issues tackled have included transaction customization in Circuitcity.com (Thirumalai and Sinha, 2011), brokerage service and personalized advice service provided by Ebay.com and Amazon.com (Xu, Benbasat, & Cenfetelli, 2013), Cyber University System (Liao et al., 2007), prompt replies to customer needs in Ctrip.com (Gu and Ye, 2014), and measurement of negative utility (potential losses) attributable to e-service adoption (Featherman & Pavlou, 2003).

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Perceived e-service commonly referred to a perceptions of web-based services (Rowley, 2006) or interactive services delivered on the Internet (Boyer, Hallowell, & Roth, 2002). Zhang, Prybutok, and Huang (2006) defined perceived e-service as a perception of the services provided through electronic channels that could potentially increase the quality of the service while examining the factors affecting user satisfaction with e-service using a questionnaire. Santos (2003) defined perceived e-service quality as overall customer perceptions, judgments, and evaluations of the quality of a service obtained from a virtual marketplace. Zeithaml (2002) defined perceived e-service quality as the perceived extent to which a website facilitates efficient and effective shopping and the purchase and delivery of goods and services. Cristobal et al. (2007) measured perceived e-service based on the SERVQUAL scale using four dimensions: web design, customer service, assurance, and order management. Further, the two factors that were found to most commonly determine why users accept or reject e-services were perceived usefulness and perceived ease of use. The technology acceptance model (TAM) originally proposed by Davis (1989) has clearly explained computer-usage behavior and addressed why users accept or reject information technology. Perceived usefulness refers to the degree to which a person believes that using a particular service will enhance his or her job performance, and in contrast, perceived ease of use refers to the degree to which a person believes that using a service will be free of effort (Liao et al., 2007; Venkatesh & Davis, 2000). Effort is a finite resource that a person may allocate to various activities for which he or she is responsible and where all else being equal, a service perceived to be easier to use than another is more likely to be accepted by users (Radner & Rothschild, 1975). In particular, Ha and Stoel (2009) used the TAM to understand consumer acceptance of e-shopping with 298 college students and provided important implications for e-retailers whose website developers must keep in mind that customers are not only web users with trust/safety and information needs, but also shoppers with service and experiential needs.

In this study, perceived e-service refers to the perception of an interactive, content-centered, and internet-based customer service integrated with a container shipping company's customer support processes and technologies with the goal of strengthening the customer-service provider relationship. It is a multidimensional construct with perceived usefulness and perceived ease of use and gives customers a superior experience in terms of electronic communication, information gathering, transaction processing, and data interchange within and between businesses across time and space. Perceived usefulness refers to the degree to which customers believe that using this container shipping company's e-services will enhance their job performance, and perceived ease of use refers to the degree to which customers believe that using this container shipping company's e-services will be free of effort.

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The relationship between perceived e-service and customer satisfaction have been investigated in the context of an airline service website (Lee & Wu, 2011), online shopping (Cristobal, et al., 2007), and a cyber university system (Liao et al., 2007). Lee and Wu (2011) surveyed 236 international travelers in Taiwan who had experience with purchasing airline tickets from travel websites and found that perceived trust and usefulness positively moderated the relationship between e-service quality, perceived service value, and service satisfaction. Cristobal et al. (2007) developed a multiple-item scale for measuring e-service quality and investigated the influence of perceived quality on consumer satisfaction levels and the level of website loyalty in the context of online shopping using 461 internet users who had visited, bought, or used the services offered by an internet service. It was found that perceived quality was a multidimensional construct of web design, where customer service, assurance, order management, and perceived quality positively influenced satisfaction, and satisfaction positively influenced consumer loyalty. Liao et al. (2007) devoted a great deal of effort to developing an integrated model designed to predict and explain the continued use of online services (a cyber university system) for 2,014 students based on the concepts of the TAM, the expectation disconfirmation model, and the theory of planned behavior and found that students' behavioral intention towards e-service continuance was determined by satisfaction and additionally affected by perceived usefulness and subjective norm. Chang et al. (2009) developed a comprehensive research model of electronic commerce to identify its antecedent and related research variables in Taiwan's online market in order to test the interrelationships among perceptions of e-service quality, customer satisfaction, and customer loyalty using 330 internet questionnaires. Their findings indicated that e-service quality influenced customer satisfaction and that in turn, it generated customer loyalty. Rust and Kannan (2003) compared e-service with traditional service by measuring customers' assessments of an organization's services and products and found that the enhancement of service operations improved customer satisfaction and retention. Thus, firms must take full advantage of net-based e-service opportunities, particularly in the transition of products to services, to garner long-term customer relationships and loyalty.

In this study, it is posited that excellent e-services on the part of a container shipping company will be perceived as useful and easy to use, will improve the job performance of customers and would increase their productivity and effectiveness, allow them to provide clear and an understandable e-services on the platform, to make correct shipping decisions, and to reply to customer problems immediately in the way that meets their needs and expectations, thus leading to positive perceptions on the part of customers. As a result, customers won't worry about the process of using e-services; their satisfaction, trust, and

doi:10.6844/NCKU201900868

commitment toward the service will be built, and the relationship quality between the company and customers will be improved. Hence, the following hypothesis is proposed:

H4: Perceived e-service is positively related to relationship quality.

3.5 Moderating Role of Perceived E-service

Perceived e-service has been found to be a critical factor in service operations (Roth & Menor, 2003) that increases the quality of services (Zhang et al., 2006) increases competitive capabilities that improve business performance (Oliveira, Roth, & Gilland, 2002) but reduce the cost of time and location-based activities because such activities become non-locational and non-temporal (Watson, Pitt, Berthon, & Zinkhan, 2002). E-service plays an indispensable role in the long-term trends of switching from a goods-based economy to a service-based economy with massive information embedded on electronic networks that offer tremendous opportunities for potential economic expansion (Taherdoost, Sahibuddin, & Jalaliyoon, 2014).

Reliable, high-quality services on the part of container shipping companies will improve the relationship quality between a company and its customers. At the same time, useful and easy to use e-services will endow customers with the ability to trace the location and condition of cargos using electronic data interchanges. No more obstacles exist for customers to utilize information flexibly and skillfully by themselves anytime and anywhere. Hence, customer satisfaction, trust, and commitment toward the container shipping company can be further strengthened. However, perceived useless and/or difficult to use e-services will result in delayed, incorrect, and missing information during the container shipping service process, so the relationship quality of a company and its degree of customer satisfaction is unlikely to be good. Despite the fact that a company may provide reliable, acceptable container shipping services, e-services that are perceived as poor will make customers feel worried about the cargo delivery process. As a consequence, a relationship quality between the company and its customers will be less likely. To summarize, perceptions that an e-service is useful and easy to use will reflect seamless and effective information transmission during the container shipping service process and further strengthen a strong linkage of the company to its customers. Thus, the following hypothesis is proposed:

H5a: Perceived e-service positively moderates the relationship between service quality and relationship quality.

Likewise, the reliable, acceptable service quality on the part of container shipping services will make customers willing to use the services continuously and cause them to

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build a long-term relationship with the company. Perceptions that e-services are useful and easy to use will further strengthen customer loyalty toward both the services and the company. Thus, the following hypothesis is proposed:

H5b: Perceived e-service positively moderates the relationship between service quality and customer loyalty.

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Chapter Four

Methodology

Based on the above discussions providing the theoretical background and a literature review, the research model together with the interrelationships between each construct is proposed. Using electronic customer relationship management to help container shipping companies will lead to better service quality and build better customer relationships, ever increasing customer loyalty that maximizes customer value. Also, the model illustrates how expectation confirmation theory is linked to service quality, relationship quality, and customer loyalty.

4.1 Research Model

Based on the theoretical background, the proposed research model constructed for the study is depicted in Figure 2. Relationship quality is divided into three factors: satisfaction, trust, and commitment. Perceived e-service is divided into two factors: perceived usefulness and perceived ease of use. Sequentially, service quality influences relationship quality and customer loyalty, and relationship quality influences customer loyalty. Perceived e-service has a direct influence on relationship quality and a moderating effect on the linkage of service quality to relationship quality and customer loyalty. The interrelationships between each construct in the research model are addressed below.

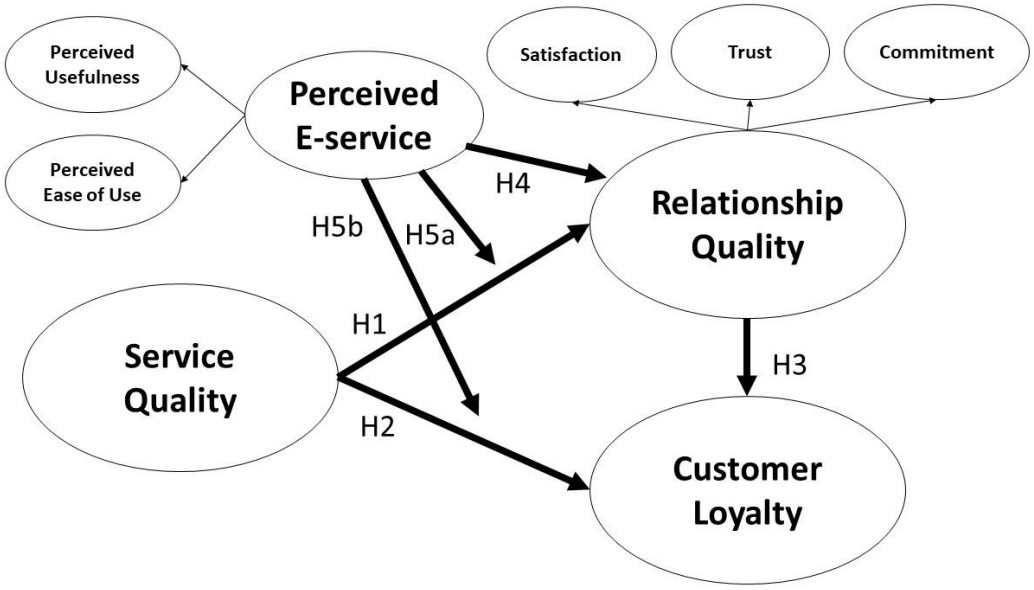

Figure 2 Proposed research model

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4.2 Measurement Development

In this study, the proposed research model presented in Figure 2 includes four constructs: service quality, relationship quality, customer loyalty, and perceived e-service, which are well-discussed in the literature. The structure of the questionnaire is organized into five parts. Part 1 surveys the demographic characteristics of respondents and their companies in a nominal scale such as years of tenure that the employee has worked in shipping industry, years that their company has been operating, job title, the number of workers in the company, the company ownership types, the main routes the respondent is responsible for, the shipping companies that the respondent mainly cooperates with, the e-service channels provided by shipping companies that the respondent uses, and the e-service items provided by the shipping companies that the respondent uses. Parts 2, 3, and 4 evaluate the respondent's perceptions of service quality, relationship quality, and customer loyalty toward their container shipping company, respectively. Part 5 evaluates the perceived e-services provided by the respondents' container shipping company. All the items in parts 1-5 are measured using a 5-point Likert scale, ranging from strongly disagree (1) to strongly agree (5). The measurement of the constructs is summarized as follows:

Service Quality

Service quality (SQ) is measured by twenty service attributes chosen and adapted from Brooks (1985; 1990), Matear and Gray (1993), Kent and Stephen Parker (1999), Maloni, et al. (2016), and Lu (2000; 2003). Respondents are asked to rate each of the following twenty service attributes: This container shipping company's "freight rates are reasonable;" "sailing is intensive;" "freight loss and damage control is good;" "transit time is fast;" "transit time is reliable;" "special equipment is complete;" "container condition is good;" "pick-up and delivery is on time;" "salesmanship quality is good;" "equipment is available;" "advertised sailing schedules are reliable;" "inland transportation is complete;" "finances are stable;" "documentation is accurate;" the container shipping company provides "direct sailings;" "complete door-to-door services;" "complete expedited shipments," and the container shipping company has "a claims process," "willingness to negotiate," and "a reasonable price and discount structure."

Relationship Quality

Relationship quality (RQ) is measured using three factors: satisfaction, trust, and commitment, chosen and adapted from Ulaga and Eggert (2006), Walter, Müller, Helfert, and Ritter (2003), and Luarn and Lin (2003). Respondents are asked to rate items addressing these three factors. Satisfaction consists of four items: "This container shipping company is successful;" "This container shipping company has met our

doi:10.6844/NCKU201900868

expectations;" "We are very pleased with what this container shipping company does for us;" and "All in all, we are very satisfied with this container shipping company." Trust consists of six items: "We believe that the container shipping company performs its tasks professionally;" "We believe that the container shipping company keeps our best interests in mind;" "We believe that the container shipping company considers our welfare as well as its own when making important decisions;" "We believe that the container shipping company is trustworthy;" "We believe that the container shipping company handles critical information on our company confidentially," and "The container shipping company is not always honest with us." Commitment consists of seven items: "The relationship with our container shipping company is something to which we are very committed;" "The relationship with our container shipping company is very important to our business;" "The relationship with our container shipping company is something our business intends to maintain indefinitely;" "The relationship with our container shipping company is something our business really cares about;" "The container shipping company is honest with us;" "The relationship with our container shipping company deserves our business' maximum effort to maintain;" and "It would be difficult to change our beliefs about this container shipping company."

Customer Loyalty

Customer loyalty (CL) is measured by six items, chosen and adapted from Palmatier, Scheer, and Steenkamp, (2007), Rapp, Beitelspacher, Grewal, and Hughes, (2013), and Hallowell (1996). Respondents are asked to rate the following six items: "For our next cargo transport, we will consider this container shipping company as our first choice;" "We will do more business with this container shipping company in the next few years;" " All else being equal, we plan to cooperate with this container shipping company;" " We say positive things about this container shipping company to peer industries;" " We would recommend this container shipping company to someone seeking our advice;" and " We encourage friends and peer industries to do business with this container shipping company."

Perceived E-service

Perceived e-service (PE) is measured by two factors: perceived usefulness and perceived ease of use, chosen and adapted from Lu, Lai, and Cheng, (2007), Wu, and Wu, (2005), Davis, (1989). Respondents are asked to rate items addressing these two factors. Perceived usefulness consists of six items: " Using this container shipping company's e-services will make it possible to complete tasks more quickly;" "Using this container shipping company's e-services will improve job performance;" "Using this container

doi:10.6844/NCKU201900868

shipping company's e-services will increase job productivity;" "Using this container shipping company's e-services will enhance our effectiveness on the job;" "Using this container shipping company's e-services will make it easier to do our job;" and "We find this container shipping company's e-services useful in our job." Perceived ease of use consists of six items: " Learning to operate this container shipping company's e-services is easy for us;" "It is easy to get the e-services of this container shipping company to do what we want them to do;" "Our interaction with this container shipping company's e-services is clear and understandable;" We find this container shipping company's e-services to be flexible to interact with;" "It is be easy to become skillful at using this container shipping company's e-services," and "I find this container shipping company's e-services easy to use."

The definitions of the constructs, factors, and questionnaire items, and reference sources are compiled in Table 5. All measurement items in English and Chinese are listed in appendices A and B.

doi:10.6844/NCKU201900868

Table 5 Definition and measurement of the variables

Construct	Definition	Scale Source	Item
Service Quality (SQ)	The cognitive judgment related to the superiority of a service. It measures how well the service level delivered matches customer expectations compared with some explicit or implicit standard.	● Grönroos (1984) ● Parasuraman et al. (1985; 1988)	SQ1-SQ20
Relationship Quality (RQ)	The overall assessment of the strength of a relationship between a company and its customers that meets the needs and expectations of the customers. It is a multidimensional construct with satisfaction, trust, and commitment. This intangible asset plays a critical role in long-term relationship maintenance.	● Levitt (1981) ● Hennig-Thurau and Klee (1997) ● Smith (1998) ● Garbarino and Johnson (1999) ● Kim and Cha (2002)	RQ1-RQ17
Customer Loyalty (CL)	The customers' commitment to do business with a particular company, purchasing its goods and services repeatedly, and recommending the services and products to friends and associates.	● Oliver, 1997 ● McIlroy and Barnett (2000)	CL1-CL6
Perceived E-service (PE)	Interactive, content-centered, and internet-based customer service, integrated with a company's customer support processes and technologies with the goal of strengthening the customer-service provider relationship. It is a multidimensional construct with perceived usefulness and perceived ease of use and gives customers a superior experience related to electronic communication, information gathering, transaction processing, and data interchange within and between businesses across time and space.	● Featherman and Pavlou (2003) ● Rowley (2006)	PE1-PE12

doi:10.6844/NCKU201900868

4.3 Data Collection and Sampling

The objective of this study is to investigate the linkages of service quality and relationship quality to customer loyalty and the moderating effect of perceived e-service on them. There are 54 questionnaire items out of four constructs in the current study, and the research object is targeted at the route operators of all 570 forwarders in the "International Ocean Freight Forwarders and Logistics Association Taiwan" list. There have been a few studies suggesting the minimum sample size used in a study. Krejcie and Morgan (1970) suggested a required sample size of at least 313 in a large population. MacCallum, Widaman, Zhang, and Hong (1999) suggested that when communalities are consistently low with many or all under 0.5, but there is high overdetermination of factors (e.g., six or seven items per factor and a rather small number of factors), large samples probably well over 100 are required. Hoelter (1983) suggested having 200 samples as a reasonable starting point regardless of the differences between the model and data. In similar studies of customer loyalty, the samples used were 214 in measuring the impact of corporate social responsibility on customer satisfaction, relationship maintenance and loyalty in the shipping industry in South Korea (Shin & Thai, 2015), 221 for business-to-business marketing service recovery and customer satisfaction issues in ocean shipping lines in Singapore (Durvasula, Lysonski, & Mehta, 2000), and 85 for the intention of shippers to use internet services in Taiwan liner shipping (Lu et al., 2007). Therefore, a sample size between 200 and 250 was preferred for the current study.

4.4 Analytical Procedure

In order to test the hypotheses proposed in this study, SPSS 17.0 and AMOS 21.0 statistical tools were employed to assist with and analyze the collected data. The data analysis process is illustrated in Figure 3.

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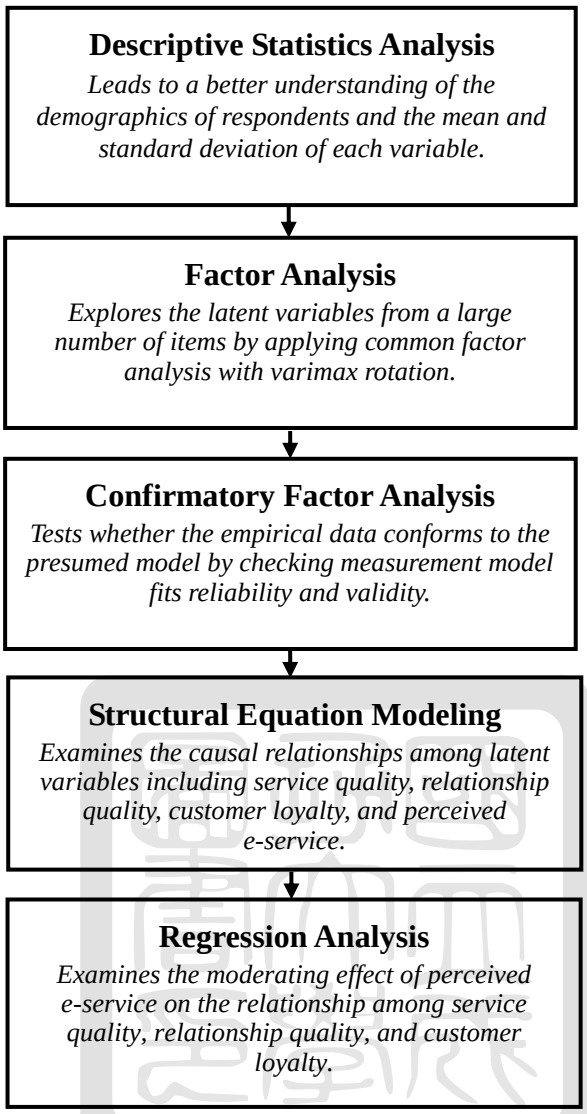

Figure 3 Analytical procedure

4.4.1 Descriptive Statistic Analysis

A descriptive statistics analysis was employed to provide a basic summary of the sample data through analyzing the demographic information of the respondents by examining the mean and standard deviation of each item in the constructs. In this study, the demographic information included the years the employee has worked in the shipping industry, the number of years that their company has been operating, their job title, the number of workers in the company, the company ownership types, the main routes the respondent is responsible for, the shipping companies that the respondent mainly cooperates with, the e-service channels provided by the shipping companies that respondents use, and the e-service items provided by the shipping companies that

doi:10.6844/NCKU201900868

respondents use. The mean and standard deviation of the items classified the respondents' attitude (the extent of agreement/disagreement) toward each item. An item with a higher mean indicated that the respondent agreed with it. Standard deviation was used to examine whether the respondents had a similar attitude pattern toward an item. An item with a lower standard deviation indicated that the respondents shared a similar attitude toward a given item.

4.4.2 Factor Analysis

In order to summarize a larger number of variables based on a smaller number of underlying dimensions, factor analysis (FA) is used as a statistical tool, for investigating variable for complex concepts (Stewart, 1981). The rotation method is adopted to help facilitate the explanation by adjusting the factor loadings to be more differentiated among the constructs. There are several choices for extraction and rotation when conducting a factor analysis (e.g., a principle component analysis and a common factor analysis). A varimax rotation has been used to transform a set of interrelated variables into a set of unrelated linear combinations of these variables (Churchill & Iacobucci, 2006). In general, items with factor loadings of less than 0.4 (a threshold commonly used for factor analysis results) or 0.5 should be dropped (Hulland, 1999), and the latent variables with eigenvalues of more than one should be retained (Kaiser, 1960). A principle component analysis with an orthogonal rotation (i.e., varimax) is the most frequently used technique for researchers when conducting a factor analysis (Ford, MacCallum, & Tait, 1986), and it is thus applied in this study.

4.4.3 Confirmatory Factor Analysis

In this study, a confirmatory factor analysis (CFA) was used as a statistical tool to confirm that the latent variables and underlying items were consistent with the hypotheses based on theories or previous analytical research. All of the items in this study were chosen and adopted from well-founded questionnaire in the past, and thus, an EFA was omitted from this analysis procedure, and only a CFA is used to examine the model. There are two steps used to conduct a CFA: analyzing model fits, followed by testing validity and reliability. Several common indices such as Chi-square, normed Chi-square index (NCI), goodness of fit index (GFI), adjusted goodness of fit index (AGFI), comparative fit index (CFI) and root mean square error of approximation (RMSEA) are adopted in determining model fits (Hair, Black, Babin, & Anderson, 2010). Chi-square is measured by the discrepancy between the observed covariance matrix and the presumed covariance matrix, where an insignificant result, a *p*-value over 0.05, is considered good model fit (Barrett, 2007). An NCI score lower than 3 is recommended to achieve good fit (Bollen, 1989; Hair

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et al., 2010). A CFI compares the Chi-square of an observed model with the Chi-square of an independent model in which variables are uncorrelated to one another (Bentler, 1990). Hu and Bentler (1999) and Sharma (1996) suggested that the CFI should be above 0.9 to reach an acceptable model fit. The GFI examines the ratio of variance and covariance taking into account the presumed model and the observed data (Jöreskog & Sörbom, 1984). The AGFI is another index similar to the GFI but it adjusts with degrees of freedom. The threshold for the GFI and AGFI should be above 0.85 and 0.8, respectively (Cole, 1987; Hair et al., 2010). Finally, the RMSEA estimates the error of approximation and takes degrees of freedom and sample size into account, meaning the index is not affected by model complexity and sample size (Fan, Thompson, & Wang, 1999). The acceptable value for the RMSEA is below 0.08 (Browne & Cudeck, 1992; Chen, Curran, Bollen, Kirby & Paxton, 2008; McDonald & Ho, 2002).

After checking for model fit, reliability and validity measures were conducted. Composite reliability (CR) was measured to identify the internal consistency of the latent variables. A higher CR score indicates that underlying items among latent variable are strongly related. The suggested threshold is above 0.7 (Mallat, Rossi, Tuunainen, & Ö örni, 2009). Convergent validity is used to test whether the measure is able to represent what the construct is supposed to represent. The average variance extracted (AVE) is calculated to help analyze convergent validity. The threshold for the AVE should be above 0.5. In contrast to convergent validity, discriminant validity tests whether two latent variables are uncorrelated. Discriminant validity is measured by observing a matrix composed of the square root of the AVE (in the diagonal of the correlation matrix) and correlations between latent variables (off diagonal) (Gefen & Straub, 2005). Diagonal values should be larger than the off diagonal values in the corresponding rows and columns in order to show good discriminant validity. The threshold of model fits suggested by these previous studies is listed at Table 6.

doi:10.6844/NCKU201900868

Table 6 Acceptable model fits

Index	Threshold	Source
p-value	> 0.05	Barrett (2007)
Chi-square/*df*	< 3	Bollen (1989); Hair et al. (2010)
Comparative fit index (CFI)	> 0.9	Hu and Bentler (1999); Sharma (1996)
Goodness of fit index (GFI)	> 0.85	Cole (1987)
Adjusted goodness of fit index (AGFI)	> 0.8	Hair et al. (2010)
Root mean square error of approximation (RMSEA)	< 0.08	Chen et al. (2008) Browne and Cudeck (1992)
Composite reliability (CR)	>0.7	Mallat et al. (2009)
Average variance extracted (AVE)	>0.5	Fornell and Larcker (1981)

4.4.4 Structural Equation Modeling

Structural equation modeling (SEM) is a statistical methodology applied to analyze the relationships between two constructs and to examine hypotheses. SEM provides simultaneous examinations of multiple dependence interrelationships and improves analytical results by incorporating latent variables accounting for measurement error (Hair et al., 2010). In this study, SEM was used to confirm the hypothetical interrelationships among service quality, relationship quality, customer loyalty, and perceived-service. The same as a CFA, SEM requires the fit indices of a measured model to reach a specific threshold. The criteria for the measurement model fit during the CFA process was adopted again to test the structural model.

Next, SEM was used to analyze the mediating effect of a variable (E) on the linkage of an independent variable (X) to a dependent variable (Y), as shown in Figure 4. The three steps used to test the mediating effect in the research model are as follows: First, regress the dependent variable Y on the independent variable X. If the regressor X is found to be insignificant, this indicates there is no mediation effect. Second, regress mediator E on the independent variable X. Likewise, if the regressor X is found to be insignificant, this also indicates there is no mediation effect. Last, regress the dependent variable Y on the independent variable X and the mediator E simultaneously. There will be two potential results: full mediation and partial mediation. If the regressor X is non-significant, this indicates that variable E fully mediates the two variables X and Y. However, if regressor X

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is significant but has a lower standardized path coefficient compared with the result of the first step, this indicates that variable E only partially mediates the two variables X and Y.

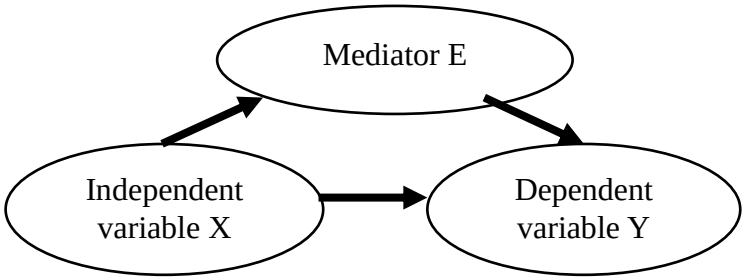

Figure 4 Mediation analysis

4.4.5 Regression Analysis

A regression analysis is employed to examine the moderating effect of a variable (Z) on the relationship of an independent variable (X) to a dependent variable (Y). It is a statistical method used to explore the relationships among a dependent variable and several independent variables (Aiken, West, & Reno, 1991). In general terms, a moderator may be a numeric or categorical variable that affects the direction or strength of the relationship between an independent variable and a dependent variable. Specifically, within a correlational analysis framework, a moderator is a third variable that affects the zero-order correlation between two other variables. Before conducting a regression analysis, a collinearity statistic must be tested. Collinearity illustrates that in a multiple regression model, one predictor variable can be linearly predicted from the others with a substantial degree of accuracy. The variance inflation factor (VIF) is the ratio of variance in a model with multiple terms divided by the variance of a model with one term alone, and it quantifies the severity of multicollinearity in an ordinary least squares regression analysis. It provides an index that measures how much the variance (the square of the estimate's standard deviation) of an estimated regression coefficient is increased because of collinearity.

The impact of covariate (Z) on the linkage of X and Y has two scenarios, as shown in Figure 5: (a) a basic moderation model and (b) a direct effect moderation model (Edwards & Lambert, 2007). The step for a moderation investigation are as follows: In a basic moderation model, the independent variable X only has a direct effect on the dependent variable Y. It represents an interaction between a focal independent variable and a factor that specifies the appropriate conditions for its operation. Baron and Kenny (1986) suggested regressing Y on X, Z, and the product of X and Z. The impact of the noise intensity as a predictor has an impact on the estimated coefficient of X; the impact of controllability as a moderator has an impact on the Z, and the interaction or product of

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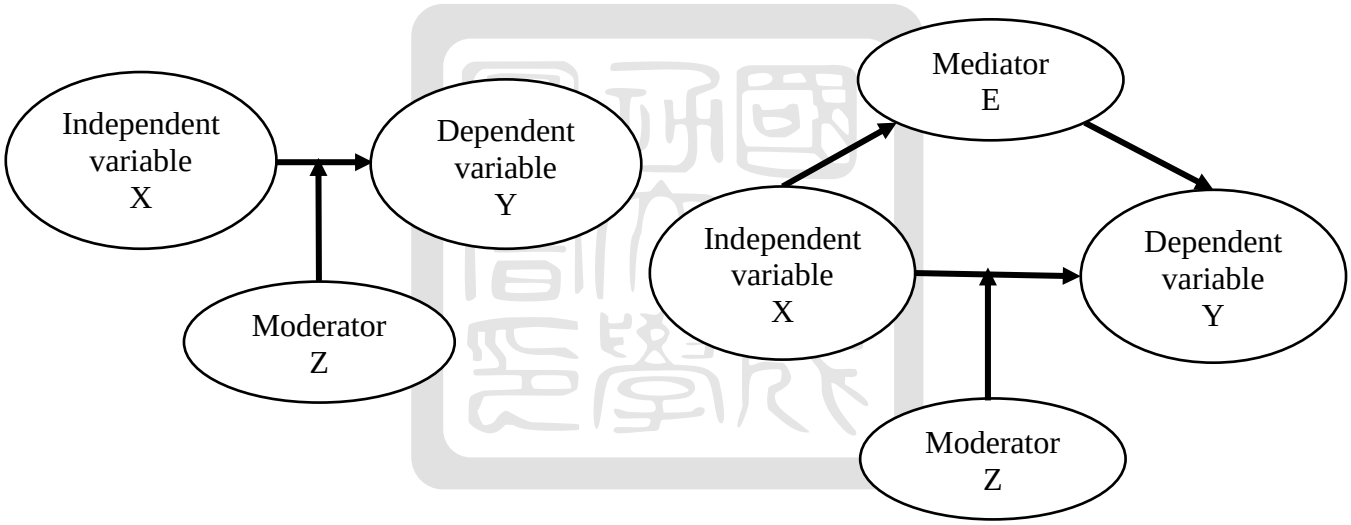
these two refer to that of X*Z. Hence, if the product of X and Z is significant, this indicates Z has the moderating effect on the linkage of X and Y and that the moderator hypothesis is supported. Otherwise, there is no moderation. Note that there may also be significant effects on the independent variable and the moderator, but these are not directly conceptually relevant to testing the moderator hypothesis. In a direct effect moderation model, the independent variable X has both a direct effect and an indirect effect (via the mediator E) on the dependent variable Y (Sharma, Durand, & Gur-Arie, 1981). Likewise, regress Y on X, the mediator E, the moderator Z, the product of X and E, and the product of X and Z. If the product of X and Z are significant, this indicates Z has a moderating effect on the linkage of X and Y. Otherwise, there is no moderation.



(a) Basic moderation model (b) Direct effect moderation model

Figure 5 Moderation analysis

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Chapter Five

Empirical Results

This chapter provides a discussion of the data collection and the analytical process. The data were analyzed using the research procedure proposed in Chapter Four. First of all, the characteristics of the respondents and the means and standard deviations of the items among the constructs are presented in the descriptive statistics. Then a confirmatory factor analysis (CFA) is conducted to examine the discrepancies between the hypotheses and empirical data and to test whether the proposed theoretical model fits the empirical data. Subsequently, structural equation modeling (SEM) is applied to test the causal model and to understand the relationship between constructs. Finally, a moderation analysis is conducted to examine the moderating role of perceived e-service on the relationship between service quality and relationship quality and the relationship between service quality and customer loyalty.

5.1 Descriptive Statistics Analysis

Questionnaires were collected through mail distribution during a two-month time period from February 2019 to March 2019. The questionnaire included 54 items measured on a 5-point Likert scale ranging from 1 for "strongly disagree" to 5 for "strongly agree." The research object was route operators of all the 570 forwarders in the "International Ocean Freight Forwarders and Logistics Association, Taiwan." With 3 questionnaires for each company, a total of 1,710 questionnaires were sent out. A total of 284 responses from 108 companies were collected (i.e., response rate = 16.6%). After deleting invalid samples (e.g., incomplete questionnaires, all items filled with the same or only two answers), 233 effective samples were collected (i.e., effective sample rate = 13.6%). In terms of confidence level and interval, a confidence level of 99% (Berkowitz, 2001; Jeltema & Profumo, 2016), 95% (Rorabacher, 1991; Junk, 1999), or 90% (Buckland, 1984) is usually recommended for selecting the minimum sample size. A case of a 90% confidence level with a 5% confidence interval would cover the 90% true value of all parameters plus-or-minus 5% (Buckland, 1984; Ding, Velicer, & Harlow, 1995), so it was determined that a minimum sample size of 233 was needed in this study.

5.1.1 Respondent Profile

The descriptive statistics of the respondents' demographic characteristics are summarized in Table 7. Of all 233 effective respondents, years that the employee had

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worked in the shipping industry ranged from less than 5 years (30.5%), more than 20 years (27.5%), 11-15 years (17.2%), 6-10 years (13.7%), and 16-20 years (11.2%). Years that their company has been operating ranged from 20 years (52.4%), 6-10 years (14.2%), under 5 years (12.0%), 11-15 years (10.7%), and 16-20 years (10.7%). The job titles of the respondents included staff (57.5%), top manager/manager and above (29.2%), and middle manager/section manager (13.3%). The ownership types of the companies included Taiwanese owned (69.5%), Taiwan and foreign joint operation (15.9%), and foreign branch (14.6%). The number of workers in the company ranged from 11-30 people (35.2%), under 10 people (25.3%), 101-500 people (13.7%), 31-50 people (11.6%), 51-100 people (6.4%), above 1,000 people (6.0%), and 501-1,000 people (1.7%). The main routes the respondents were responsible for included Hong Kong/Macao/China (26.2%), Southeast Asia (19.3%), Japan/Korea (17.2%), West Africa/South Africa (9.4%), the Mediterranean (6.0%), Australia/New Zealand (7.3%), United States/Canada (5.6%), Mexico/Central, South America/Caribbean Sea (5.2%), Nordic (2.6%), Western Europe (0.9%), and Middle East/India/Pakistan (0.4%). The shipping companies that the respondents mainly cooperated with included Evergreen (26.2%), Wan Hai (19.3%), Yang Ming (17.2), T.S. Line (9.9%), Ocean Network Express (7.3%), Maersk (6.4%), China COSCO (4.3%), Hapag-LIoyd (4.3%), CMA CGM (3.0%), Mediterranean (0.9%), Cheng Lie Navigation (0.4%), Hyundai Merchant Marine (0.4%), and Zim (0.4%). The e-service channels provided by the shipping companies that respondents used included e-mail (89.7%), e-commerce/website (79.8%), EDI (20.6%), social media (13.3%), and i-B/L/i-Dispatch (12.0%). The e-service items provided by the shipping companies that respondents used included sailing schedules (91.0%), vessel tracking (76.0%), cargo tracking (72.1%), booking (64.4%), B/L instruction (58.4%), EDI (19.8%), and customs inquiry (10.0%).

doi:10.6844/NCKU201900868

Table 7 Demographic characteristics

	Frequency	Percentage
Years of tenure that employee has worked in shipping industry		
Less than 5 years	71	30.5%
6-10 years	32	13.7%
11-15 years	40	17.2%
16-20 years	26	11.2%
More than 20 years	64	27.5%
Years that their company has been operating		
Under 5 year	28	12.0%
6-10 years	33	14.2%
11-15 years	25	10.7%
16-20 years	25	10.7%
Above 20 years	122	52.4%
Job title		
Staff	134	57.5%
Middle manager	31	13.3%
Top manager	68	29.2%
Number of workers in the company		
Under 10 people	59	25.3%
11-30 people	82	35.2%
31-50 people	27	11.6%
51-100 people	15	6.4%
101-500 people	32	13.7%
501-1,000 people	4	1.7%
Above 1,000 people	14	6.0%
Company ownership type		
Taiwanese owned	162	69.5%
Foreign branch	34	14.6%
Taiwan and foreign joint operation	37	15.9%
E-service channels		
E-mail	209	89.7%
E-commerce/Website	186	79.8%
Social media	31	13.3%
i-B/L/i-Dispatch	28	12.0%
EDI	48	20.6%

	Frequency	Percentage
Main routes the respondent is responsible for		
Hong Kong/Macao/China	61	26.2%
Japan/Korea	40	17.2%
Southeast Asia	45	19.3%
Middle East/India/Pakistan	1	0.4%
West Africa/South Africa	22	9.4%
Mediterranean	14	6.0%
Western Europe	2	0.9%
Nordic	6	2.6%
United States/Canada	13	5.6%
Mexico/Central, South America/Caribbean Sea	12	5.2%
Australia/ New Zealand	17	7.3%
Shipping companies that the respondent mainly cooperates with		
Evergreen	61	26.2%
Yang Ming	40	17.2%
Wan Hai	45	19.3%
Cheng Lie Navigation	1	0.4%
T.S. Line	23	9.9%
Maersk	15	6.4%
Mediterranean	2	0.9%
CMA CGM	7	3.0%
China COSCO	10	4.3%
Hapag-LIoyd	10	4.3%
Ocean Network Express	17	7.3%
Hyundai Merchant Marine	1	0.4%
Zim	1	0.4%
E-service items		
Sailing schedules	212	91.0%
Booking	150	64.4%
B/L instruction	136	58.4%
Vessel tracking	177	76.0%
Cargo tracking	168	72.1%
Customs inquiry	23	10.0%
EDI	46	19.8%

doi:10.6844/NCKU201900868

5.1.2 Mean and Standard Deviation of Items

The mean and standard deviations of the questionnaire items on a 5-point Likert scale for all four constructs are summarized in Table 8. The questionnaires included 54 items in total: 20 items for service quality (SQ), 16 items for relationship quality (RQ), 6 items for customer loyalty (CL), and 12 items for perceived e-service (PE).

In the service quality construct, the twenty items had a mean of 3.52. The items with the highest mean (3.72) were "This container shipping company's salesmanship quality is good (SQ9)" and "This container shipping company's finances are stable (SQ16)". The item with the lowest mean (3.16) was "This container shipping company has a claims process (SQ12)". In the relationship quality construct, the sixteen items had a mean of 3.69. The item with the highest mean (3.88) was "We believe that this container shipping company performs its tasks professionally (RQ1)," and the item with the lowest mean (3.47) was "We believe that this container shipping company considers our welfare as well as its own when making important decisions (RQ3)."

In the customer loyalty construct, the six items had a mean of 3.68. The item with the highest mean (3.74) was " For our next cargo transport, we will consider this container shipping company as our first choice (CL1)," and the item with the lowest mean (3.60) was "We encourage friends and peer industries to do business with this container shipping company (CL6)". In the perceived e-service construct, the twelve items had a mean of 3.77. The item with the highest mean (3.83) was "Using this container shipping company's e-services will make it possible to accomplish tasks more quickly (PE1)" and the item with the lowest mean (3.69) was "Using this container shipping company's e-services will increase productivity (PE3)."

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Table 8 The mean and standard deviations of the questionnaire items

Construct		Item	Item content	Mean	Standard deviation
Service Quality (SQ) 3.52		SQ1	This container shipping company's freight rates are reasonable.	3.42	0.722
		SQ2	This container shipping company's sailing frequency is intensive.	3.70	0.678
		SQ3	This container shipping company's freight loss and damage control is good.	3.25	0.736
		SQ4	This container shipping company's transit time is fast.	3.50	0.783
		SQ5	This container shipping company's transit time is reliable.	3.64	0.759
		SQ6	This container shipping company's special equipment is complete.	3.46	0.688
		SQ7	This container shipping company's container condition is good.	3.58	0.774
		SQ8	This container shipping company's pick-up and delivery is on time.	3.65	0.745
		SQ9	This container shipping company's salesmanship quality is good.	3.72	0.812
		SQ10	This container shipping company's equipment is available.	3.68	0.715
		SQ11	This container shipping company provides many direct sailings.	3.67	0.713
		SQ12	This container shipping company has a claims process.	3.16	0.798
		SQ13	This container shipping company's advertised sailing schedules are reliable.	3.61	0.819
		SQ14	This container shipping company's inland transportation is complete.	3.42	0.757
		SQ15	This container shipping company provides complete door-to-door services.	3.43	0.692
		SQ16	This container shipping company's finances are stable.	3.72	0.747
		SQ17	This container shipping company provides complete expedited shipping.	3.42	0.762
		SQ18	This container shipping company's documentation is accurate.	3.68	0.795
		SQ19	This container shipping company has the willingness to negotiate.	3.43	0.807
		SQ20	This container shipping company has a reasonable price and discount structure.	3.32	0.805
Relationship Quality	Trust (RT) 3.70	RQ1	We believe that container shipping company performs its tasks professionally.	3.88	0.727
		RQ2	We believe that container shipping company keeps our best interests in mind.	3.48	0.851
		RQ3	We believe that container shipping company considers our welfare as well as its own when making important decisions.	3.47	0.891
		RQ4	We believe that container shipping company is trustworthy.	3.75	0.788
		RQ5	We believe that container shipping company handles critical information about our company confidentially.	3.82	0.754
	Satisfaction (RS) 3.67	RQ6	The container shipping company is always honest with us.	3.77	0.770
		RQ7	This container shipping company is successful.	3.78	0.805
		RQ8	This container shipping company has met our expectations.	3.61	0.763
		RQ9	We are very pleased with what the container shipping company does for us.	3.67	0.798
		RQ10	All in all, we are very satisfied with this container shipping company.	3.61	0.775

doi:10.6844/NCKU201900868

(RQ) 3.69	Commitment (RC) 3.69	RQ11	The relationship with our container shipping company is something to which we are very committed.	3.75	0.687
		RQ12	The relationship with our container shipping company is very important to our business.	3.73	0.707
		RQ13	The relationship with our container shipping company is something our business intends to maintain indefinitely.	3.57	0.774
		RQ14	The relationship with our container shipping company is something our business really cares about.	3.70	0.733
		RQ15	The relationship with our container shipping company deserves our business' maximum effort to maintain.	3.79	0.683
		RQ16	It would be difficult to change our beliefs about this container shipping company.	3.59	0.732
Customer Loyalty (CL) 3.68		CL1	For our next cargo transport, we will consider this container shipping company as our first choice.	3.74	0.698
		CL2	We will do more business with this container shipping company in the next few years.	3.69	0.720
		CL3	All else being equal, we plan to cooperate with this container shipping company.	3.71	0.755
		CL4	We say positive things about this container shipping company to peer industries.	3.67	0.729
		CL5	We would recommend this container shipping company to someone seeking our advice.	3.65	0.768
		CL6	We encourage friends and peer industries to do business with this container shipping company.	3.60	0.776
Perceived E-service (PE) 3.77	Perceived Usefulness (PU) 3.78	PE1	Using the e-services of this container shipping company will make it possible to complete tasks more quickly.	3.83	0.795
		PE2	Using the e-services of this container shipping company will improve our job performance.	3.79	0.772
		PE3	Using the e-services of this container shipping company will increase job productivity.	3.69	0.799
		PE4	Using the e-services of this container shipping company will enhance our effectiveness on the job.	3.79	0.764
		PE5	Using the e-services of this container shipping company makes it easier to do our job.	3.75	0.804
		PE6	We find the e-services of this container shipping company useful in our job.	3.82	0.771
	Perceived Ease of Use (PEOU) 3.75	PE7	Learning to operate the e-services of this container shipping company was easy for us.	3.81	0.836
		PE8	We find it easy to get the e-services of this container shipping company to do what we want them to do.	3.71	0.771
		PE9	Our interaction with the e-services of this container shipping company is clear and understandable.	3.77	0.764
		PE10	We find the e-services of this container shipping company to be flexible to interact with.	3.70	0.758
		PE11	It will be easy for us to become skillful at using the e-services of this container shipping company.	3.79	0.802
		PE12	I find the e-services of this container shipping company easy to use.	3.73	0.805

Note: The number in the parenthesis represents the means of the item in that construct/factor.

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5.1.3 Analysis of Variance Analysis

An analysis of variance analysis (ANOVA) was applied to examine the differences among the demographic characteristics towards the scale of a given variable by utilizing SPSS 17.0 statistical tools. The examined demographic characteristics included years that the employee had worked in the shipping industry, years that their company has been operating, job title, the number of workers in the company, company ownership types, the main routes the respondent is responsible for, shipping company that the respondent mainly cooperates with, e-service channels provided by the shipping companies the respondents use, and e-service items provided by the shipping companies used by the respondents. Before conducting the ANOVA analysis, the assumption of homogeneity of variance had to be examined. Levene's *F* test is widely used to test for unequal variance where the *p*-value should exceed 0.05 to accept the null hypothesis, indicating that the variances are homogeneous (Lim & Loh, 1996; Choi, Pae, Park, & Wright, 2010).

The variances of service quality were found to be equal for years that employee had worked in shipping industry, years that their company has been operating, job title, number of workers in the company, company ownership types, and the main routes the respondent is responsible for, but were found to be unequal on the scale of the shipping company that the respondent mainly cooperates with, e-service channels provided by shipping companies that used by the respondents, and e-service items provided by the shipping companies used by the respondents (see Table 9). The variances in relationship quality were found to be equal on all the demographic characteristics (see Table 10). Finally the variances of customer loyalty and perceived e-service were found to be equal on all the demographic characteristics except for e-service items provided by shipping companies used by the respondents (see Tables 11 and 12).

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Table 9 Test of homogeneity of variances in service quality

Scale	*F*	*p*
Years that employee had worked in the shipping industry	0.007	0.993
Years that their company has been operating	0.307	0.736
Job title	1.051	0.351
Number of workers in the company	0.676	0.510
Company ownership type	0.916	0.402
Main routes for which the respondent is responsible	0.280	0.756
Shipping companies that the respondent mainly cooperates with	4.366	0.014*
E-service channels	3.441	0.034*
E-service items	4.939	0.008*

*Reject null hypothesis

Table 10 Test of homogeneity of variances in relationship quality

Scale	*F*	*p*
Years that the employee had worked in the shipping industry	2.653	0.072
Years that their company has been operating	0.124	0.883
Job title	0.729	0.483
Number of workers in the company	0.188	0.829
Company ownership type	0.681	0.507
Main routes for which the respondent is responsible	2.051	0.131
Shipping companies that the respondent mainly cooperates with	2.331	0.099
E-service channels	0.212	0.809
E-service items	2.364	0.096

*Reject null hypothesis

Table 11 Test of homogeneity of variances in customer loyalty

Scale	*F*	*p*
Years that the employee had worked in the shipping industry	0.921	0.399
Years that their company has been operating	1.535	0.217
Job title	0.105	0.900
Number of workers in the company	1.785	0.170
Company ownership type	0.814	0.444
Main routes for which the respondent is responsible	0.719	0.488
Shipping companies that the respondent mainly cooperates with	1.834	0.162
E-service channels	0.047	0.954
E-service items	3.718	0.026*

*Reject null hypothesis

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Table 12 Test of homogeneity of variances in perceived e-service

Scale	*F*	*p*
Years that the employee had worked in the shipping industry	1.146	0.319
Years that their company has been operating	0.318	0.728
Job title	0.483	0.618
Number of workers in the company	2.717	0.068
Company ownership type	0.206	0.814
Main routes for which the respondent is responsible	1.677	0.189
Shipping companies that the respondent mainly cooperates with	0.877	0.417
E-service channels	1.072	0.344
E-service items	4.158	0.017*

*Reject null hypothesis

Next, the scales with homogeneous variances were tested with the Scheffe's method, and the scales with non-homogeneous variances were tested with the Games-Howell post hoc test (Ruxton & Beauchamp, 2008). The post hoc analysis for service quality revealed there to be apparent differences ($p < 0.05$) found only in the scales of e-service items provided by shipping companies used by the respondents. The ANOVA results are shown in Table 13 and Table 14. It was found that when more e-service items were provided by the container shipping company, the respondents perceived a higher level of service quality.

The post hoc analysis for relationship quality revealed that there were apparent differences ($p < 0.05$) found only in the scales of number of workers in the company and e-service items provided by shipping companies used by the respondents. The ANOVA results are shown in Table 15. It was found that the respondents who worked in small-sized companies (below 51 persons) had the highest level of relationship quality with their container shipping company, but those in medium-sized companies (51-500 persons) had the lowest level of relationship quality with their container shipping company. Further, when the respondents used more container shipping company e-service items, they had a higher the level of relationship quality with them.

Likewise, the post hoc analysis for customer loyalty revealed that there were apparent differences ($p < 0.05$) found only in the scales of the number of workers in the company. The ANOVA results are shown in Table 16 and Table 17. It was found that the respondents who worked in small-sized companies (below 51 persons) had the highest level of customer loyalty toward their container shipping company, but those in

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medium-sized companies (51-500 persons) had the lowest level of customer loyalty toward their container shipping company.

The explanations of the above results are as follows: In small-sized companies, an operator might be responsible for many shipping routes. Specific and relatively few container shipping companies would be selected and used in the provision of forwarding businesses due to manpower limitations. Thus, these operators would have higher levels of the relationship quality and customer loyalty with their container shipping companies as compared to forwarders at other scales. In medium-sized companies, each shipping route may be in run by a specialized operator. They are relatively sensitive to freight rates and profit due to company expansion. Thus, the relationship quality and customer loyalty with their container shipping companies would be weaker than forwarders at other scales.

Finally, the post hoc analysis for perceived e-service revealed there were apparent differences ($p < 0.05$) found in both the scale of shipping company that the respondent mainly cooperated with and the scale of the e-service items. The ANOVA results are shown in Table 18 and Table 19. It was found that the respondents who mainly cooperated with the top 6-10 container shipping companies had the highest level of perceived e-service, but those who mainly cooperated with the top 1-5 container shipping companies had the lowest level of perceived e-service. Also, when the respondents used more e-service items of the container shipping company, they had higher levels of perceived e-service.

In the collected data, the top 6-10 global shipping companies (51.1%) were the ones the forwarders mostly cooperated with, followed by small-sized shipping companies (30%) and top 1-5 shipping companies (18.9%). Therefore, it was not the case that, in Taiwan, bigger shipping companies had more business from forwarders. Of all the forwarders in Taiwan, 73% of the respondents mainly cooperated with Taiwan-based container shipping companies (i.e., Evergreen, Yang Ming, Wan Hai, Cheng Lie Navigation, and T.S. Line). In particular, Evergreen (26.2%) and Yang Ming (17.2%) were listed among the top 6-10 global shipping companies despite the fact that the other three were classified as small-sized shipping companies. These Taiwan-based container shipping companies provided forwarders with localized services, and thus, the forwarders had better service experiences or equivalently, high levels of perceived e-service for the top 6-10 shipping companies.

doi:10.6844/NCKU201900868

Table 13 ANOVA results in service quality (Scheffe)

Scale	Level	Mean	SD	*F*	*p*	Post hoc (Scheffe)
Years the employee has worked in shipping industry	1 Below 11 years	3.59	0.572	0.554	0.575	
	2 11-20 years	3.53	0.556			
	3 Above 20 years	3.50	0.541			
Years that their company has been operating	1 Below 11 years	3.55	0.557	0.722	0.487	
	2 11-20 years	3.62	0.504			
	3 Above 20 years	3.51	0.580			
Job title	1 Staff	3.57	0.547	0.340	0.712	
	2 Middle manager	3.54	0.503			
	3 Top manager	3.50	0.609			
Number of workers in the company	1 Below 51 persons	3.58	0.548	1.203	0.302	
	2 51-500 persons	3.46	0.575			
	3 Above 500 persons	3.47	0.600			
Company ownership type	1 Taiwanese owned	3.51	0.572	1.998	0.138	
	2 Foreign branch	3.53	0.563			
	3 Taiwan and foreign joint operation	3.71	0.477			
Main routes for which the respondent is responsible	1 Asia	3.53	0.556	0.921	0.400	
	2 Europe/Africa	3.48	0.512			
	3 America/Australia	3.63	0.600			

Table 14 ANOVA results in service quality (Games-Howell)

Scale	Level	Mean	SD	*F* (Welch)	*p* (Welch)	Post hoc (Games-Howell)
Shipping companies that the respondent mainly cooperates with	1 Top 5 shipping companies	3.44	0.485	1.647	0.198	
	2 Top 6-10 shipping companies	3.60	0.506			
	3 Small shipping companies	3.52	0.656			
E-service channels	1 Using 1 channel	3.51	0.619	0.165	0.848	
	2 Using 2 channels	3.55	0.507			
	3 Using above 2 channels	3.57	0.599			
E-service items	1 Using 1-2 item	3.28	0.673	4.141	0.021	3>2>1
	2 Using 3-5 items	3.59	0.497			
	3 Using above 5 items	3.66	0.636			

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Table 15 ANOVA results in relationship quality (Scheffe)

Scale	Level	Mean	SD	*F*	*p*	Post hoc (Scheffe)
Years that the employee has worked in the shipping industry	1 Below 11 years	3.80	0.763	1.151	0.318	
	2 11-20 years	3.68	0.523			
	3 Above 20 years	3.66	0.607			
Years that their company has been operating	1 Below 11 years	3.73	0.648	2.833	0.061	
	2 11-20 years	3.91	0.682			
	3 Above 20 years	3.65	0.645			
Job title	1 Staff	3.77	0.693	1.595	0.205	
	2 Middle manager	3.54	0.633			
	3 Top manager	3.73	0.589			
Number of workers in the company	1 Below 51 persons	3.81	0.659	5.030	0.007	1>3>2
	2 51-500 persons	3.48	0.640			
	3 Above 500 persons	3.65	0.566			
Company ownership type	1 Taiwanese owned	3.73	0.685	1.560	0.212	
	2 Foreign branch	3.57	0.571			
	3 Taiwan and foreign joint operation	3.84	0.604			
Main routes for which the respondent is responsible	1 Asia	3.68	0.687	1.236	0.292	
	2 Europe/Africa	3.76	0.522			
	3 America/Australia	3.85	0.652			
Shipping companies that the respondent mainly cooperates with	1 Top 5 shipping companies	3.67	0.523	1.098	0.335	
	2 Top 6-10 shipping companies	3.78	0.654			
	3 Small shipping companies	3.64	0.733			
E-service channels	1 Using 1 channel	3.68	0.637	0.375	0.687	
	2 Using 2 channels	3.71	0.665			
	3 Using above 2 channels	3.78	0.668			
E-service items	1 Using 1-2 item	3.50	0.783	3.329	0.037	3>2>1
	2 Using 3-5 items	3.76	0.618			
	3 Using above 5 items	3.86	0.653			

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Table 16 ANOVA results in customer loyalty (Scheffe)

Scale	Level	Mean	SD	*F*	*p*	Post hoc (Scheffe)
Years that the employee has worked in the shipping industry	1 Below 11 years	3.68	0.732	0.601	0.549	
	2 11-20 years	3.72	0.579			
	3 Above 20 years	3.59	0.707			
Years that their company has been operating	1 Below 11 years	3.72	0.713	2.517	0.083	
	2 11-20 years	3.83	0.571			
	3 Above 20 years	3.59	0.697			
Job title	1 Staff	3.67	0.691	0.609	0.545	
	2 Middle manager	3.56	0.650			
	3 Top manager	3.72	0.680			
Number of workers in the company	1 Below 51 persons	3.74	0.651	3.101	0.047	1>3>2
	2 51-500 persons	3.49	0.764			
	3 Above 500 persons	3.54	0.643			
Company ownership type	1 Taiwanese owned	3.64	0.694	1.283	0.279	
	2 Foreign branch	3.67	0.658			
	3 Taiwan and foreign joint operation	3.83	0.645			
Main routes for which the respondent is responsible	1 Asia	3.63	0.698	0.929	0.397	
	2 Europe/Africa	3.74	0.588			
	3 America/Australia	3.76	0.660			
Shipping companies that the respondent mainly cooperates with	1 Top 5 shipping companies	3.59	0.600	0.568	0.567	
	2 Top 6-10 shipping companies	3.70	0.625			
	3 Small shipping companies	3.62	0.802			
E-service channels	1 Using 1 channel	3.70	0.721	0.096	0.908	
	2 Using 2 channels	3.65	0.668			
	3 Using above 2 channels	3.68	0.680			

Table 17 ANOVA results in customer loyalty (Games-Howell)

Scale	Level	Mean	SD	*F* (Welch)	*p* (Welch)	Post hoc (Games-Howell)
E-service items	1 Using 1-2 item	3.44	0.879	2.368	0.103	
	2 Using 3-5 items	3.69	0.617			
	3 Using above 5 items	3.84	0.678			

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Table 18 ANOVA results in perceived e-service (Scheffe)

Scale	Level	Mean	SD	*F*	*p*	Post hoc (Scheffe)
Years that the employee has worked in the shipping industry	1 Below 11 years	3.81	0.778	0.270	0.763	
	2 11-20 years	3.74	0.636			
	3 Above 20 years	3.76	0.618			
Years that their company has been operating	1 Below 11 years	3.78	0.648	0.800	0.451	
	2 11-20 years	3.87	0.651			
	3 Above 20 years	3.73	0.733			
Job title	1 Staff	3.79	0.783	0.280	0.756	
	2 Middle manager	3.81	0.610			
	3 Top manager	3.72	0.650			
Number of workers in the company	1 Below 51 persons	3.83	0.638	2.415	0.092	
	2 51-500 persons	3.65	0.806			
	3 Above 500 persons	3.57	0.806			
Company ownership type	1 Taiwanese owned	3.77	0.676	1.018	0.363	
	2 Foreign branch	3.65	0.672			
	3 Taiwan and foreign joint operation	3.88	0.798			
Main routes for which the respondent is responsible	1 Asia	3.77	3.633	0.060	0.942	
	2 Europe/Africa	3.78	3.673			
	3 America/Australia	3.81	3.809			
Shipping companies that the respondent mainly cooperates with	1 Top 5 shipping companies	3.59	0.712	4.958	0.008	2>3>1
	2 Top 6-10 shipping companies	3.91	0.656			
	3 Small shipping companies	3.65	0.710			
E-service channels	1 Using 1 channel	3.70	0.655	0.912	0.403	
	2 Using 2 channels	3.75	0.680			
	3 Using above 2 channels	3.86	0.750			

Table 19 ANOVA results in perceived e-service (Games-Howell)

Scale	Level	Mean	SD	*F* (Welch)	*p* (Welch)	Post hoc (Games-Howell)
E-service items	1 Using 1-2 item	3.44	0.763	4.690	0.013	3>2>1
	2 Using 3-5 items	3.83	0.627			
	3 Using above 5 items	3.89	0.854			

5.2 Factor Analysis

Before conducting the factor analysis, the Kaiser-Meyer-Olkin (i.e., KMO) test proposed by Kaiser (1960) was used to test the partial correlations among the constructs. The value of the KMO ranges from 0 to 1, and researchers suggest that it should exceed 0.8 for meritorious appropriateness of the proceeding factor analysis (Hair et al., 2010). In this study, the KMO score calculated using SPSS 17 was 0.962, which is considered applicable for a factor analysis.

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In the model, a principal component analysis with varimax rotation was applied to conduct the factor analysis. A total of two factors were extracted with eigenvalues of 1.0 or greater, accounting for 57.671% of total cumulative variance. Among the original items, SQ17, SQ1, SQ6, and SQ11 were dropped because of cross loading (i.e., the highest factor loading minus the second highest factor loading was less than 0.3) (Lessiter, Freeman, Keogh, & Davidoff, 2001). After the elimination of the four items, these two factors accounted for 60.504% of total cumulative variance. The final results of the factor analysis are shown in Table 20.

Table 20 Principal component analysis with varimax

Scale item	Factor Loading	
	Factor 1	**Factor 2**
SQ2	**.775**	.116
SQ3	**.699**	.398
SQ4	**.693**	.288
SQ5	**.757**	.329
SQ7	**.772**	.191
SQ8	**.738**	.418
SQ10	**.723**	.261
SQ13	**.690**	.350
SQ14	**.658**	.357
SQ15	**.633**	.326
SQ16	**.672**	.372
SQ9	.391	**.691**
SQ12	.376	**.683**
SQ18	.295	**.698**
SQ19	.213	**.811**
SQ20	.165	**.817**
Eigenvalue	**8.438**	**1.243**
Cumulative variance (%)	**52.736**	**60.504**

- Factor 1 (Facilities and Reliability, FR)

The eigenvalue of this factor was 8.438 and the percentage of variance explained was 52.736%. Facilities and reliability refers to the service quality level of the container shipping company in providing a complete infrastructure and reliable service. Factor 1 includes eleven items: This container shipping company's "sailing frequency is intensive;" "freight loss and damage control is good;" "transit time is fast;" "transit time is reliable;"

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“container condition is good;” “pick-up and delivery is on time;” “equipment is available;” “advertised sailing schedules are reliable;” “inland transportation is complete;” “finances are stable;”, and “This container shipping company provides complete door-to-door services”.

- Factor 2 (Sales Service, SS)

The eigenvalue for this factor was 1.243, and the percentage of variance explained was 7.768%. Sales service refers to the service quality level of the container shipping company in the transaction process and pricing when matching customer needs. Factor 2 includes five items: This container shipping company’s “salesmanship quality is good;” “documentation is accurate;” and the container shipping company has “a claims process,” “ willingness to negotiate,” and “a reasonable price and discount structure.”

5.3 Confirmatory Factor Analysis

AMOS 21.0 was utilized to conduct CFA on the latent variables and observe the of service quality, relationship quality, customer loyalty, and perceived e-service items (see Figure 4).

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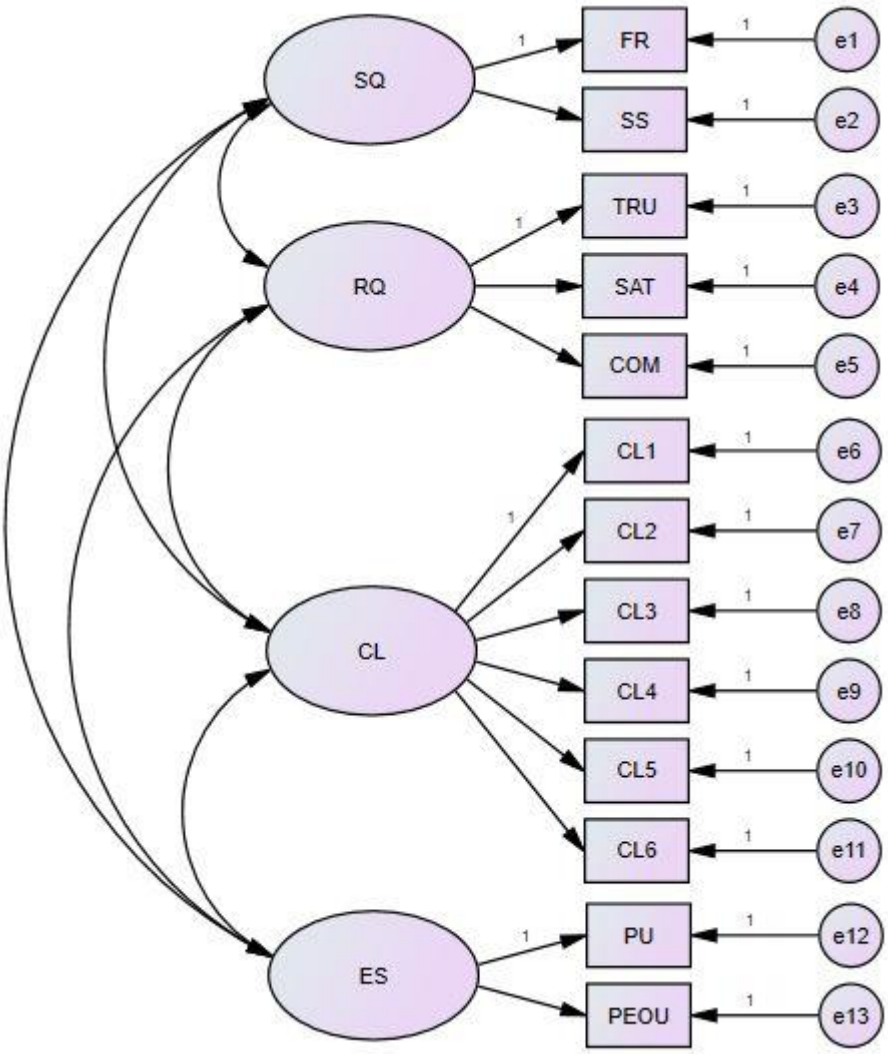

Figure 6 Confirmatory factor analysis model

The measurement items were developed and used based on the theoretical insights found in the past literature. To ensure the reliability of all the scales, the Cronbach's alpha for each construct is suggested to be no less than the acceptable threshold of 0.7, the good threshold of 0.8, or the excellent threshold of 0.9, and each factor loading item should be greater than 0.5 (Hair, Anderson, Tatham, & Black, 1998; Bagozzi & Yi, 1988). Of all the constructs, service quality (0.934), relationship quality (0.962), customer loyalty (0.930), and perceived e-service (0.969) exhibited excellent alpha values. A CFA was conducted to analyze the relationships among the constructs and was estimated using several criteria, including Chi-square, goodness of fit index (GFI), adjusted goodness of fit index (AGFI), comparative fit index (CFI), and the root mean square error of approximation (RMSEA). The GFI examines the ratio of variance and covariance accounted for by the presumed model and observed data and the AGFI, another index similar to the GFI, further adjusts

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the GFI according to degrees of freedom (Jöreskog & Sörbom, 1984). The GFI and AGFI scales range from 0 to 1. It is suggested that the thresholds for GFI and AGFI should be above 0.85 and 0.8, respectively (Seyal, Rahman, & Rahim, 2002). Hu and Bentler (1999) suggested the CFI to be above 0.9 in order to reach an acceptable model fit. Finally, the RMSEA estimates the error of approximation and takes degrees of freedom and sample size into account, implying the index is not affected by model complexity and sample size (Fan et al., 1999). An acceptable value below 0.08 for the RMSEA is considered a good fit (McDonald & Ho, 2002).

The measurement model showed overall good model fit. A summary for the model fit of the CFA estimates in the final model is provided in Table 21. Although the *p*-value did not exceed the value of 0.05, previous studies indicated that it was sensitive to sample size and recommend using the Chi-square/*df* instead in such cases (Hair et al., 1998). The Chi-square/*df* (2.381 = 140.463/59) was calculated to have a value below 3, which was within the acceptable interval. The GFI (0.916) and the AGFI (0.871) were higher than the suggested thresholds of 0.85 and 0.8, respectively. In addition, the CFI (0.972) was above 0.9, and the RMSEA (0.077) was lower than 0.08. Overall, the final model demonstrated good model fit.

Table 21 Model fit of CFA estimates

Fit measures	Result	Threshold	Resource
p-value	0	> 0.05	Barrett (2007)
Chi-square/*df*	2.381	< 3	Bollen (1989); Hair et al. (2010)
Comparative fit index (CFI)	0.972	> 0.9	Hu and Bentler (1999); Sharma (1996)
Goodness-of-fit (GFI)	0.916	> 0.85	Cole (1987)
Adjusted GFI (AGFI)	0.871	> 0.8	Hu and Bentler (1999)
Root mean square error of approximation (RMSEA)	0.077	< 0.08	McDonald and Ho (2002)

After completing the model fit indices, the next step in the CFA is to verify the reliability and validity of the model. Reliability is measured by the composite reliability (CR) to identify the internal consistency of the latent variables. The CR scores for all constructs are shown in Table 22 and range from 0.853 to 0.944, which were all higher than the suggested level of 0.7, indicating good reliability and internal consistency for all the constructs (Fornell & Larcker, 1981).

The average variance extracted (AVE) was calculated to evaluate the convergent validity of the final model, where the threshold is suggested to be above 0.5 with a value lower than the corresponding CR score. It can be observed in Table 22 that all of the AVE values were higher than 0.5, ranging from 0.739 to 0.873 and that all of the constructs had

doi:10.6844/NCKU201900868

AVE scores lower than the CR values. Next, discriminant validity was tested to confirm that no item from one construct correlated more strongly with an item from another construct. This was examined by comparing the square root of the AVE for each construct and the correlations between latent variables (Gefen, Straub, & Boudreau, 2000). As shown in Table 23, the square roots of the AVE ranged from 0.860 to 0.934 (displayed on the diagonal of the correlation matrix), which were greater than the correlations between the latent variables in the corresponding rows and columns (as displayed on the off-diagonal). To summarize, the measurement model showed good convergent validity and discriminant validity. Therefore, it was appropriate to conduct an SEM for the purpose of testing the proposed hypotheses.

Table 22 Convergent validity estimates

Construct	Factor	Standardized factor loading	CR	AVE	Cronbach's Alpha
Service Quality (SQ)	FR	0.852	0.853	0.743	0.934
	SS	0.872			
Relationship Quality (RQ)	TRU	0.923	0.924	0.803	0.962
	SAT	0.891			
	COM	0.874			
Customer Loyalty (CL)	CL1	0.835	0.944	0.739	0.930
	CL2	0.795			
	CL3	0.851			
	CL4	0.886			
	CL5	0.892			
	CL6	0.894			
Perceived E-service (PE)	PU	0.963	0.932	0.873	0.969
	PEOU	0.905			

Table 23 Discriminant validity estimates

Construct	SQ	RQ	CL	PE
Service Quality (SQ)	**0.862**			
Relationship Quality (RQ)	0.853	**0.896**		
Customer Loyalty (CL)	0.815	0.846	**0.860**	
Perceived E-service (PE)	0.700	0.724	0.713	**0.934**

Note: Diagonal elements represent the square roots of average variance extracted (AVE) values by each construct (in bold), and off-diagonal elements are correlations between latent variables.

doi:10.6844/NCKU201900868

5.4 Structural Equation Modeling

A structural equation model (SEM) was conducted to analyze the overall model fit and the causal relationships between the constructs of the final model proposed in the study utilizing AMOS 21.0 software. The fit indices of the final model are shown as Table 24. The path coefficients and *t*-values are shown in Figure 5 and Table 25. Although the *p*-value (0) didn't meet the recommended score of 0.05, the alternative chi-square/*df* (2.446=146.787/60) had a score below 3, passing the suggested threshold. The model also had a good fit for GFI (0.913), AGFI (0.869), CFI (0.971), and RMSEA (0.079). All the paths are found to be significant, with *t*-values higher than 1.96 (Jöreskog & Sörbom 1984).

Table 24 Model fit of SEM estimates

Fit measures	Result	Threshold
p-value	0	> 0.05
Chi-square/*df*	2.446	< 3
GFI	0.913	> 0.85
AGFI	0.869	> 0.8
CFI	0.971	> 0.9
RMSEA	0.079	< 0.08

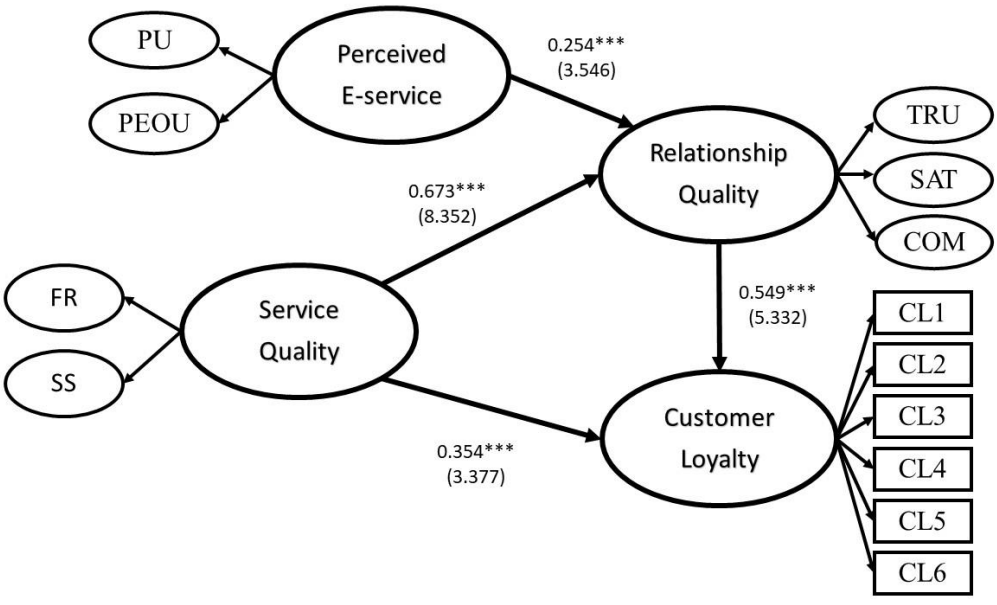

Figure 7 Path analysis with standardized path coefficients and *t*-value

Note: *$p < 0.05$, **$p < 0.01$, ***$p < 0.001$; the value in the bracket refers to the *t*-value

doi:10.6844/NCKU201900868

Table 25 Standardized path coefficients and significance of path

Path	Standardized coefficient	Standard deviation	*t*-value	*p*-value
H_1: Service Quality → Relationship Quality	0.673	0.092	8.352	***
H_2: Service Quality → Customer Loyalty	0.354	0.135	3.377	***
H_3: Relationship Quality → Customer Loyalty	0.549	0.116	5.332	***
H_4: Perceived E-service → Relationship Quality	0.254	0.067	3.546	***

Note: ***p< .001, ** p< .01 *p< .05

Based on the SEM results, all four hypotheses in the model were supported by the empirical data. Service quality (SQ) was found to be significantly positively related to relationship quality (RQ) (H_1: γ = 0.673, t = 8.352). The result was consistent with studies that have identified a significant and positive relationship between service quality and relationship quality by investigating customers of life insurance companies (Crosby et al., 1990), advertising agencies (Chumpitaz Caceres & Paparoidamis, 2007), health care businesses (Lee et al., 2012), and service environments (Cronin et al., 2000). Enhancing sailing density, salesmanship quality, and having complete equipment will provide customers with more booking options and complete logistic services in which a reliable, convenient cargo delivery process can be tracked anytime and anywhere and where their expectations will be met. Hence, customers' satisfaction, trust, and commitment toward the service will be built and the relationship quality of the company with its customers will in turn be improved. As a consequence, a positive relationship between service quality and relationship quality was proven.

Service quality (SQ) was found to be positively related to customer loyalty (CL) (H_2: γ = 0.354, t = 3.377). This result was consistent with studies that have found a positive relationship between service quality and customer loyalty by investigating the customers of commercial airlines (Ostrowski et al., 1993), health centers, city theatres, fast food restaurants, supermarkets, and amusement parks (De Ruyter et al., 1998). Likewise, the provision of complete, convenient service by a container shipping company was found to be positively related to customers' attitudes, satisfaction, and behavioral intention toward the service and the company. Further, customers were willing to build a long-term relationship with the company, and customer loyalty was increased. As a consequence, a

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positive relationship between service quality and customer loyalty was proven. Based on the expectation confirmation theory, understanding customer expectations and perceptions of performance is truly important, so companies will know how to modify service quality levels in order to improve relationship quality and customer loyalty.

Relationship quality (RQ) was found to be significantly positively related to customer loyalty (CL) (H_3: $\gamma = 0.549$, $t = 5.332$). This result was consistent with studies of the airline industry (Pi & Huang, 2011), small-to-medium enterprises (SMEs) (Rauyruen & Miller, 2007), and the mobile telecommunications industry (Liu et al., 2011). Enhancing customers' satisfaction, trust, and commitment toward the container shipping company made them believe the company would meet their needs and expectations, reduce communication errors, and make them feel that the company can be relied upon. Customers indicated that they feel the company to be trustworthy and believe that it keeps their best interest in mind when making important decisions. Thus, these customers were willing to build long-term relationship with the company, to engage in more businesses with it, and even to recommend friends and peer firms to do businesses with it as well. Hence, a positive relationship between relationship quality and customer loyalty was proven.

Finally, perceived e-service (PE) was found to be significantly positively related to relationship quality (RQ) (H_4: $\gamma = 0.254$, $t = 3.546$). This result was consistent with studies of airline service websites (Lee & Wu, 2011), online shopping (Cristobal, et al., 2007), and cyber university systems (Liao et al., 2007). A clear, understandable e-service platform made the shipping company customers perceive it as useful and easy to use. In particular, the platform improved their job performance, productivity, and effectiveness and solved their problems on a timely basis. Thus, customers did not worry about the cargo service process, their satisfaction, trust, and commitment toward the service were developed, and the relationship quality between the company and their customers was improved. Hence, a positive relationship between perceived e-service and relationship quality was proven.

5.5 Mediation Analysis

In order to examine the mediation role of relationship quality on the relationship between an independent variable (i.e., service quality) and a dependent variable (i.e., customer loyalty), the mediation analysis proposed by Baron and Kenny (1986) utilizing AMOS 18.0 was adopted. In step 1, the association between service quality and customer loyalty was found to be significant, and the standardized regression coefficients was 0.723 at a significance of 0.000, indicating that service quality is significantly related to customer loyalty. In step 2, the association between service quality and relationship quality was

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found to be significant, and the standardized regression coefficients was 0.673 at a significance of 0.000, indicating that service quality is significantly related to relationship quality. To determine whether relationship quality is a partial mediator or a full mediator, the relationship between service quality and customer loyalty and the relationship between relationship quality and customer loyalty were tested simultaneously in step 3. The standardized regression coefficient between service quality and customer loyalty was 0.354 (lower than 0.723 in step 1) and the standardized regression coefficient between relationship quality and customer loyalty was 0.549, indicating that relationship quality is a partial mediator between service quality and customer loyalty. Hence, the partial mediation of relationship quality on the relationship between service quality and customer loyalty was proven. The results of the mediation analysis are presented in Table 26.

Table 26 The partial mediation of relationship quality on the relationship between service quality and customer loyalty.

Path	Standardized regression coefficients	*p*-value
SQ→CL	0.723	***
SQ→RQ	0.673	***
SQ→CL	0.354	***
RQ→CL	0.549	***

Note: ***p< .001, **p< .01, *p<.05

5.6 Moderation Analysis

In order to investigate the moderating effect of perceived e-service on the relationship between an independent variable (i.e., service quality) and a dependent variable (i.e., relationship quality, customer loyalty), the moderating analysis proposed by Baron and Kenny (1986) utilizing SPSS 17.0 statistical tools was adopted. In the collinearity statistical results for relationship quality (Table 27), the VIFs of service quality and perceived e-service were 1.633 and 1.633, respectively. In the collinearity statistical results for customer loyalty (Table 28), the VIFs of service quality, perceived e-service, and relationship quality were 2.453, 1.979 and 2.830, respectively. All of the VIF values were smaller than 3, indicating that there was no collinearity existing in this model. After confirming that no collinearity existed, the regression analysis could be conducted.

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Table 27 Collinearity statistics for relationship quality

Model	Standardized Coefficients	*t*-value	Sig.	Tolerance	VIF
(Constant)		142.909	0.000		
SQ	0.538	10.745	0.000	0.612	1.633
PE	0.350	6.984	0.000	0.612	1.633

Table 28 Collinearity statistics for customer loyalty

Model	Standardized Coefficients	*t*-value	Sig.	Tolerance	VIF
(Constant)		146.908	0.000		
SQ	0.200	3.475	0.001	0.408	2.453
PE	0.170	3.286	0.001	0.505	1.979
RQ	0.540	8.741	0.000	0.353	2.830

Before conducting a regression analysis, it has been suggested that dependent and independent variables should be standardized into Z scores (Baron & Kenny, 1986). In the basic moderation model, where service quality only had a direct effect on relationship quality, relationship quality was regressed using service quality and perceived e-service, as well as the product of service quality and perceived e-service. In the results of the moderation analysis (Table 29), the *t*-values of the product of perceived e-service and service quality was less than 1.96 (or *p*-values higher than 0.05), indicating perceived e-service did not moderate the relationship between service quality and relationship quality. Thus, the hypothesis positing that the relationship between service quality and relationship quality is moderated by perceived e-service was not supported.

In the direct effect moderation model, where service quality has both a direct effect and an indirect effect on customer loyalty, customer loyalty was regressed using service quality, relationship quality, and perceived e-service, the product of service quality and perceived e-service, and the product of relationship quality and perceived e-service. In the results of the moderation analysis (Table 30), the *t*-values of the product of service quality and perceived e-service were higher than 1.96 (or *p*-values less than 0.05), indicating perceived e-service moderated the relationship between service quality and customer loyalty. Thus, the hypothesis positing that the relationship between service quality and customer loyalty is moderated by perceived e-service was supported.

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Table 29 Moderator statistics for relationship quality

Model		Standardized Coefficients	*t*-value	Sig.
	(Constant)		129.545	0.000
	Z-score (SQ)	0.538	10.735	0.000
	Z-score (PE)	0.355	7.009	0.000
	Z-score (SQ*PE)	0.029	0.718	0.474

Dependent Variable: Relationship Quality

Table 30 Moderator statistics for customer loyalty

Model		Standardized Coefficients	*t*-value	Sig.
	(Constant)		138.896	0.000
	Z-score (SQ)	0.198	3.592	0.000
	Z-score (PE)	0.131	2.615	0.010
	Z-score (RQ)	0.565	9.522	0.000
	Z-score (SQ*PE)	0.169	2.658	0.008
	Z-score (RQ*PE)	0.285	4.459	0.000

Dependent Variable: Customer Loyalty

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Chapter Six

Discussion and Conclusion

6.1 Summary of the Results

Based on the electronic customer relationship management and expectation confirmation theory, this study built a research model to test the causal relationships among service quality, relationship quality, customer loyalty, and perceived e-service in freight forwarder companies. The constructs demonstrated good partial correlations in the factor analysis and good discriminant and convergent validity in the confirmatory factor analysis. In the structural equation modeling results, it was found that service quality had a positive effect on relationship quality and customer loyalty; perceived e-service had a positive effect on relationship quality, and relationship quality had a positive effect on customer loyalty. The influences of the factors on customer loyalty were sequentially service quality, relationship quality, and perceived e-service with the respective total effects of 0.723, 0.549, and 0.139. Further, it was found that relationship quality had a partial mediating effect on the relationship between service quality and customer loyalty and that perceived e-service had a moderating effect on the relationship between service quality and customer loyalty. However, no significant moderating effect of perceived e-service was found on the relationship between service quality and relationship quality. In addition, the ANOVA results showed significant differences among e-service items and service quality, number of workers in the company/e-service items and relationship quality, number of workers in the company and customer loyalty, and shipping companies that the respondent mainly cooperates with/e-service items and perceived e-service. For example, the respondents who used more e-service items (e.g., cargo tracking, sailing schedules searching and booking) were shown to perceive a high level of service quality, relationship quality, and e-services.

Such a mediating effect explains how and why service quality (an independent variable) influenced consumer loyalty (a dependent variable), and the direct and indirect effects (via relationship quality) of service quality on consumer loyalty are thus now better understood. A high level of service quality will improve customer attitudes and increase their behavioral intention toward the service and the company and cause them to resist switching opportunities. Also, good service quality implies that the company can closely meet customer needs and expectations and consequently, cause them to be willing to build a long-term relationship with the company. Equivalently, service quality increased customer loyalty through relationship quality.

doi:10.6844/NCKU201900868

The moderation effect results indicated that better interaction between perceived e-service and service quality will affect customer loyalty but not customer's degree of satisfaction, trust, and commitment to the company. The possible explanations for this finding are as follows: Most liner operators use e-services to search and book shipping cabins and track cargo, for example. E-service has become the essential part of service quality, and it would be impossible to imagine shipping services without electronic applications. It would be difficult for liner operators to distinguish between e-service and service quality. Next, electronization of shipping services did increase customer work efficiency and improved their job performance. It induced them to constantly and repeatedly use these e-services and thus to become loyal to the company. However, it was not found to enhance the connection and relationship between the customers and the company. Finally, there were three different fundamental concepts including trust, satisfaction, and commitment within relationship quality, this combination might have impeded the possibility of a moderating effect of perceived e-service between service quality and relationship quality. In contrast, a moderating effect of perceived e-service between service quality and customer loyalty was found to exist under the single and pure concept of customer loyalty. Hence, perceived e-service is an essential service but does not affect the freight forwarders' perspective on the company's degree of competitive edge. In other words, e-service is basically a part of container shipping service, but without it, the company will occupy an inferior position in the market.

To summarize, the expectation confirmation theory asserts that customers are satisfied and will repurchase or continually use a service when the perceived performance of a service is higher than their expectations. An enhancement in the quality of the service process will increase customers' levels of satisfaction, trust, commitment and promote repurchase behavior, leading to continuous support of the company and high customer loyalty (i.e., significant mediating effect of relationship quality on the linkage of service quality to customer loyalty.) The electronic customer relationship management also asserted that e-services not only changed the service purchasing process but also improved their work efficiency, leading to the building of willingness to establish a long-term relationship with company (i.e., significant moderating effect of perceived e-service on the linkage of service quality to customer loyalty.)

To summarize, this study made some specific contributions to the literature on this topic. Previous studies on relationship quality (Cronin et al., 2000; Santouridis & Trivellas, 2010; Lee et al., 2012) mainly focused on customer satisfaction, but ignored trust and commitment. To fill this gap in the literature, this study incorporated satisfaction, trust, and commitment into the relationship quality construct and found that the factor loading of

doi:10.6844/NCKU201900868

trust (0.923) was higher than that of satisfaction (0.891) and commitment (0.874) in terms of an effect on relationship quality. Second, the partial mediating role of relationship quality on the relationship between service quality and customer loyalty was verified. Finally, unlike previous literature extensively investigated e-commerce in the container shipping industry, this study uniquely focused on e-services that adopt all sorts of IT applications.

6.2 Managerial Implications

Several managerial suggestions for container shipping industries can be drawn from the results to provide ideas of how to possibly increase customer loyalty. Based on the standardized path estimation in the SEM model, both service quality and relationship quality were the two factors most influencing customer loyalty. In particular, service quality increased relationship quality. Therefore, an increase in service quality and relationship quality will promote customer loyalty. As for service quality, a container shipping company should endeavor to reduce freight loss and damage and pick-up and delivery delays, and should increase the provision of special equipment provision and make improvements in container condition and salesmanship quality. As for relationship quality, it is a dispensable duty for everyone in the container shipping company to truly communicate with its customers, effectively provide the e-service items as they need, sincerely deal with customer complaints, and efficiently make cargo information transparent and accessible. In other words, a container shipping company should demonstrate to its customers that the company is professional, trustworthy, and honest with regard to completing cargo delivery tasks and with keeping the customers' best interest and welfare in mind when making important decisions. As such, customers will have confidence and will develop greater levels of trust toward the company. Therefore, switching motivation will decrease, and customer loyalty would increase.

Next, the SEM results also revealed perceived e-service to have a positive effect on customer loyalty. E-services are extensively used in the container shipping service process of. Using the e-service channel, customers are able to obtain sailing schedules, book cabins, and track cargos and vessels themselves. An increase in the provision of e-service items with individual customization and an exclusive channel will make it possible to resolve customer complaints effectively on a timely basis and will in turn promote perceptions of high service quality that lead to relationship quality. Hence, customer loyalty will increase. Specifically, usefulness and ease of use of e-services demonstrated high factor loadings of 0.963 and 0.905, respectively, since customers use such services to pursue efficiency and thus improve their job performance. A container shipping company should make the content of its operation interface, navigation device, and website design user-friendly and

doi:10.6844/NCKU201900868

correct and should provide directive instructions for first-time users. Based on the ANOVA analysis, when container shipping companies provide more e-service items to customers, they will get higher scores related to service quality and relationship quality, which means if container shipping companies want to increase their service quality, optimizing and providing more e-services would be an effective method to do so.

Finally, based on the 80/20 rule of marketing, 80 percent of revenues typically comes from the 20 percent of loyal customers. The ANOVA results indicated that small-sized companies (below 51 persons) had the highest level of customer loyalty, but medium size companies (51-500 persons) had the lowest level of customer loyalty. Container shipping companies could never forgo small-sized forwarders due to their small business size, where an employee might be responsible for many routes, nor should they avoid medium-sized forwarders with high price sensitivity. In order to increase customer loyalty, salespersons from shipping companies should provide a system that integrates all route information to small-sized forwarders and provides extra discounts and services to medium-sized forwarders.

6.3 Limitations and Future Research

Although this research provides valuable results and implications, there are some limitations. The respondents in this analysis were located exclusively in one geographical region (i.e., Taiwan). However, cultural differences could influence respondents' value evaluations. People from different countries and regions could have different standards by which to evaluate their perceptions of service quality, relationship quality, customer loyalty, perceived e-service level, and what kind of relationship they want. Many Taiwan-based container shipping companies with localized services will provide their forwarders better service experiences. This may also be the case with companies in other geographical regions.

There are a few extensions for future research as follow. It would be interesting to investigate the impact of innovation capability and digital capability on performance in container shipping companies incorporating with the constructs of digital resource and customer relations. High-tech progresses cause massive changes to customer relation marketing and entrepreneurial strategies in the rapidly changing environments. The innovation capability of container shipping companies is important for customers and serves as one of the critical competitiveness factors. The innovation capability and digital capability will evolve from the technology development in the long run. To help container shipping companies obtain new opportunities and markets, researchers may explore the impact of innovation capability and digital capability on performance.

doi:10.6844/NCKU201900868

Another possible extension is to investigate the impact of social media overload on job stress incorporating with the constructs of work exhaustion and work-life conflict from the perspectives of employees in container shipping services. Also, the construct of emotional intelligence is used as a meditation moderator. Widely adopted e-service brings great benefits to container shipping companies with some side effects. It is widely believed that diversified e-services may cause heavy workloads and inconvenience of salespersons and their good physical and mental states are highly related to the quality of service provision. Hence, the influence of workload and job stress of employees in the container shipping employee would be the issue being worthy to explore for the future research.

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doi:10.6844/NCKU201900868

Appendix A: Items in Questionnaire

The following 54 questions were used to collect data in this study and they were measured using a 5-point Likert scale.

Part 1 Service Quality (20 Items)

SQ1	This container shipping company's freight rates are reasonable.
SQ2	This container shipping company's sailing frequency is intensive.
SQ3	This container shipping company's freight loss and damage control is good.
SQ4	This container shipping company's transit time is fast.
SQ5	This container shipping company's transit time is reliable.
SQ6	This container shipping company's special equipment is complete.
SQ7	This container shipping company's container condition is good.
SQ8	This container shipping company's pick-up and delivery is on time.
SQ9	This container shipping company's salesmanship quality is good.
SQ10	This container shipping company's equipment is available.
SQ11	This container shipping company provides many direct sailings.
SQ12	This container shipping company has a claims process.
SQ13	This container shipping company's advertised sailing schedules are reliable.
SQ14	This container shipping company's inland transportation is complete.
SQ15	This container shipping company provides complete door-to-door services.
SQ16	This container shipping company's finances are stable.
SQ17	This container shipping company provides complete expedited shipments.
SQ18	This container shipping company's documentation is accurate.
SQ19	This container shipping company is willing to negotiate.
SQ20	This container shipping company has a reasonable price and discount structure.

Part 2 Relationship Quality (17 Items)

RQ1	We believe that this container shipping company performs its tasks professionally.
RQ2	We believe that this container shipping company keeps our best interests in mind.
RQ3	We believe that this container shipping company considers our welfare as

doi:10.6844/NCKU201900868

well as its own when making important decisions.

RQ4 We believe that this container shipping company is trustworthy.

RQ5 We believe that this container shipping company handles critical information about our company confidentially.

RQ6 This container shipping company is always honest with us.

RQ7 This container shipping company is successful.

RQ8 This container shipping company meets our expectations.

RQ9 We are very pleased with what this container shipping company does for us.

RQ10 All in all, we are very satisfied with this container shipping company.

RQ11 The relationship with our container shipping company is something to which we are very committed.

RQ12 The relationship with our container shipping company is very important to our business.

RQ13 The relationship with our container shipping company is something our business intends to maintain indefinitely.

RQ14 The relationship with our container shipping company is something our business really cares about.

RQ15 The relationship with our container shipping company deserves our business' maximum effort to maintain.

RQ16 It would be difficult to change our beliefs about this container shipping company.

Part 3 Customer Loyalty (6 Items)

CL1 For our next cargo transport, we will consider this container shipping company as our first choice.

CL2 We will do more business with this container shipping company in the next few years.

CL3 All else being equal, we plan to cooperate with this container shipping company.

CL4 We say positive things about this container shipping company to peer industries.

CL5 We would recommend this container shipping company to someone seeking our advice.

CL6 We encourage friends and peer industries to do business with this container shipping company.

doi:10.6844/NCKU201900868

Part 4 Perceived E-service (12 Items)

PE1	Using this container shipping company's e-services will make it possible to complete tasks more quickly.
PE2	Using this container shipping company's e-services will improve overall job performance.
PE3	Using this container shipping company's e-services will increase job productivity.
PE4	Using this container shipping company's e-services will enhance job effectiveness.
PE5	Using this container shipping company's e-services will make it easier to do our job.
PE6	We find this container shipping company's e-services useful in our job.
PE7	Learning to operate the e-service of this container shipping company is easy for us.
PE8	We find it easy to get the e-services of this container shipping company to do what we want them to do.
PE9	Our interaction with the e-service of this container shipping company is clear and understandable.
PE10	We find the e-service of this container shipping company to be flexible to interact with.
PE11	It was easy to become skillful at using the e-services of this container shipping company.
PE12	I find the e-services of this container shipping company easy to use.

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Appendix B: Items in Chinese Questionnaire

編號：_____

親愛的負責人，您好：

感謝您於百忙之中打開這份問卷，這份問卷是研究「**貨櫃船公司之電子化服務對服務品質、關係品質和顧客忠誠度的影響程度**」，數位化時代已來臨，貨櫃船公司如何善用數位化服務來加強顧客關係並提高顧客忠誠度是本研究的宗旨。

本問卷填答對象為**海運承攬業之操作人員(OP)**，大約需要花費您7-8分鐘的時間，煩請撥冗填寫，您的寶貴意見將使本研究更有價值，懇請您表達真實的想法與意見，協助完成此研究調查。本問卷是**匿名填寫並且內容不牽涉您個人或公司的私密資料**，所有調查結果僅供學術研究使用，任何資料不對外公開，敬請安心作答。在此謹對您的熱心協助，致上最誠摯的謝意。**本問卷獎品為【饗食天堂】自助美饌平日午餐券(市價878元) 10張，提供抽獎**。

敬祝 萬事如意 身體健康

成功大學

第一部份：下列是有關個人及公司的基本資料，請在適當的□內打「∨」。

1. 請問您從事海運業幾年？

□5 年以內 □6~10 年 □11~15 年 □16~20 年 □20 年以上

2. 請問貴公司成立幾年？

□5 年以內 □6~10 年 □11~15 年 □16~20 年 □20 年以上

3. 請問您目前職稱為何？

□一般職員(含業務人員) □基層主管(含課長及主任)

□高階主管(含副理、經理及協理以上)

4. 請問貴公司的員工總數大約為多少人？

□10 人以下 □11~30 人 □31~50 人 □51~100 人 □101~500 人

□501~1,000 人 □1,000 人以上

doi:10.6844/NCKU201900868

5. 請問貴公司所有權為何？

☐台灣公司 ☐外國分公司 ☐台灣與外國分公司共同經營

☐其他(請說明)_____

6. 請問您負責的主要航線為何？**(單選)**

☐台灣-香港/澳門/中國大陸 ☐台灣-日本/韓國 ☐台灣-東南亞 ☐台灣-中東印巴 ☐台灣-南非/西非 ☐台灣-地中海沿岸 ☐台灣-西歐 ☐台灣-北歐 ☐台灣-美國/加拿大 ☐台灣-墨西哥/中南美洲/加勒比海諸國 ☐台灣-澳洲/紐西蘭

☐其他_____

7. 請問**貴公司該航線**最常合作的船公司為？**(單選)**

☐長榮海運(Evergreen) ☐陽明海運(Yang Ming) ☐萬海航運(Wan Hai) ☐正利航運(CNC) ☐德翔航運(T.S. Line) ☐馬士基(Maersk) ☐地中海航運公司(Mediterranean Shg Co) ☐達飛輪船 (CMA CGM) ☐中遠海運(COSCO) ☐赫伯羅特(Hapag-LIoyd) ☐Ocean Network Express (ONE) ☐現代商船(HMM) ☐以星航運(Zim) ☐其他(請說明)_____

8. 請問**上述所選擇的船公司**提供哪些電子化服務是貴公司有在使用的？(**可複選**)

☐電子郵件 ☐公司網站/電子商務 ☐社群網站/通訊軟體(包括 Facebook, LINE, WeChat, Whatsapp, Instagram, Plurk, Twitter) ☐i-B/L(雲提單)/i-Dispatch(雲快遞) ☐電子數據交換 (EDI) ☐其他(請說明) _____

9. 請問使用**上述所選擇的船公司**提供的電子化服務項目為何？**(可複選)**

☐船期查詢 ☐線上訂艙 ☐提單製作 ☐船舶追蹤 ☐動態貨物追蹤

☐關務查詢 ☐EDI(電子數據交換) ☐其他(請說明)_____

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第二部分：下列是您對於**上述所選船公司之服務品質**的問項，請依照您個人的想法在適當的□內打「∨」。	非常不滿意	不滿意	普通	滿意	非常滿意
這間貨櫃船公司的					
1. 運費合理性	□	□	□	□	□
2. 船期密集度	□	□	□	□	□
3. 貨損理賠狀況	□	□	□	□	□
4. 轉運速度	□	□	□	□	□
5. 轉運的可靠	□	□	□	□	□
6. 特殊設備	□	□	□	□	□
7. 貨櫃狀況	□	□	□	□	□
8. 交提貨的準時性	□	□	□	□	□
9. 業務人員的品質	□	□	□	□	□
10. 設備的充裕性	□	□	□	□	□
11. 直航服務	□	□	□	□	□
12. 賠償的迅速	□	□	□	□	□
13. 船期的可靠性	□	□	□	□	□
14. 內陸運送安排	□	□	□	□	□
15. 戶對戶運輸服務	□	□	□	□	□
16. 財務穩定性	□	□	□	□	□
17. 緊急服務	□	□	□	□	□
18. 文件的準確	□	□	□	□	□
19. 協商的願意	□	□	□	□	□
20. 價格與折扣	□	□	□	□	□

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第三部分：下列是有關於您對**上述所選船公司之關係品質**的問項，請依照您個人的想法在適當的□內打「∨」。	非常不同意	不同意	普通	同意	非常同意
1. 我們相信這間貨櫃船公司專業地執行任務	□	□	□	□	□
2. 我們相信這間貨櫃船公司會牢記我們的最佳利益	□	□	□	□	□
3. 我們相信這間貨櫃船公司在做出重要決策時會考慮雙方的福利	□	□	□	□	□
4. 我們相信這間貨櫃船公司值得信賴	□	□	□	□	□
5. 我們相信這間貨櫃船公司會保密處理我們公司的重要資訊	□	□	□	□	□
6. 這間貨櫃船公司是誠實的	□	□	□	□	□
7. 這間貨櫃船公司是成功的	□	□	□	□	□
8. 這間貨櫃船公司符合我們的期望	□	□	□	□	□
9. 我們對這間貨櫃船公司為我們所做的事感到滿意	□	□	□	□	□
10. 總而言之，我們非常滿意這間貨櫃船公司	□	□	□	□	□
11. 我們非常確認與這間貨櫃船公司的關係	□	□	□	□	□
12. 我們與這間貨櫃船公司的關係對業務非常重要	□	□	□	□	□
13. 我們打算無限期持續與這間貨櫃船公司的關係	□	□	□	□	□
14. 我們與這間貨櫃船公司的關係是我們公司真正關心的	□	□	□	□	□
15. 我們與這間貨櫃船公司的關係是值得我們維持的	□	□	□	□	□
16. 我們對這間貨櫃船公司的想法是很難改變的	□	□	□	□	□

第四部分：下列是有關於您對**上述所選船公司之忠誠度**的問項，請依照您個人的想法在適當的□內打「∨」。	非常不同意	不同意	普通	同意	非常同意
1. 對於我們下一次的貨物運輸，我們將把這間貨櫃船公司視為首選	□	□	□	□	□
2. 未來幾年，我們將與這間貨櫃船公司開展更多的業務	□	□	□	□	□
3. 在其他條件相同的情況下，我們計畫與這間貨櫃船公司合作	□	□	□	□	□
4. 我們會在同行業中，說明這間貨櫃船公司正向的評價	□	□	□	□	□
5. 我們會向我們尋求建議的人推薦這間貨櫃船公司	□	□	□	□	□
6. 我們鼓勵朋友和同行業與這間貨櫃船公司合作	□	□	□	□	□

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第五部分：下列是有關於**上述所選船公司之感知電子化服務**的問項，請依照您個人的想法在適當的□內打「∨」。	非常不同意	不同意	普通	同意	非常同意
1. 這間貨櫃船公司所提供的電子化服務可以更快地完成任務	□	□	□	□	□
2. 這間貨櫃船公司所提供的電子化服務可以改善我們的工作績效	□	□	□	□	□
3. 這間貨櫃船公司所提供的電子化服務可以提高生產力	□	□	□	□	□
4. 這間貨櫃船公司所提供的電子化服務可以提高我們的工作效能	□	□	□	□	□
5. 這間貨櫃船公司所提供的電子化服務可以使工作變得簡單	□	□	□	□	□
6. 我們發現這間貨櫃船公司所提供的電子化服務對工作是有用的	□	□	□	□	□
7. 學習操作這間貨櫃船公司所提供的電子化服務是容易的	□	□	□	□	□
8. 我們發現這間貨櫃船公司所提供的電子化服務可以完成我們想做的事	□	□	□	□	□
9. 我們與這間貨櫃船公司所提供的電子化服務之互動是清楚和理解的	□	□	□	□	□
10. 我們可以很靈活的與這間貨櫃船公司所提供的電子化服務互動	□	□	□	□	□
11. 我們可以很熟練的使用這間貨櫃船公司所提供的電子化服務	□	□	□	□	□
12. 我們認為這間貨櫃船公司所提供的電子化服務是容易使用的	□	□	□	□	□

本問卷到此全部結束，感謝您的耐心填答！

請回頭檢查您問卷的填答是否完整沒有遺漏、沒有亂填，以確保您的抽獎資格。本研究問卷之獎品為【饗食天堂】自助美饌平日午餐券 10 張(市價 878 元)。如果您有意願參與抽獎，請填寫相關聯絡資料，以便日後通知以及獎項寄送等事宜；得獎名單將於民國 108 年 4 月初由本論文指導教授公開抽出並且公佈於成功大學交通管理學系暨電信管理研究所網頁(http://www.tcm.ncku.edu.tw/)。

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