

**Performance Measurement and Management of  
Third Party Logistics: An Organizational Theory Approach**

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**A thesis submitted in partial fulfillment of the requirements**

**for the degree of**

**Doctor of Philosophy**

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**Hong Kong Baptist University**

**February 2006**

UMI Number: 3213981

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## DECLARATION

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## ABSTRACT

*Keywords: Third party logistics, Outsourcing, Performance measurement, Hong Kong*

Third party logistics (3PL) has become an important source of competitive advantage, especially in supply chains. To maintain a competitive advantage in 3PL, firms must enhance their ability to plan, take action, manage, and control product services and information from supplier to customer as an integrated process, rather than as a series of discrete functions.

From a service partner perspective, 3PL is a value-added process that is intentionally used to enhance organizational cooperative advantages and to provide low-cost product or service differentiation and focused strategies. However, this may be undermined by a lack of measurement of 3PL service performance to manage service vendors. For service providers, outstanding performance is reflected in 3PL service outcomes that are tangibly and intangibly defined by their operations.

A comprehensive literature review reveals that there is a lack of study of 3PL organizational performance in supply chain management (SCM) and in particular on the effects and implications of 3PL organizational effectiveness and relationship management in logistics and SCM. Based on the literature review, this study develops a research model from organizational theory to elaborate the cause and effect relationship between 3PL service quality, organizational effectiveness, and relationship management with service partners. It also fills a gap in the literature, and provides insight on the performance measurement and management of logistics outsourcing.

This study of 3PL organizational performance (OP) measurement and management

explores service quality (SQ), organizational effectiveness (OE), and relationship management (RM) between 3PL service providers and their supply chain partners. Sixteen hypothesized links are developed that represent 3PL organizational performance. These links affect channel relationships in the supply chain and the effectiveness of delivered services. Based on the literature and practice in 3PL services, a comprehensive measurement scale is developed with 98 items on service quality, organizational effectiveness, and relationship management.

A pilot study of the developed organizational performance measurement scale for 3PL providers was conducted among respondents from twenty business partners of 3PL providers to confirm the content validity of the scale. A survey was then used to collect data for the revision of the measurement scale from staff of four similar 3PL providers and their business partners in the transport logistics industry in Hong Kong.

To avoid confusion, data were collected on the expected and actual organizational performance of 3PL providers separately. Four (2×2) sets of completed questionnaires on the expected and actual organizational performance of 3PL providers from staff members and on the actual and expected organizational performance of 3PL providers from business partners were collected.

Randomly selected 3PL staff members were divided into two groups, and each group completed self-evaluation questionnaires on either the expected or actual organizational performance of 3PL providers. In an identical survey, two business partner representatives of the four 3PL providers also completed questionnaires on either the expected or actual organizational performance of 3PL providers. A total of 742 questionnaires were completed and serve as analyzable data.

The descriptive statistics are analyzed, and reliability tests and confirmatory factor analysis (CFA) to test the construct validity and measurement loadings are conducted. The sixteen hypothesized links between the three constructs and eleven factors of 3PL organizational performance are analyzed using structural equation modeling (SEM). Gap analysis is also performed to examine the loading differences between indicator variables and to confirm the variables on 3PL service providers, customers, and partners. The data on the actual differences in logistics service provide 3PL providers with useful recommendations for service improvement.

After the measurement model is analyzed, the structural model is tested and confirmed. The testing and confirmation results show that the significant criteria that are related to 3PL organizational performance comprise three constructs: service quality (SQ), organizational effectiveness (OE), and relationship management (RM). The three constructs in turn consist of eleven significant and positive dimensions. Service quality (SQ) includes tangibility (TANGI), reliability (RELIAB), responsiveness (RESPON), assurance (ASSUR), and empathy (EMPAT); organizational effectiveness (OE) includes cycle time (CYCLE), customer service (CUSTO), reputation, and goodwill (GOORE); and relationship management (RM) includes guanxi (GUANX), trust (TRUST), and commitment (COMMI).

The results indicate that the causal relationships between service quality, organizational effectiveness, and relationship management are important dimensions of 3PL organizational performance. The results also confirm the multidimensional measurement capacity of 3PL organizational success and support the application of the concept to organizational performance.

The four sets of collected data provide strong verification for the effectiveness of the SEM method; the multidimensionality of 3PL service quality, organizational effectiveness, and relationship management; and the existence of three constructs of 3PL organizational performance. After refinement of the measurement models and the testing of the validity and reliability of the constructs, relevant measurement items were retained for the final version of these items and their latent constructs. The final version serves as a reliable tool to measure 3PL organizational performance and also as a guideline for 3PL practitioners to improve performance.

Gap analyses are undertaken to examine the group differences between the indicator variables to confirm that they are 3PL service provider and partner variables, and also to examine the actual differences in logistics service, which provide useful feedback for 3PL company on service improvement. The results of this study can be applied to improve 3PL business performance.

This is the first comprehensive study of 3PL organizational performance measurement and management of Hong Kong service providers. The research provides analysis of 3PL service quality, organizational effectiveness, and relationship management; identifies a research framework of 3PL organizational performance; and confirms the collaborative relationship between 3PL service providers and their partners. The research results provide valuable information and insights for logistics practitioners, policy makers, and supply chain partners.

The study contributes to the literature on performance measurement and strategic 3PL management, and provides practical guidelines for practitioners to improve their 3PL organizational performance. The gap analysis examines the difference between perceived

and actual 3PL organizational performance, which defines collaborative relationships and 3PL competence, and develops a solid foundation for the improvement of 3PL organizational performance.

This is a theoretically, methodologically, and analytically detailed empirical study that adds to the limited existing literature on organizational performance. The study provides valuable groundwork for further studies on the development of strategies and the benchmarking of successful 3PL organizational performance.



## ACKNOWLEDGEMENTS

I would like to express heartfelt thanks to many people without whose support this research would not have been possible.

I would like to express my deepest gratitude to my supervisor, Dr. SHI Xinping, for his tremendous support and invaluable guidance during the course of my study. Dr. Xinping's input, unwavering patience, and encouragement made this thesis possible. I would also like to extend special thanks to my co-supervisor, Dr. Vincent W.S. CHOW, who offered innumerable constructive and useful suggestions for the improvement of my research. Without this combined supervisory help and assistance, my thesis would not have been completed.

I would also like to thank Dr. Ludwig Chang, Mr. Peter Wong, Mr. C. K. Lam, and especially Mr. Matthew Cheng, whose valuable guidance, assistance, and encouragement inspired me to do my best.

I would like to express my sincere appreciation to the respondents who participated in my research, without whose help and cooperation this thesis would not have been possible.

Finally, I would like to thank my family, especially my grandparents, and my friends for their generous support while I was completing my thesis. I am indebted to everyone who made this thesis possible.

YUEN Sheung Man

February 2006

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# CHAPTER 1

## INTRODUCTION

Effective logistics and supply chain management is the key to most organizational success. The continual advancement of logistics and supply chain management is important for Hong Kong to continue to be a leading commercial trade center in the Asia-Pacific region. High quality and efficient corporate supply chain management is a critical reason for cultivating relationships with partners and improving supply chain competence.

The use of third party logistics (3PL) services is a means of obtaining these benefits. 3PL, which is also called “logistics outsourcing” or “contract logistics,” has shown significant expansion over the past decade (Lau, 1999; Knemeyer et al., 2003). 3PL is a relationship between a shipper or customer and a third party, and, compared to ordinary service, offers more comprehensive, customized, and multipurpose services. 3PL is also characterized by a long-term, more mutually beneficial relationship between service providers and customers. Companies that outsource their logistics activities to 3PL service providers promote interactive relationships. It is important to amass organizational connections that adopt a relational, rather than transactional, corporate approach (Africk and Calkins, 1994; Webster, 1992).

Logistics outsourcing and 3PL services ought to remain a key element of contemporary supply chain management. Recent research has revealed record high 3PL usage among Fortune 500 companies, and it was projected that by 2005, U.S. 3PL users would spend an average of nearly one-third of their total logistics budgets (compared to 20% today) on



support for 3PL services (Gooley, 2000).

In adopting the outsourcing approach, firms employ an external company to perform some, or all, of their logistics activities to achieve high-quality professional services. 3PL firms provide inventory improvements and enhance efficiency, and capture the economies of scale that result from the higher volumes that are obtained by the aggregation of demand across a large market.

There seems to be a lack of research on the collaborative relationship between management and organizational performance in 3PL services providers and their supply chain partners (suppliers and customers). This study of organizational performance measurement of logistics outsourcing in the Hong Kong transport logistics industry explores the relationship between 3PL service providers and supply chain partners, and enhances the effectiveness of the services provided. It is imperative that firms excel in quality assurance to facilitate the efficient and effective flow of goods and the transfer of information and finances within supply chains. This will not only improve the quality of logistics outsourcing services, but will also bolster economic growth and give Hong Kong an edge over rival neighboring economies such as Singapore, South Korea, and Taiwan.

This chapter outlines the thesis introduction, which includes the following.

- 1.1 Contextual and conceptual background of the study
- 1.2 Objectives of the study
- 1.3 Contribution of the study
- 1.4 Organization of the study

## 1.1 Contextual and Conceptual Background

### 1.1.1 *Fundamentals of Logistics and SCM*

Logistics and supply chain management (SCM) are critical for corporate success in today's business environment because of economic globalization and the development of information technology (TDC, 2000). The Council of Logistics Management defines logistics as the part of a supply chain process that plans, implements, and controls the efficiency, effective flow, and storage of goods, services, and related information from the point of origin to the point of consumption based on consumer demand. Cooper and Ellram (1990) claim that logistics is used to ensure the availability of the right product, in the right quantity and condition, at the right time and place, that reaches the right customer, at the right cost.

Logistics business involves transportation, warehousing, inventory management, communication, and information systems, and manufacturing or materials management. It also involves a variety of value added services such as packaging, in-transit assembling, kitting and light assembling, product reworking, price tagging, security tagging, bar coding, sorting, order picking, delivery confirmation, and call center support services.

There is common ground among authors about the definition of a supply chain (Cooper and Ellram, 1993; La Londe and Masters, 1994; Lambert et al., 1998). La Londe and Masters (1994) propose that a supply chain is a group of firms that pass materials forward. In their definition, several independent firms are involved in the manufacture of a product and place it in the hands of the end user via a supply chain, which is made up of raw materials and component producers, product assemblers, wholesalers, and retailer

merchants (La Londe and Masters, 1994). Similarly, Lambert, Stock, and Ellram (1998) define a supply chain as the alignment of firms to bring products and services to markets.

Christopher (1992) defines a supply chain as a network of organizations that are involved through upstream (supply) and downstream (distribution) links in the different processes and activities that produce value in the form of ultimate consumer products and services. A supply chain consists of multiple firms or partners.

Supply chain management (SCM) is the management of all logistics activity links. Quinn (1998) defines SCM as the activities that are associated with moving goods from raw materials and parts, manufacturing and assembly, warehousing and inventory tracking, order entry and order management, distribution across all channels, and delivery to customers. Table 1.1 shows the various definitions of SCM in the literature that is analyzed.

**Table 1.1: Definitions of supply chain management**

<b>Authors</b>	<b>Definition</b>
Berry et al. (1994)	Supply chain management aims at building trust, exchanging information on market needs, developing new products, and reducing the supplier base to a particular OEM (original equipment manufacturer) to release management resources for developing meaningful, long term relationships.
Christopher (1992)	A network of organizations that are involved through upstream and downstream links in the different processes and activities that produce value in the form of ultimate consumer products and services.
Ellram (1991)	A network of firms that interact to deliver a product or service to an end customer and to link flow from raw material supply to the final delivery.
Jones and Riley (1985)	An integrative approach to deal with the plan and control of the material flow from suppliers to end-users.
Kueng (2000)	The set of entities, including suppliers, logistics services providers,

	manufacturers, distributors, and resellers, through which materials, products, and information flow.
Lee and Billington (1992)	Networks of manufacturing and distribution sites that procure raw materials, transform them into intermediate and finished products, and distribute the finished products to customers.
Lee and Ng (1997)	A network of entities that starts with the suppliers' supplier and ends with the customers' customer; the production and delivery of goods and services.
Saunders (1995)	External chain is the total chain of exchange from the original source of raw materials, through the various firms that are involved in extracting and processing raw materials, manufacturing, assembling, distributing, and retailing to ultimate customers.
Tan et al. (1998)	Supply chain management encompasses materials or supply management from the supply of basic raw materials to final product (and possibly to recycling). Supply chain management focuses on how firms utilize their suppliers' processes, technology, and capability to enhance competitive advantage. It is a management philosophy that extends traditional intra-enterprise activities by bringing trading partners together with the common goal of optimization and efficiency.

SCM represents a new management philosophy that integrates a variety of business processes. The Global Supply Chain Forum defines supply chain management as “the integration of key business processes from end users through original suppliers that provide products, services, information and value-adding for customers and other stakeholders.”

SCM also takes a system approach by regarding a channel as a single entity, rather than as a set of fragmented parts, that performs its own function (Ellram and Cooper, 1990; Houlihan, 1985). The philosophy of supply chain management extends the notion of partnership to a multiform effort to manage the total flow of goods from the supplier to the ultimate customer (Ellram, 1990; Jones and Riley, 1985). SCM comprises a set of beliefs that each supply chain firm directly and indirectly affects the performance of all of the

other supply chain members and the overall performance of the channel (Cooper et al., 1997).

Channel SCM seeks the synchronization and convergence of intrafirm and interfirm operational and strategic capabilities into a unified, compelling force (Ross, 1998). Integrative SCM directs supply chain members toward the development of innovative solutions to create unique, individualized sources of service value. Langley and Holcomb (1992) suggest that the objective of SCM should be the synchronization of all channel activities to create customer value. Thus, the SCM philosophy suggests that its boundaries include not only logistics, but also all other firm and supply chain functions to create customer value and satisfaction. In this context, an understanding of the customer's values and requirements is essential (Tyndall et al., 1998).

Efficient logistics and SCM bring great benefits, which include value maximization, process integration, and responsiveness improvement (Hewitt, 1994; Tompkins, 2000). They can also achieve customer satisfaction and efficient resource allocation.

### *1.1.2 Global and Local Logistics and SCM Development*

As international business broadens its scope and horizons, logistics and SCM become increasingly more complex and challenging. The shift towards worldwide manufacturing and assembling operations has led to a greater role for logistics and SCM to provide dedicated services for customers and supply chain partners. Bowersox and Calantone found in 1998 that worldwide logistics firms had expended more than US\$3.4 trillion to achieve product and material positioning. Table 1.2 shows that firms in three major trading regions (North America, Europe, and the Pacific region) reduced their total logistics

expenditure from 12.1% to 11.7% between 1992 and 1996. This shows that logistics and SCM not only improve efficiency and cost effectiveness in business operations, but can also mean the development of a variety of local and worldwide businesses.

**Table 1.2: Comparative GDP and logistics expenditure, 1996 and 1992**

Region	1996			1992		
	GDP	Logistics Expenditure	Percentage Logistics GDP	GDP	Logistics Expenditure	Percentage Logistics GDP
<i>North America</i>	8495	915	10.7	7149	837	11.7
<i>Europe</i>	7981	941	11.7	7086	876	12.3
<i>Pacific region</i>	5605	652	11.6	4387	516	11.7
<i>Other</i>	7080	916	12.9	5120	662	12.9
<i>Total</i>	29162	3425	<b>11.7</b>	23743	2984	<b>12.1</b>
* (In Billions of US Dollars)						

Source: Bowersox and Calantone (1998)

In 2001, logistics and SCM business had an annual worldwide value of around US\$320 billion. The industry has been growing at an annual rate of 3-10% (Singapore Service Sub-committee, 2002). The global SCM market was estimated to grow to US\$173.7 billion during 2005, which represents a compound growth rate of 10%. SCM integrates the individual activities within the supply chain to offer customers a complete “end-to-end” service. Worldwide trends indicate an increasing preference by companies to opt for integrative SCM outsourcing models, which encompass the co-ordination of three flows – physical, information, and cash. The demand for SCM services is likely to grow against the backdrop of greater outsourcing, globalization, the advent of new products, and shorter product life cycles (Ellram and Cooper, 1990). There will be further global expansion of logistics and SCM activities in the future.

Regionally, the Asian SCM market is poised for robust growth. Annual SCM growth rates are 7% in Europe, 10% in North America, and 15% in Asia. The high growth rate in Asia is confirmed by a JP Morgan research survey that shows that Asian shippers have outsourced only about 2.5% of their logistics functions compared to the figures of 20% and 25% of their US and European counterparts (Singapore Service Sub-committee, 2002). It also shows that Asian companies have indicated a strong interest in the revamping and integration of their supply chains with worldwide operations.

It is common knowledge that Hong Kong has become the busiest container port in the world. The Hong Kong Shipper's Council reported in 2003 that 75% of its China-made cargo was re-exported through Hong Kong. This has transformed Hong Kong into a southern China and regional transshipment logistics hub. According to the Trade and Development Council, (2002), the logistics industry in Hong Kong comprises air transportation, sea transportation, traditional freight forwarding, and 3PL. The logistics industry is the backbone of the Hong Kong economy, due largely to Hong Kong's excellent harbor, its strategic location, and its export trade.

Hong Kong is also a major aviation and maritime hub, and has been ranked the busiest in the world for many years. Hong Kong has a leading international airport with an annual cargo handling capacity of up to 9 million tons. In 2003, Hong Kong handled 20.4 million twenty-foot equivalent units in marine cargo terminals and another 2.64 million tons of air cargo in air cargo terminals. In 2003 the International Airports' Council ranked Hong Kong number two in the handling of international cargo.

In the past decade, logistics and transport have become two of the most important sectors of Hong Kong's economy. In 2000, the air and sea transport logistics sectors together

constituted about 18% of Hong Kong's GDP (TDC, 2002). The importance of the logistics industry in Hong Kong is reflected in the tremendous growth in freight, cargo, and container throughput over the last two decades, and especially in re-export trade and transshipment since the relocation of most of Hong Kong's manufacturing business to southern China. (Voon and Ho, 2001).

The relaxation of freight forwarding and transportation policies in China following accession to the WTO has created fierce competition within the Pearl River Delta (PRD). To maintain Hong Kong as a regional logistics centre and transport hub, the effective management of supply chain dynamics is paramount. Hong Kong's Chief Executive announced in 2001 the Logistics Council's plan to implement a series of policies and recommendations from academics, industry experts, and professionals to maintain and strengthen Hong Kong's transshipment and logistics hub status in the Asia-Pacific region.

In the policy address for 2003 and 2004, Hong Kong's Chief Executive further spelled out the goal of establishing Hong Kong as a trading and multi-modal trade management and operations center. The government aims to strengthen Hong Kong's position as Asia's premier transportation and logistics hub by facilitating the development of the logistics center and express cargo terminal of Hong Kong International Airport, and by building a logistics park on Lantau Island. The government will also upgrade the existing infrastructure to ensure a smooth flow of cargo between Hong Kong and mainland China.

Hong Kong is in a unique position to serve as a logistics hub for the distribution of parts and materials between manufacturers in southern China and overseas suppliers. Although the future infrastructure upgrade will help Hong Kong's logistics providers to enhance their competitive power, logistics service providers must still be prepared to cope with other



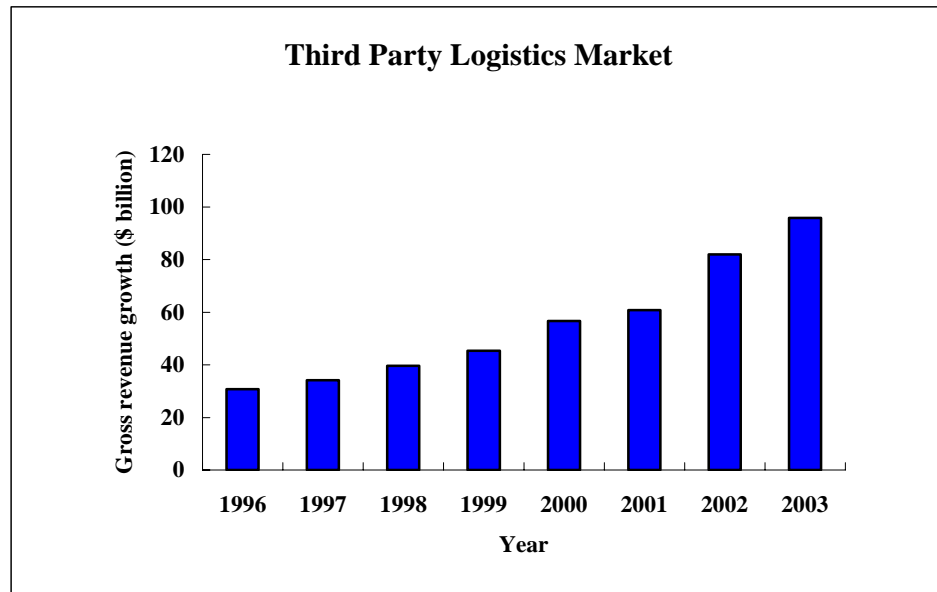
demands and imminent challenges.

### *1.1.3 Development of Outsourcing or Third Party Logistics (3PL)*

Commercially, suppliers meet demand by increasing inventory level, speeding up transportation solutions, posting on-site engineer services, and occasionally by employing outsourcing mode or third party logistics (3PL) service providers. Suppliers currently face the challenges of increased service demands as a result of the rapidly changing market structure of business to business (B2B) and business to customer (B2C) goods and services delivery, and of e-procurement, complete supply visibility, virtual inventory management, and RFID technology. Many studies on logistics partnerships or logistics outsourcing in the West (Kopczak, 1996; Laarhoven, et al. 2000; House and Stank, 2001) have found that the outsourcing of logistics is prevalent throughout North America and Europe .

Logistics outsourcing has really only developed in the last decade. According to the Council of Logistics Management, in Europe about 76% and in North America about 58% of supply chain partners, suppliers, and customers outsource their logistics activities to 3PL service providers. Figure 1.1 shows that the gross revenue of the 3PL industry nearly tripled between 1996 and 2003. Armstrong and Associates, a supply chain management consulting firm, states that the value of 3PL is readily apparent. The revenue of 3PL services reached US\$100 billion by 2003. Crucial factors that have driven the 3PL industry have been access to integrated supply chain technology, the ability to provide a global logistics solution, and reduced capital expenditure.

Figure 1.1: Third party logistics market 1996-2003



Source: Armstrong and Associates 2004

To meet these new demands, a general trend in the logistics industry is to outsource non-core logistics activities to other professional service providers. Outsourcing gives an organization the opportunity to employ experienced professionals to serve non-core business partners, which removes the responsibility and daily costs of 3PL service providers of carrying out business functions such as transportation, warehousing, inventory management, and information technology. However, it has been found that experienced professional service providers usually lack broader skills, such as global networking strategies and the ability to integrate technologies. There is also a lack of standard measurement of service quality and organizational performance in providing logistical services (Rabinovich et al., 1999; Murphy and Poist, 1998; Leahy et al., 1995).

The demand for better integrated logistics services has increased in Hong Kong to accommodate the structural transformation of manufacturing, and 3PL service providers (for example, Kerry Logistics, Sun Logistics, Oriental Logistics, Jardine Logistics, and ABX Logistics) have formed collaborative relationships with upstream and downstream

partners in the Hong Kong and mainland China supply chains. 3PL services not only reduce comprehensive logistics costs, but also strengthen core business. It is advantageous for Hong Kong, and especially its small and medium sized enterprises (SMEs), to maintain a competitive edge. 3PL can enhance the collaborative relationship between supply chain partners, and the exploitation of this competitive edge can promote company success.

## **1.2 Objectives of the study**

### *1.2.1 Objectives*

The purpose of this study is to empirically investigate 3PL organizational performance in the transport logistics industry in Hong Kong. The specific research objectives of this study are presented as follows.

1. To define the collaborative relationship and performance among 3PL service providers and their upstream and downstream partners.
2. To use organizational theory to develop a research model of the performance measurement of 3PL, and to specify the collaborative relationship among 3PL service providers.
3. To empirically investigate the performance measurement model, provide guidelines for logistics organizations in managing relationships with 3PL providers.
4. To provide a solid foundation for organizational performance measurement to enhance the academic study of 3PL.

### *1.2.2 Scope*

The focus of this study is to empirically investigate the organizational performance in outsourcing and 3PL providers in the transport logistics industry in Hong Kong. To avoid misleading research findings, “third party logistics (3PL)” and “logistics outsourcing” refer to companies that provide professional logistics services to their customers, whereas a 3PL “customer” refers to a company that uses 3PL or logistics outsourcing services (such as suppliers, shippers, and upstream and downstream partners) within a supply chain.

### **1.3 Contribution of the study**

#### *1.3.1 Academic Contribution*

This study explicates the collaborative content of the organizational performance measurement of logistics outsourcing in the Hong Kong transport logistics industry and develops service criteria for 3PL service providers to achieve corporate success and to empirically test a research model. The research findings are expected to contribute to the theory and practice of 3PL in Hong Kong.

This study also provides 3PL organizational performance measurement with an academic foundation, and its empirical evidence and validation makes it generally applicable beyond the Hong Kong transport logistics industry.

Supply chain management and related research ostensibly ignores relationship management and the partnership between logistics outsourcing, or 3PL service providers, and channel partners within supply chains. The developed and tested content of this study fills the research gap by providing reliable and useful reference material on the CFSs of 3PL providers in the transport logistics industry in Hong Kong.

This study of 3PL organizational performance measurement in Hong Kong's transport logistics industry can also provide valuable insights for further research into the development of a theoretical model of the performance measurement of logistics outsourcing and 3PL in Hong Kong.

### *1.3.2 Practical Contribution*

To determine whether the research objectives meet the requirements of the Hong Kong transport and logistics industry, a pilot study was conducted to collect feedback and recommendations from the government, industry experts, and academics. The following are some comments and recommendations that can be applied in the field.

- *“Research on the performance measurement of logistics outsourcing is important for the development of logistics in Hong Kong. We hope your study can contribute to the logistics industry.”* Miss Yik Wai King, Senior Information Officer, Hong Kong Logistics Development Council.
- *“A study on the performance measurement of logistics outsourcing is an important contribution to the corporate success of the 3PL industry in Hong Kong. Research on this topic can enrich and insure quality and performance in our industry.”* Mr. Gary So, General Manager, Kerry Logistics (Hong Kong) Limited.
- *“From a shipper’s point of view, the promotion of quality performance of logistics outsourcing will result in both flexible and reliable 3PL services. We appreciate that this research will contribute to both shippers and the logistics industry.”* Mr. Sunny Ho, Executive Director, Hong Kong Shippers’ Council.

## 1.4 Organization of the study

This thesis is organized into eight chapters. The first chapter describes the study's background information, objectives, contribution, and the organization of the thesis. The second chapter presents a comprehensive literature review of logistics and supply chain management (SCM), outsourcing and 3PL, and 3PL performance measurement research.

Chapter 3 provides a comprehensive explanation of the study's grounding in organizational theory, and chapter 4 outlines the model's framework and the study hypotheses.

Chapter 5 details the methodology and instruments that are employed in the study. Chapter 6 focuses on the results of the data analysis and hypotheses testing. LISREL is chosen as the statistical analysis tool, and several statistical tests, such as the reliability and validity of measurement tools, are also presented in this chapter. A discussion and the implications of the findings are presented in Chapter 7. The final chapter, Chapter 8, details the study's academic contributions, its practical implications, the fulfillment of research objectives, the limitations of the study, and recommendations for future research. The chapter also provides a summary of the study's findings and a conclusion.

## CHAPTER 2

### LITERATURE REVIEW

This chapter gives a comprehensive review of the literature that is related to the study. The chapter is composed of the following sections.

- 2.1 Research on Logistics and SCM
- 2.2 Research on 3PL
- 2.3 Determinants and Advantages of 3PL
- 2.4 Research on 3PL in Asia and Hong Kong
- 2.5 Research on Performance Measurement
- 2.6 Summary

#### **2.1 Research on Logistics and SCM**

Research on logistics and SCM has steadily increased since the 1980s, when companies began to recognize the benefits of collaborative relationships within and beyond their own organizations (Lummus and Vokurka, 1999). However, Mabert and Venkataramanan (1998) claim that research on logistics and SCM is not a recent phenomenon. The first comprehensive investigation and demonstration of supply chain interdependence was conducted by Forrester (1961), and was documented in *Industrial Dynamics*.

In the past few decades, innumerable studies have addressed various aspects of logistics and SCM. From the 1950s until the 1970s, research on manufacturing emphasized mass

production with a minimization of production costs as the primary operation focus (Lummus and Vokurka, 1999). It was thought the development of material requirement planning and investment in work-in-progress inventories could minimize manufacturing costs and improve quality.

In the 1980s, intensive competition among world-class organizations brought the focus of logistics and SCM toward low-cost, high quality, reliable products with greater design flexibility. The development of the just-in-time model is an example of the improvement of manufacturing efficiency and the shortening of the cycle time within a supply chain. In the 1990s, organizations further extended their implementation of best practice to corporate management resources, including strategic suppliers and logistics functions (Lummus and Vokurka, 1999).

Supply chain partners have embraced the concepts of logistics and SCM to improve efficiency and effectiveness across the supply chain, which has led to the emergence of research into supply chain performance measurement (Chow, Heaver and Hendrickson, 1994; Caplice and Sheffi, 1995; Lummus and Vokurka, 1999). Recently, research into logistics and SCM has focused on the development of a framework of supply chain integration to measure the effectiveness of strategic decisions within supply chain activities. Croom's (2000) classification of six research areas of interests is shown in Table 2.1.



**Table 2.1: Principal research areas in the supply chain literature**

<b>Strategic management</b>	<b>Relationships or partnerships</b>
Strategic networks	Relationships development
Control in the supply chain	Supplier development
Time-based strategy	Strategic supplier selection
Strategic sourcing	Vertical disintegration
Vertical disintegration	Partnership sourcing
Make or buy decisions	Supplier involvement
Core competencies focus	Supply or distribution base integration
Supply network design	Supplier assessment (ISO)
Strategic alliances	Guest engineering concept
Strategic supplier segmentation	Design for manufacturing
World class manufacturing	Mergers, acquisitions, and joint ventures
Strategic supplier selection	Strategic alliances
Global strategy	Contract view, trust, commitment
Capability development	Partnership performances
Strategic purchasing	Relationship marketing
<b>Logistics</b>	<b>Best practices</b>
Integration of materials and information flows	Benchmarking
JIT, MRP, waste removal, VMI	Continuous improvement
Physical distribution	Tiered supplier partnerships
Cross docking	Supplier associations
Logistics postponement	Leverage learning network
Capacity planning	Performance measurement
Forecast information management	Quick response and time compression
Distribution channel management	Process mapping and waste removal
Planning and control of materials flow	Physical vs. market-oriented supply chain
<b>Marketing</b>	<b>Organizational behavior</b>
Relationship marketing	Communication
Internet supply chains	Human resources management
Customer service management	Employee relationships
Efficient replenishment	Power in relationships
After sales service	Organizational culture
	Organizational learning
	Technology transfer
	Knowledge transfer

Source: Croom et al. (2000)

Research into logistics and SCM generally emphasizes two major perspectives: organizational integration and flow co-ordination. In organizational integration, companies that are confronted with increasing competition reflect and interact with suppliers and customers to improve supplier response, customer service, and reduce operation costs. Senior managerial staff dissolve the functional boundaries between disciplines, such as manufacturing, distribution, marketing, accounting, and research and development, to improve staff cohesiveness. In flow co-ordination, companies coordinate physical, information, and capital flows in the supply chain network to maximize efficiency and effectiveness and to minimize wastage (Lee and Ng, 1998).

## **2.2 Research on Third Party Logistics (3PL)**

Outsourcing has received increasing attention from researchers and practitioners. Outsourcing companies act as third party service providers, and help to increase the efficiency and effectiveness of a company's logistics function (Christopher, 1992). Third party logistics (3PL) is defined as the outsourcing of logistics activities to other companies, such as transportation, warehousing, inventory management, distribution, and other value-added services (for example, pick-and-pack, assembly, repairs, and re-conditioning) (Lau, 1999). Field (1998) defined 3PL service providers as companies that provide a range of logistics services to outsourcing companies to co-ordinate the transfer of goods from one place to another.

3PL service providers supply various value-added services, such as manufacturing and upstream or downstream partnerships (between suppliers and customers) within supply chains (Kajita and Ohta, 2001). The need to develop a sustainable competitive advantage, the growing emphasis on providing quality customer service, and the strategic value of a

focus on core business and re-engineering (Hill, 1994; Lieb, 1992; Sheffi, 1990) results in the evolution of contract logistics, in contrast to traditional logistics (Table 2.2).

**Table 2.2: The difference between transport and third party logistics services**

<b>Transport services</b>	<b>Third party logistics services</b>
Untailored	Tailored
Usually one-dimensional (e.g., trucking or warehousing)	Multi-dimensional, links transportation, warehousing, inventory management systems, and others
Shippers aim to lower transportation cost through a contract	Goal is to reduce total cost and provide better service and more flexibility
One to two-year contracts	Generally longer contracts, multi-year negotiations by higher level management
Expertise requirement (e.g., the transportation of packaged materials)	Broad logistics and analytical skills requirement
Minimal contract negotiations	Contracts generally require longer negotiations
Simpler arrangements and less switching costs	Complex arrangements result in higher switching costs

Source: Adapted from Jon Africk of A. T. Kearney Consultants

3PL service development has been an important trend in logistics management since the 1990s (Kajita and Ohta, 2001). The 3PL industry generated around US\$40 billion globally in 1998, and by 2000 had grown to US\$50 billion (Leahy, Murphy, and Poist, 1995).

However, studies on 3PL are relatively new. Table 2.3 shows a summary of the research into 3PL since 1999. It appears that although there have been some studies into the integration of relationship marketing and 3PL, research has not exclusively focused on the impact of relational activities on organizational performance and on relationship management between 3PL providers and their clients.

**Table 2.3: 3PL literature (since 1999)**

<b>3PL LITERATURE REVIEW (Since 1999)</b>	
Article	Key issues and findings
Berglund et al. (1999)	3PLs adds value through the creation of operational efficiencies and/or the sharing of resources among customers.
Bhatnagar et al. (1999)	Cost saving, customer satisfaction, and flexibility (customization) are the most important reasons for logistics outsourcing.
Bolumole (2001)	The capability of service providers to facilitate supply chain solutions is largely influenced by four main factors, which in turn significantly determine their role in the supply chain. The nature of the client-provider relationship is based on one of these factors.
Boyson et al. (1999)	The outsourcing of logistics functions has helped firms to achieve a competitive advantage, improve their customer service levels, and reduce their overall logistics costs.
Knemeyer et al. (2003)	Exploratory findings suggest there are benefits to the increased costs of development of closer partnerships with 3PL providers.
Larson and Gammelgaard (2001)	Danish logistics providers tend to be “niche firms” that focus on the domestic market and limited sets of customers by industry.
Lewis and Talalayevsky (2000)	Significant improvements in information technology support the feasibility of centralized markets, such as those offered by 3PL.
Lieb and Miller (2002)	Users are most satisfied with the impact of arrangements on logistics costs, logistics service levels, and customer service.
Persson and Virum (2001)	Industry pressures and individual strategic positioning limit strategic choices and result in dominant strategic directions.
Skjoett-Larsen (2000)	Two theories that involve transaction costs and network approaches explain the development of 3PL.
Stank et al. (2003)	Relational performance through 3PL is the single most important factor that engenders customer satisfaction.
Stone (2001)	Expansion has been demanding for many U.K. logistics service providers, and the European market has not fulfilled its promise.
Sum and Teo (1999)	3PL companies that follow “cost and differentiation” strategies consistently exhibit stronger performance metrics than other strategic types.
Van Hoek (2000)	Traditional third-party logistics services, such as warehousing and transportation, have become somewhat commoditized.
Van Laarhoven et al. (2000)	“Highly successful” 3PL relationships exhibit more distinct characteristics than less successful relationships, such as a stronger emphasis on performance metrics.

### **2.3 Determinants and Advantages of Third Party Logistics (3PL)**

There are many determinants of the fast growth of logistics outsourcing. First, the globalization of business is viewed as the most prominent driving force (Foster and Muller, 1990; Rao et al., 1993; Sheffi 1990 and Trunick, 1989). The growth in global markets and foreign sourcing has placed increasing demands on logistics functions (Bovet, 1991; Cooper, 1993; Fawcett et al., 1993; McCabe, 1990; Whybark, 1990), and consequently 3PL has led to more complex supply chains (Bradley, 1994) and a greater need for transportation and distribution management in international logistics.

Second, the increasing popularity of just-in-time (JIT) principles also promotes outsourcing (Goldberg, 1990; Sheffi, 1990; Trunick, 1989). With the development of JIT, delivery, inventory, and logistics control have become even more crucial to manufacturing and distribution operations. These complexities have prompted many companies to supplement their own resources and expertise with sources outside their own corporate structure.

Third, emerging technology and the versatility of logistics outsourcing are two other important determinants of outsourcing (Trunick, 1989). Firms can easily employ a third party to develop and implement new technologies. The versatility of a third party entails improvements in control, technology, and location. 3PL service providers have the ability to reconfigure the distribution system to adjust to changing markets and technological advances. Small companies tend to be more interested in third-party use, as they are in greater need of technological expertise and assistance (Maltz, 1994; Harrington, 1995). A lack of official and infrastructure knowledge about destination countries forces firms to seek the expertise of outside logistics vendors. As the logistics outsourcing achieves

flexible commitments through flexible arrangements with logistics providers, it enhances business activities and the collaborative success of supply chains.

Lieb (1992) found that the CEOs of 3PL providers perceive a growing customer interest in logistics outsourcing. Outsourcing contributes to profits by enabling customers to gain a competitive advantage, adding measurable product value, enhancing customer service, and assisting in the development of new markets and providing dedicated resources (Foster and Muller, 1990). Logistics providers enhance value creation for customers, which results in increased competitiveness and profitability through prompt and superior customer service (Daugherty and Pittman, 1995).

3PL enhances the overall quality of performance in global supply chains. It not only allows the outsourcing organizations to achieve operational goals, such as the reduction of delivery time and the assurance of accurate shipments, but also promotes competition among service providers and motivates contribution to the renewal and refinement of services. As a result, logistics outsourcing providers and their supply chain partners frequently grow together and move into new markets (Richardson, 1997a). 3PL also allows a company to change its strategic allies if they fail to meet expected standards, which are often defined by a company's own unique demands (Richardson, 1997b).

Finally, 3PL involves long-term, mutually beneficial relationships between users and third-party service providers. Tate (1996) suggested that strategic alliances have become a matter of survival, and not merely a question of competitive advantage. Walton (1996) discussed the current satisfaction and future expectation of partnership satisfaction as perceived by business executives who are responsible for partnership implementation. Boyson et al. (1999) revealed key managerial practices in successful third-party logistics

relationships, and evaluated the impact of logistics outsourcing on competitive advantage, customer service, and overall logistics costs. Lim (2000) developed a game-theory model to study the contract design problem of a third-party logistics services buyer faced with a third-party logistics provider when the quality of service and the cost of the service provided are private information. Murphy and Posit (2000) compared third-party logistics providers and users, and revealed a notable discrepancy between the services offered and the services used.

Other advantages in outsourcing logistics include increased customer satisfaction, lower liability costs, and trimmed inventories (Bradley, 1997; Cullen, 1996; Gooley, 1996; Minahan, 1996 and 1997). Logistics outsourcing benefits not only 3PL service providers, but also supply chain partners. A representative list of reasons for outsourcing is presented in Table 2.4.

**Table 2.4: Reasons for using 3PL services**

<b>Driving outsourcing sources</b>	<b>Identified by</b>
A company's need to assess the present and future market prospects of its products	Mohammed and Chang (1998)
A change in management	
Company restructuring	
Development of supply chain partnerships	
Existing facilities and/or systems	
Expansion into unfamiliar markets	
Improved productivity measurements	
An increase in cost-efficient foreign competition	
An increase in customer demands	
An increase in environmental awareness	
Management demand for financial contribution from all company sectors	
Mergers and acquisitions that require asset concealment	
The need for flexible production	
The need for quicker inventory transferal	
Retrenchment of core business	Muller (1992)
The assumption of new product lines	Maltz (1995)
A focus on the temporal aspects of logistics management	Cooke (1994)

The success of firms that use contract logistics	Bradley (1994)
The determination of a product's competitive advantage in the market	Byrne (1993)
A trend towards centralized distribution systems	Bence (1995)

## 2.4 Research on Third Party Logistics (3PL) in Asia and Hong Kong

Studies that have been conducted in Asia have outlined the link between manufacturing firms and 3PL service providers in Hong Kong, southern China, Japan, and South Korea (Millen and Sohal, 1996). In Southeast Asia, Singapore-based firms are generally satisfied with 3PL service providers (Sum and Teo, 1999).

In Hong Kong, academic studies on logistics management are confined to a few commercial reports and consultation papers on specific topics. Wong et al. (1998) investigated quality improvement within supply chains through the theory of co-operation and competition. Voon and Ho (2001) studied the economic impact of logistics infrastructure development in Hong Kong, and concluded that substantial social benefits may be derived from investment in logistics development, and that both public and private sectors are interested in the assessment of the returns on their investments to determine the impact of investment on the economy.

Hong Kong's economy has gradually evolved into a fully fledged service-based economy, which is currently dominated by the finance, marketing, professional services, international trade, information technology, design, and tourism sectors. However, SCM originates from the manufacturing sector. The key concepts and strategies of SCM, such as the "bullwhip" effect, economic packaging, value-added services, and mass customization, lack application or relevance in Hong Kong corporations, as the majority of business is engaged in non-manufacturing activities.



The outsourcing of logistics activities to 3PL providers is widely prevalent in Europe, North America, Singapore, and Australia (Bhatnagar et al., 1999), but not in Hong Kong (Strait Times, 1999). For example, Hong Kong lags behind Singapore in logistics and technology, particularly in the development of the 3PL industry. Many companies in Hong Kong and southern China lack the modern logistics management expertise and capital to upgrade their services and facilities, even though the value-added services of 3PL are crucial to the development of competitiveness in logistics companies.

The value-added services of 3PL in Hong Kong are small compared with international standards. The current size of the logistics industry is difficult to calculate for several reasons. First, many 3PL providers belong to larger companies, and do not publish their own revenue data. Second, government statistics are unavailable, as 3PL is not yet recognized as a separate Hong Kong industry. Third, there is considerable confusion over logistics terminology, with self-respecting traditional transport companies tending to bill themselves as logistics companies or even supply chain partners. This study of the Hong Kong logistics industry (TDC, 2002) revealed that there are currently few 3PL operators that provide value-added services to the business sector.

In summary, there is limited research into supply chain logistics or 3PL in Hong Kong. A comprehensive study that focuses on the link between 3PL service providers, their supply chain partners, and 3PL quality performance is required to fill the research gap and enrich the existing literature.

## **2.5 Research on Performance Measurement**

### *2.5.1 Definitions of Performance Measurement*

Performance measurement is a popular issue that is widely discussed but rarely defined (Neely et al., 1995). Hence, it is necessary to first introduce some relevant definitions of performance measurement.

Performance refers to the nature and quality of an action that an organization carries out to accomplish its principal missions and functions for the generation of profit (Sink, 1991).

Effectiveness is the extent to which production functions are accomplished and customer requirements met. Efficiency is a measure of how economically the organization's resources are utilized in accomplishing functions. From a quantitative perspective, performance is related to the dimension of scale, and means that, generally, it can be quantified in a variety of dimensions. For example, the level of performance can be expressed as an absolute number or a percentage in a way that managers can easily understand. Performance targets are only meaningful when they can be expressed quantitatively (Macleod et al., 1997).

The definition of performance measurement varies among different authors. Some of these definitions are given in the following.

- The process of quantifying the efficiency and effectiveness of action (Neely et al., 1995; Neely et al., 1996).
- The process of evaluating performance relative to a defined goal (Rose, 1995).
- The process of evaluating performance in terms of explicit short-, medium-, and long-term objectives and reporting the results to management (Cook et al., 1995; Rose,

1995).

- The process of transferring the complex reality of performance into a sequence of limited symbols that can be communicated and reproduced under similar circumstances (Gunasekaran et al., 2001).

In summary, performance measurement is progressive language that clarifies present, and more importantly, future performance status. It enables a steady advancement toward established goals, and identifies shortfalls or stagnation (Rose, 1995). Performance measurement is a progressive guide to the achievement of objectives. It is not just an observation on past performance, but a tool for the realization of corporate aspirations and the assurance of a prosperous future.

Performance measurement is a metric that is used to quantify performance. It is an analytical tool in the performance measurement process that records measures, displays results, and determines subsequent actions (Rose, 1995). Generally, performance measures have financial or non-financial and tangible (hard) or intangible (soft) classifications. Financial performance measures tend to focus on the resultant impact in financial symbols of production activities, such as logistics activities, whereas non-financial performance measures tend to focus directly on actual production activities, such as investment turnover, defect ratio, and lead time (Polakoff, 1992).

The performance measures of tangible items indicate direct measurement, such as total costs and order fill rate, whereas soft measures are intangible metrics that indicate indirect measurement, such as instant attitude, service capability, goodwill, and reputation. Soft performance measures are indicative of intangible performance.

Based on the definitions of performance and performance measures, a performance measurement system (PMS) can be defined as the employment of a set of metrics to quantify both the efficiency and effectiveness of actions (Neely et al., 1995; Neely et al., 1996). A PMS does more than collect data on performance results or perform a rudimentary calculation and documentation of events. It integrates critical information on a firm's inputs, outputs, and actions. The measurement results of a PMS influence the future by supporting and shaping subsequent decisions and production activities.

Business performance measurement has always been a managerial priority, and has attracted increasing interest both among academics and managers. Managers continually measure business performance and request performance-related information. Performance measurement is integral to the successful execution of managerial duties. Performance measurement is the transferal of the complex reality of performance into a sequence of communicable symbols that can be reproduced under similar circumstances (Lebas, 1995).

### *2.5.2 Literature of Performance Measurement*

Sink (1991) declared that “measurement is complex, frustrating, difficult, challenging, important, abused and misused,” yet Das (1994) claimed: “if we cannot measure it, we cannot manage it.”

The literature on performance measurement has evolved since it first emerged in the 1980s. Historically, when organizations are small and operations are simple, the primary performance measurement has been cash flow. In the post-Industrial Revolution period, organization size increased and productivity measures were widely used at various stages of production. From the late nineteenth century until the 1930s, theoretical and practical

methods of management accounting were established, and standards were widely applied (Maskell, 1991). Traditional management accounting techniques became the accepted method of performance measurement for manufacturing plants and their distribution operations. As performance measurement research progressed, some researchers (Pursell, 1980) focused on the performance measurement of the entire business unit (typically division level and plant level) and examined performance criteria, standards, and measures. However, the older body of performance measurement literature lacks cohesion (Lockamy and Spencer, 1998).

During the past few decades, the corporate world has changed rapidly and dramatically in terms of work maturity, increased competition, improvement initiatives, the introduction of national and international awards, organizational roles, external demands, and new technology. Accordingly, organizations have encountered dramatic competition due to improved product quality, increased flexibility and reliability, the expansion of product variety, and an emphasis on innovation (Fry et al., 1993). Additional emphasis has been placed on the business features that are critical to corporate success, rather than mere financial reporting (Hazell and Morrow, 1992). The new challenges of the corporate world demand that organizational managers consider appropriate paradigms of performance measurement to promote managerial improvement.

### *2.5.3 Roles of Performance Measurement*

The importance of performance measurement in management is generally a given, and indeed, management can hardly exist without it (Lebas, 1995). However, a poor measurement methodology can significantly hamper a company's progress (Maskell, 1991). A well-designed PMS is an essential element of effective management planning and

control. It allows business management to excel through performance monitoring, motivation enhancement, communication improvement, and problem diagnosis (Rolstandas, 1995; Waggoner, et al., 1999). Performance measurement also provides an effective approach to the identification of success and management strategy potential, and facilitates an understanding of a company's progress and current status. The roles of performance measurement can be summarized as follows.

### *1) Monitoring of business progress*

Performance measurement results can be used to monitor an organization's progress toward the achievement of goals, which allows organizations to identify their current position and future targets. Performance measurement can create a shared understanding, and show the extent to which the planned improvements have actually taken place.

### *2) Monitoring the effect of strategies and plans*

Performance results help managers to test the effect and feasibility of strategies and plans, and the implementation of these strategies and plans can be monitored so that the correct measures are taken to ensure the achievement of long-term goals.

### *3) Diagnosis*

If business success declines, then performance measurement results can be indicative of this, and can prompt a search for reasons (Rolstandas, 1995). Organizations can thus identify problems and prevent disasters before they occur.

#### *4) Supporting decision making*

Performance measurement helps organizations to identify their success and potential opportunities, and reveals whether they have achieved customer satisfaction and their desired goals. Ideally, such measurement indicates where to act, how to act, and monitors efficiency. Feedback information facilitates greater precision in the identification of potential and actual problems. Performance measurement is critical for the justification of further investment and effort, and ensures that decisions are made based on fact, rather than supposition.

#### *5) Direct guide to operations*

Timely and accurate feedback on operational performance is essential to maintain consistent goal-oriented operations and to make timely corrections.

#### *6) Facilitation of motivation and communication*

Performance measurement reveals progress and highlights an organization's current status and future prospects. It provides clarity and a motivational incentive for the entire operation, and enhances staff communication.

Performance management both precedes and follows performance measurement in a virtual spiral, and creates a context for measurement (Lebas, 1995). In summary, performance measurement is a powerful and indispensable tool for management. In SCM, performance measurement makes a significant contribution to performance improvement, and comprehensive performance feedback supports the design and improvement of supply

chain systems.

#### *2.5.4 Models of Performance Measurement*

As performance measurement research and practice continues to evolve, principle and methodological improvements to PMS design and implementation have been suggested in articles. Before a discussion of the PMS that is proposed in this study, a review of some of the important principles and rules of PMS design and the selection of performance measures would be useful. These principles contribute significantly to the design and improvement of a PMS.

Although existing performance measurement theories vary across disciplines, they all pay attention to meeting the new and ever increasing requirements of modern business environments. The literature reveals that a large number of methods, models of performance measures, and PMSs have been developed, some typical example of which are briefly described in the following.

##### *1) Strategic Measurement Analysis and Reporting Technique System (SMART)*

Wang Laboratories (Cross and Lynch, 1989) developed a system that integrates both financial and non-financial reporting. The SMART system consists of a four-level pyramid of objectives and measures that comprises corporate vision or strategy, business unit market and financial objectives, business unit operational objectives and priorities, and departmental-level operational criteria and measures.

##### *2) Performance Measurement Questionnaire (PMQ)*



Dixon et al. (1990) developed a performance measurement questionnaire (PMQ) to help managers identify performance strengths and failures, to determine the extent to which the existing performance measures support improvements, and to establish an agenda for performance measure improvements. The PMQ involves a workshop to develop, revise, and re-focus the set of performance measures, and provides a mechanism for identifying areas of improvement in a company and their associated performance measures. However, the PMQ is not a comprehensive integrated measurement system, and does not take continuous improvement into account.

### 3) *The Balanced Scorecard*

Kaplan and Norton (1992) proposed the balanced scorecard approach to integrate strategic, operational, and financial measures. In this system, goals are set by managers based on four perspectives: customer, internal, innovation/learning, and financial, with measures being specified to achieve each goal. However, the balanced scorecard approach is weak in its ability to provide senior managers with an overall view of performance, and is not suitable for application at functional operational levels.

### 4) *Strategic Performance Measurement System*

Vitale et al. (1994) presented an action-focused tool, the strategic performance measurement system, that concentrates on an organization's strategies. The concepts and ideas of this system were developed from hands-on experience. The system concentrates on specifying goals, matching performance measures to strategies, identifying performance measures, predicting results (positive and negative behavior associated with the measures), building commitment, and planning the next step. The strategic performance measurement

system provides tailor-made logistics solutions for 3PL providers to ensure accurate and efficient 3PL customer service.

#### 5) *Integrated Dynamic Performance Measurement System (IDPMS)*

Ghalayini et al. (1997) developed an integrated dynamic PMS based on the integration of three main areas of a company: management, process improvement teams, and factory or shop floor. To achieve an integrated system, the three areas are linked through the specification, reporting, and dynamic updating of the defined areas of success, performance measures, and performance standards. Three different tools are incorporated to support and enhance integration within the IDPMS: a performance measurement questionnaire, the half-life concept, and a modified value-focused cycle time diagram.

#### 6) *Holistic Process Performance Measurement System (PPMS)*

Kueng (2000) presented a holistic process performance measurement system that was specially designed for process-based businesses. The PPMS employs a multiperspectival assessment of performance processes, including financial, employee, customer, societal, and innovative processes. This approach is designed to give the process direction, identify areas of weakness, provide a comprehensive evaluation of process performance, and assess the impact of previous process changes.

Other studies have developed other methods and approaches of PMSs. For example, Neely et al. (1996) developed a management process for the design of measurement systems. This approach provides managers with detailed directions to design and document measurement systems. Neely et al. (1997) presents a framework (a performance measure record sheet),

that can be used to design and audit performance measures. The proposed measure record sheet addresses many measure design issues, such as title, purpose, target, formula, frequency of measurement and review, source of data, operator, measurement means, and notes or comments.

Neely et al. (1997) proposed an integrated performance measurement framework, which includes a workbook, a six-stage plan, and a spectrum or checklist that contains a list of non-financial performance measures. This six-stage model goes from the identification of success factors, through the selection of measures, to implementation and maintenance. It aids in the building of new measurement systems and the optimization of existing systems.

These improved principles and models provide valuable approaches to PMS design and the selection of performance measures. There are also many recommendations for the successful adoption of PMSs in the literature that deserve attention, such as the linking of a PMS with organizational strategic objectives, the simplicity and accessibility of performance information, the flexibility and evolution of a PMS, the focus on activities and business processes, and the inclusion of financial and non-financial performance measures. These suggestions can be used as benchmarks for the development of a specific PMS that is particular to 3PL.

#### *2.5.5 Shortcomings of the Existing Performance Measurement Systems*

Performance measurement has become a popular tool in various industries and organizations. However, not all of the PMSs that are in use meet expectations. The literature has widely probed the limitations of traditional management accounting methods in supporting organizational performance improvement. Management accounting methods

were commonly used in the past in areas such as budgeting and investment analysis, but have become obsolete in a comprehensive performance measurement environment. Traditional financial performance measurement methods principally focused on profit, return on investment, return on sales, purchased price variations, and productivity until the 1980s (Ghalayini et al., 1997). However, with the new business emphasis on quality and customer satisfaction and the increasing prevalence of new production technologies and management philosophies (for example, CIM, FMS, JIT, and TQM), the traditional measurement systems and performance measures that were based on cost analysis and financial accounting became unsuitable, and were heavily criticized by many researchers (Ghalayini et al., 1997; Kaplan and Norton, 1992; Lockamy and Cox, 1994; Lynch and Cross, 1991; Maskell, 1991).

Even though organizations have improved their financial PMSs and have strived to adapt them to meet modern management requirements, critical problems continue to exist, which are highlighted in the following.

#### *1) Short-term orientated and finance based*

Many PMSs measure financial performance, such as profit, costs, and return on investment, and encourage the achievement of short-term goals at the cost of long-term improvement. Some organizations continue to use finance-based traditional measurement methods that are more effective in showing the results of previous, rather than future performance (Holmberg, 2000). The lagged nature of finance-based measurement systems does not promote performance improvement. Finance-based PMSs, are the results, rather than the cause, of previous management action and organizational performance. They inform managers of decision consequences that have already been made, but do little to predict

future performance (Eccles and Puburn, 1992).

## 2) *Lack of relevance*

The lack of relevance of PMSs to the strategies or strategic goals of organizations is also problematical and warrants attention. Many measurement initiatives do not derive from strategies, and therefore do not support strategic management (Adams et al., 1995). Given this lack of relevance, PMSs cannot comprehensively assess performance nor provide accurate feedback. This misguides further actions and decisions.

## 3) *Internal focus and local optimization*

Some PMSs focus on internal functions and performance, rather than on overall organizational performance. This ignores the benefits of observing performance in other areas and overemphasizes local performance, which leads to sub-optimality. It also loses sight of the larger context. The overall environment, rather than particular areas or divisions, determine the success of an organization, and thus this inward-looking method fails to support the improvement of the organization as a whole.

## 4) *Minimizing variance, rather than seeking continuous improvement*

Many PMSs that are used in organizations tend to measure the variance in specific performance indicators and encourage the minimization of this variance. This method prevents PMSs from supporting continuous improvement in organizations.

## 5) *Inconsistent measures*

The number and variety of measures that is used in organizations tends to increase over time, but measures are seldom removed or revised. Measures are therefore often inconsistent and incompatible with each other, or are used incorrectly. PMSs measure too many, and sometimes incorrect, factors, and thus provide wrong information. The design of PMSs should address the complex and dynamic characteristics of the management environment and the supply chain, and the measures that are used should change over time to accommodate corporate changes. Appropriate performance measures should also take into account supplier and customer perspectives.

#### 6) *Quantifying performance in financial items and absolute numbers*

A critical failing of existing PMSs is that they try to quantify both tangible and intangible performance. Their use of absolute numbers is meaningless, and does not provide useful information on performance. The inaccurate quantification of performance distorts organizational performance measurement.

The main overall shortcoming of existing PMSs is that they fail to capture the complexity of contemporary business performance. A dynamic SCM environment requires organizations to be increasingly competitive in terms of opportunity recognition, learning speed, innovation, cycle time, quality, flexibility, reliability, responsiveness, and integration. Such competition demands a more robust, flexible, and integrated measurement system that can measure the capabilities of organizations and their holistic performance.

Many companies recognize the importance of non-financial performance measures. Suitable non-financial performances are the cause, and successful financial performances

are the effect (Kaplan, 1986). The whole foundation of a reasonable PMS is an inherent faith in the cause-effect relationship. However, the integration of financial and non-financial performance measures into a comprehensive measurement system represents a significant challenge (Norton and Kaplan, 1992).

## **2.6 Summary**

This chapter provides an extensive literature review that is relevant to this study. First, previous research into logistics and SCM is presented, followed by reviews of the nature, determinants, advantages, and field studies of third party logistics (3PL). This chapter also identifies the importance of performance measurement in organizations, and introduces different performance measurement models. The literature review reveals only a few studies on performance measurement of logistics and SCM, which are discussed in the next chapter.

## CHAPTER 3

### THE THEORETICAL BASIS OF THE STUDY

This chapter reviews the theoretical basis of this study, and organizational theory, which is applied as the ground theory, is thoroughly explicated. The chapter is composed of the following sections.

- 3.1 Organizational Performance Theory and Application
- 3.2 Service Management: Theory and Application
- 3.3 Performance Measurement in Logistics and Supply Chain Management (SCM)
- 3.4 Performance Measurement in 3PL
- 3.5 Summary

#### 3.1 Organizational Performance Theory and Application

Performance is a recurring theme in management paradigms. It includes strategic and operations management, and is of interest to both academic scholars and practicing managers. Performance is defined as the evaluation of constituents using efficiency, effectiveness, or social referent criteria to measure how well an organization meets the aspiration levels of constituents (Thompson, 1967; Friedlander and Pickle, 1968).

According to Seashore and Yuchtman (1967), conceptual frameworks for the assessment of organizational performance were developed in response to the repeated failure of managers to make reliable and valid estimates of the performance of their organizations, and the



repeated failure of research to locate stable and generally applicable relationships between predictor variables and organizational performance variables.

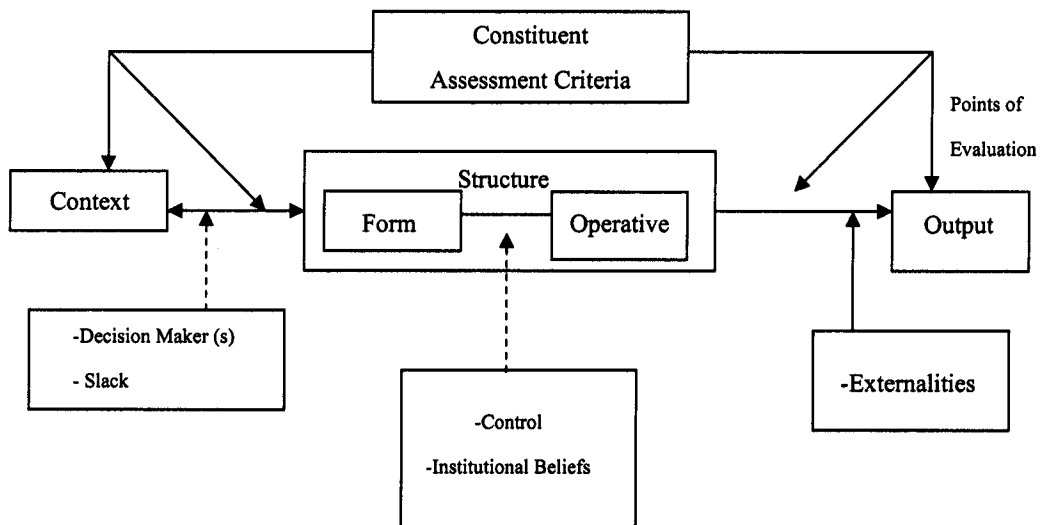
Although prescriptions for improving and managing organizational performance are widely available (Nash, 1983), the academic community has been largely preoccupied with discussions and debates about issues of terminology, levels of analysis, and conceptual bases for the assessment of performance (Ford and Schulenburg, 1982). Although the importance of performance concepts such as organizational effectiveness is widely recognized (Campbell, 1977; Conlon and Deutsch, 1980; Goodman and Pennings, 1977; Hannan et al., 1976; Kirchoff, 1977; Steers, 1975, 1977; Yuchtman and Seashore, 1967), the treatment of performance in a research setting is perhaps one of the thorniest issues that confronts academic researchers today. There are several approaches to organizational performance, such as the theory developed by Pugh et al. (1963).

A review of the literature of organizational performance indicates that there are six major groups of research (Lenz, 1981). One group comprises investigations on the link between environment and performance. Some key variables that have emerged from microeconomics in this group are business policy, sociology, environment, and organizational structure. Another group involves research into the structural-contingency hypothesis that was advanced by Lawrence and Lorch (1967). The third group consists of studies that are based on the idea that the structure of an organization is a principle determinant of performance. The relationships among size and performance and the factors that moderate this link are considered. This group also includes research that is based on a strategy-organization or structure-performance hypothesis, environmental concepts, and overall strategy to explain a firm's performance and intra-industry competitive structures. Some of this research focuses on the effects of various aspects of administration on

organizational performance (Lenz, 1981).

Differences in both the concepts and approaches to organizational performance assessment have undoubtedly contributed to the inconsistencies in research findings. Scott (1977) suggested that even if these were resolved, contradictory findings would still appear because of the links between organizational characteristics, such as context, structure, and organizational performance. Ford and Schulenburg (1982) developed a conceptual framework for the identification and examination of the relationship between context, structure, and output within an organization to identify and resolve the problem of contradictory findings. This framework is shown in Figure 3.1

**Figure 3.1: Links between context, structure, output, and constituent assessment criteria**



Source: Ford and Schulenburg (1982)

Figure 3.1 shows that Ford and Schulenburg's framework assumes the organizational performance links between organizational characteristics to be rational and direct. The two most important links are between context (technology) and structure, and structure and output.

In terms of the link between organizational context and structure, current perspectives on organizations, most notably the contingency theory, implicitly assume that there is a direct, logical, and necessary relationship between the two, and that the direction of causality is from context to structure (Bobbitt and Ford, 1980). Yuchtman and Seashore (1967) argue that an organization's bargaining position, and thus its ability to secure resources, is influenced by the tightness of alignment, link input, transformation, and output processes. This is demonstrated by their focus on input processes only, and their assumption of the existence of rational links between input, transformation, and output.

Several studies indicate the existence of entities that affect the directness of the relationship between context and structure. Bobbitt and Ford (1980), Montanari (1978), and Child (1972) argue that contextual factors refer to any variable that influences a decision maker's choice other than the individual characteristics of that decision maker. Ford (1980) indicates that the relationship between context and structure is not determined by context, but depends on how decision makers view the value of the context and how they choose to deal with it.

Decision makers may alter organizational structure to improve the alignment of context and structure. However, this argument assumes that decision makers will preserve the integrity of an existing structure by undertaking proactive strategies that are designed to control the value of contextual factors (Ford and Schulenburg, 1982). Whetten (1980) indicated that a strategy that a declining organization may pursue is that of "prevention," in which the organization attempts to change the value of its environment and thus stem the decline. This strategy is commonly manifested in the attempt of companies to control imports. A focus on the value of context enables decision makers to realize a change in an organization's output, such as profits and turnover, without modification of the existing

organizational structure.

Changing or controlling of the value of context, rather than structure, may become the basis for organizational decision-making, and hence the relationship between context and structure is not purely direct. Decision makers decide the value of a structure based on their cognitive and motivational orientations. Once the value of a structure is determined, either the structure or the context may be changed. The structure of an organization, such as a 3PL provider, may be affected the contexts (reliability or responsiveness) of its decision makers (suppliers or customers), as is supported by the foregoing framework.

The link between structure and output is not often considered by companies when organizational performance is assessed (Ford and Schulenburg, 1982). The conceptual framework of Ford and Schulenberg assumes organizational output to be under organizational control through its structural arrangement. Lenz (1981) and Dalton et al. (1980) claimed that numerous factors that are outside an organization's control may influence output. The assessment of organizational performance may thus focus on the behavioral (turnover or satisfaction) and non-behavioral (i.e., profit) consequences of organization that may be intended, as with product quality or unintended, as with turnover. These may be viewed as organizational outcomes.

The conceptual framework of the link between structure and output supports 3PL organizational performance, as service providers can be affected by structure, such as service quality and externalities (trust and relationship management). Organizational theory, which uses the context – structure – output approach, reveals both a conceptual and empirical link between 3PL service providers, supply chain partners, and 3PL organizational performance measurement.

A theoretical framework of 3PL organizational performance measurement is presented in the following.

### **3.2. Service Management: Theory and application**

Service management has typically been used to describe marketing and logistics activities that are aimed at the enhancement of the products that are offered or the facilitation of the exchange process between suppliers and customers. From a marketing perspective, customer service includes elements of product design and maintenance, training in sales attitudes and responsiveness, the ease of customer interaction with suppliers, guarantees, price, and elements of logistics service.

Logistics service, as a subset of overall customer service, includes elements that are associated with the delivery of products to meet customer demands. Delivery reliability, product availability, timeliness and responsiveness, accuracy, and freedom from damage are important dimensions of logistics service (Mentzer et al., 1989; Rinehart et al., 1989). Rinehart et al. (1989) note that customer service is the unifying factor in the integration of marketing and logistics, and the performance of both marketing and logistics activities creates customer service output for a firm. Customer service can be thought of as an integrative activity within a supply chain.

#### *3.2.1 Service Management: Theoretical Studies and Practice*

The literature of customer service management from the 1960s to the late 1980s reveals that logistics management research mainly focused on physical distribution services (PDS), including the identification of the elements of PDS, the determination of the cost effects of

PDS, normative discussions of the management and measurement of PDS, and investigation into the impact of PDS on demand (Mentzer et al., 1989). Manrodt and Davis (1993) described early work in customer service as being extremely supplier-oriented, with a focus predominantly on internal management and measurement and with very little emphasis on the identification and satisfaction of customer needs. In the 1980s and 1990s, researchers began to focus on the creation of customer value and competitive advantage through customer service and customer satisfaction (Manrodt and Davis, 1993).

Langley and Holcomb (1992) noted several trends in customer service in relation to this shift toward the creation of customer value. First, firms have become more proactive in their approach to providing value-creating services before, during, and after a product is delivered. Second, the emphasis on customer service has increased in response to more demanding customers. Third, information management is seen as the key to an increase in customer service. Fourth, there is a trend of a move away from transactional relationships and a move toward long-term relationships with fewer suppliers. This suggests that with the increase in pressure to improve customer service, firms that are successful in undertaking this shift will achieve sustainable competitive advantage. With an increased focus on customer service as a means of creating value for customers and acquiring competitive advantage, the development of an appropriate customer service strategy has become a much more significant dimension of customer service management within a firm.

An important element in the determination of appropriate customer service offerings is the customer's reaction to a product or service failure. For example, in a situation in which a product is a critical component of the downstream customer's production process, a supplier firm's responsiveness to supply failure is equally critical to the customer's ability

to meet the demands of downstream consumers (Manrodt and Davis, 1993). A customer service strategy therefore needs to include responsive supply maintenance and support. If the product is not critical to the customer's production process, then a warranty that ensures that the product can be returned or repaired with no charge may be more appropriate. Likewise, the level of responsiveness of a logistics service may depend on a consumer's reaction to product unavailability.

Questions about consumer responses to service failures have often been the basis for determining the most cost-effective service strategy. The idea behind this approach is to determine optimal service levels based on both the cost of providing a service and the cost of sales lost because of service failure. In supply chains, service costs and customer responses (the cost of service failure) must be assessed at the level of the end consumers and across multiple firms to determine appropriate customer service strategies for the supply chain as a whole.

The traditional objectives of a customer service strategy, such as the assurance of optimum service levels to enhance the profitability of the firm, the balance between internal capability and the needs of external customers, and the focus on service offerings that provide competitive or differential advantage, are important in a supply chain context. It is equally important, however, to recognize that a customer service strategy within a supply chain must look beyond the immediate customer-supplier relationship (Manrodt and Davis, 1993).

The implications of customer satisfaction and customer response in a traditional customer-supplier relationship must be considered, and the role of customer service in the facilitation of the ability of supply chain partners to serve their downstream customers

must be taken into account. For example, a firm should optimize service levels to mediate for customer firms based on the implications for the downstream services that are provided to the ultimate consumer. Even though higher levels of responsiveness are more costly for the main firm, it may enable downstream customers to respond more effectively to consumer markets changes, and thus increase market share for the supply chain as a whole (Langley and Holcomb, 1992).

To be more effective, total supply chain capability (including upstream suppliers and 3PL service providers) must correspond to downstream customer demand. To achieve the SCM objective of improved ultimate consumer services, customer service strategies must be developed for the supply chain as a whole. Research is needed to develop tools and techniques for the development, implementation, and evaluation of such integrative strategies across firms within the supply chain. In service management, service quality and relationship management are both vital for the identification of cohesive customer service relationships between 3PL service providers and their customers.

### *3.2.2 Service Quality*

Research into service quality has generally focused on the process of service delivery in consumer-oriented service applications, such as retail banking, dry cleaning, and credit card companies. For service firms, the delivery of higher levels of service quality is key to the achievement of a stronger market position. Service quality is conceptualized as a global attitude that is similar to consumer satisfaction through a comparison between what service firms should offer (expectations) and the perceptions of the firm's actual performance (Parasuraman et al., 1988).



Customer service quality has tangible and intangible dimensions. The tangible components include the appearance of customer service personnel and facilities, and the intangible components include the process components of the service encounter, such as the ability to fulfill service commitments accurately and dependably, the willingness to help customers and provide prompt knowledgeable service, and the display of courtesy and attentiveness toward customers (Parasuraman et al., 1988). The difference between the expectations and perceptions of the services that are provided by a firm is a measure of service quality (Parasuraman et al., 1988).

The literature has shown a significant correlation between service quality and variables such as consumer willingness to recommend the service provider to a friend (word of mouth), purchase intentions, increased market share, and profit contribution (Boulding et al., 1993; Cronin and Taylor, 1992; Parasuraman et al., 1991). Most service quality research has focused on consumers, with limited investigation into the applicability of service quality concepts in a supply chain or channel.

Some researchers have extended the concept of service quality into the area of logistics service quality (Bienstock et al., 1997; Mentzer et al., 1989). Compared to the consumer approach, logistics service is composed of both technical (or outcome) and process dimensions, such as those that are emphasized by the service quality literature (Bienstock et al., 1997; Jiang et al., 2000; Kuei et al., 2002; Robinson and Malhotra, 2005; Narasimhan and Nair, 2005). Technical quality is defined as whether a service delivers core benefits (punctual delivery and product availability), and functional quality addresses the process of service delivery (interfacing with customer service personnel).

It is recognized that the expectations and perceptions of customers of service processes

(convenience, flexibility, personalized attention, and information) are important in the measurement of customer satisfaction, along with the traditional logistics service measures of speed, availability, accuracy, and consistency (Mentzer et al., 1989). Satisfaction-based loyalty is also an important variable that links logistics service activity to customer intentions. This suggests that the service processes that are associated with customer-supplier interfacing may play an important role in the enhancement of customer satisfaction and in the influence of customer behavior on a supply chain (Chow, 2004).

### *3.2.3 Relationship Management*

In terms of service management, SCM is focused on relationship management and on the flow of information and materials to deliver enhanced customer services. Berry (1995) describes relationship management as the attraction and maintenance of customer relationships to secure loyalty and retain existing customers. Although customer service traditionally aims to attract and keep customers (Lambert and Stock, 1993), an expanded view that encompasses the enhancement of customer relationships is warranted in a supply chain.

Because supply chain relationships are built on long-term partnerships, a focus on loyalty assurance is important. The objective of customer relationship enhancement and loyalty assurance of guaranteeing repeated purchases is not likely to be sufficient in supply chain management. The focus should instead be on the enhancement of interaction in the relationship to improve supply chain performance generally. This raises the question of how customer service interfacing influences the satisfaction and loyalty of intermediary customers and, as a result, the degree of cooperation and information exchange between firms (Lambert and Stock, 1993).

Key strategies in relationship marketing include the tailoring of the relationship to individual customers, core service augmentation with extra benefits, service pricing to encourage customer loyalty, and employee marketing to encourage the improvement of customer service performance (Berry, 1995). Internal activities that aim to establish, develop, and maintain successful relational exchanges are mutually beneficial. At advanced levels of relationship marketing, structural solutions to the problems of important customers are critical elements of the services that are provided.

SCM is a philosophy that synchronizes internal and external capabilities to create market value and allow supply chain members to focus on finding new ways to create unique and innovative solutions that provide value to customers on an individual basis (Ross, 1998). Guanxi, trust, and commitment are three major elements in relationship management between 3PL providers and their customers.

This section focuses on the elements that are important in service and relationship management as management activities or organizational processes. To achieve customer service improvement in a supply chain as a means of value creation, customer satisfaction, and differential advantage achievement, firms must focus on the development of appropriate strategies that are based on their understanding of consumer needs, and on the development of the capabilities of the supply chain to meet those needs in a cost-effective way.

The differences in service requirements across customer segments must be understood, and organizational processes must be designed to allow firms to respond to the different requirements of strategic customer segments. To accomplish these objectives, customer service interfacing must be managed in a way that enhances the quality of the relationship

and encourages the open exchange of information between firms. Important information about customers must be distributed and utilized to focus supply chain activities on the most valuable customer services. A critical element of customer service management is an understanding of the performance outcomes of the customer service process that customers perceived to be important. This study identifies the service management activities of 3PL providers and their customers.

### **3.3 Performance Measurement of Logistics and Supply Chain Management (SCM)**

Performance measurement is defined as the process of quantifying effectiveness and the efficiency of actions (Stock et al., 1999). In business management, performance measurement contributes to industrial performance improvement. Sink and Tuttle (1989) claimed that you cannot manage what you cannot measure. Harrington (1991) stated: “if you cannot measure it, you cannot control it. If you cannot control it, you cannot manage it. If you cannot manage it, you cannot improve it.” The importance of performance measurement for logistics and SCM management is therefore obvious.

In management, performance measurement provides the necessary management feedback for decision making. It plays a critical role in performance monitoring, motivation enhancement, communication, and problem diagnosis. Performance measurement also facilitates the identification of actual and potential success in management strategies, and an understanding of progress and position. It not only assists in the direction of management attention and a revision of company goals, but also in the re-engineering of business processes (Bourne et al., 2000; Kuwaiti and Kay, 2000; Waggoner et al., 1999; Van Hoek, 1998; Rolstandas, 1995). The proper measurement of the performance of a supply chain is necessary for the cultivation of understanding between supply chain

partners for performance improvement and implementation (Dreyer, 2000; Fawcett and Cooper, 1998; Lee and Billington, 1992). Appropriate performance measurement is conducive to successful SCM operations.

There has been some research into performance measurement systems (PMSs) and performance measures for SCM (Beamon, 1998, 1999; Gunasekaran et al., 2001; Holmberg, 2000; Narasimhan and Jayanth, 1998; Van Hoek, 1998). However, most of this research focuses on individual measures, such as cost, activity time, customer responsiveness, and flexibility.

According to Beamon (1998), measures of supply chain effectiveness and efficiency can be divided into qualitative and quantitative performance measures, as is detailed in the following.

#### *1) Qualitative performance measures*

- Customer satisfaction is the degree to which customers are satisfied with a product or service received from internal and external customers. It is composed of pre-transaction satisfaction, transaction satisfaction, and post-transaction satisfaction.
- Flexibility is the degree to which supply chain partners respond to fluctuations in a demand pattern.
- Information and material flow integration is the extent to which all of the functions within a supply chain communicate information and transport materials.
- Supplier performance is the consistent and punctual delivery of quality raw materials to production facilities by suppliers.

## 2) *Quantitative performance measures*

- Measures based on cost that include cost minimization, sales maximization, profit maximization, customer response time minimization, lead-time minimization, and function duplication minimization.

Beamon (1999) argued that existing supply chain models have typically restricted themselves to traditional measure of cost, and that the individual performance measures that are often used in supply chain analysis are non-inclusive, and ignore the interactions among supply chain characteristics and the critical aspects of organizational strategic goals. Beamon proposed three separate types of performance measures.

- *Resource measures.* These measure the resource management efficiency of inventory levels, personal requirement, equipment, utilization, energy usage, and cost.
- *Output measures.* These include the measurement of customer responsiveness and quality, and the quality of the final product.
- *Flexibility measures.* These include the measurement of volume, delivery, and new product flexibility.

Gunasekaran et al. (2001) claimed that there is an urgent need to study performance measures and metrics because there a lack of balance in the approach and a lack of clear distinction between metrics at the strategic, tactical, and operational levels. A set of performance measures and metrics in supply chains is discussed in the following literature summary.

- *Metrics of planned order procedures* are used to measure the performance in

order-related activities. These metrics assess the order entry method, order lead-time, and order path.

- *Supply chain partnership and related metrics* are used to assess level of coordination among supply chain partners. Evaluation criteria include the level and degree of information sharing, buyer-vendor cost initiatives, the extent of mutual cooperation that leads to improved quality, and the extent of mutual assistance in problem solving efforts.
- *Production level measures and metrics* involve the measurement of a range of products and services, capacity utilization, and the effectiveness of scheduling techniques.
- *Delivery link measures* are designed to evaluate the performance of delivery and distribution costs.
- *Customer service and satisfaction measures* are aimed at the integration of customer needs in the design and setting of dimensions of quality and feedback for the control process. The assessed factors include product or service flexibility, customer query time, and post-transaction services.
- *Finance and logistics cost metrics* are used to assess the financial performance of a supply chain, such as asset cost, return on investment, and total inventory cost.

Holmberg (2000) presented a performance model that reflects the systematic structure that underlies a supply chain. Some problems in the existing performance measurement systems (PMSs) for supply chains include weak links between strategies and actions, a heavy reliance on financial measures that cause reactive behavior, and a confusing multitude of isolated measures. In summary, Holmberg argued that the literature often focuses either on the metrics to be deployed in certain situations and their inherent characteristics, or on the development process of a proper PMS. There is some indication that the adoption of a systematic view of performance measurement and the management

of supply chains helps to achieve a balanced PMS and the alignment of strategies with actions across the spectrum of supply chain operations.

Although logistics and SCM concepts have received significant attention from both academics and practitioner, inter-organizational supply chain performance measurement appears to be limited to the buyer-seller relationship. Keebler et al. (1999) surveyed the logistics and supply chain activities of about 3,100 logistics executives and concluded that “few, if any, firms are measuring full supply chain network performance.” This implies that comprehensive supply chain performance measurement systems are few and far between.

Several observations can be made from the literature on supply chain performance measurement. A great deal of attention has historically been placed on individual measures, rather than on systems of measurement (Beamon, 1999), and many of the existing studies are prescriptive in nature and emphasize the attributes that good metrics and measurement systems should have (Bourne et al., 2000).

Keebler et al. (1999) indicated that relatively few firms measure the performance of the logistics supply chain, especially logistics outsourcing. This is because the systems perspective is seldom adopted and very little empirical research exists on supply chain performance measurement from a broader system perspective, such as organizational performance measurement.

Although academics have attempted to build new measures and metrics for the measurement of supply chain management performance, most of these measures fail to meet the requirements of supply chain management (Keebler et al., 1999), largely because they rely heavily on the use of cost as a primary (if not sole) measure. This is often



inconsistent with the strategic goals of an organization, and does not consider the effects of uncertainty (Beamon, 1999).

A performance measurement program for a supply chain should be complete, must consider important aspects of performance in any form, and must be tailored to the varied needs of the supply chain participants. A good performance measurement program brings about improved cross-functional and inter-organizational process planning and controlled and more complete supply chain integration (Gunasekaran et al., 2004). A comprehensive model of a supply chain is necessary to assure effective and efficient performance throughout the supply chain.

In addition to research- and practitioner-driven initiatives in the area of SCM performance measurement, creative efforts are also needed to design new measures and new programs of performance assessment for the entire supply chain and for the measurement of the organizational performance of its individual constituents (Gunasekaran et al., 2004). This would play a significant role in helping firms to address present and future challenges in supply chain management, and would also facilitate progress and competitive advantage in the promotion of greater supply chain integration.

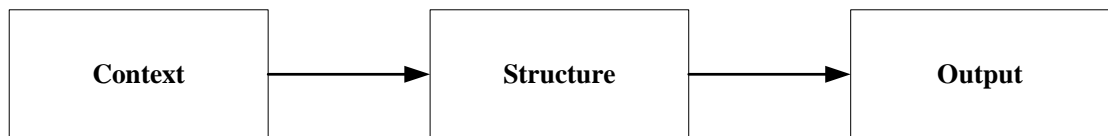
#### **3.4. Performance Measurement of Third Party Logistics (3PL)**

The objective of this study, which determines the organizational performance measurement of logistics outsourcing in the Hong Kong transport logistics industry by using the organizational theory approach, is to provide significant information on the organizational performance measurement of logistics outsourcing in Hong Kong. It aims to improve the performance of logistics service providers in Hong Kong, enhance their competitive

advantage, and promote Hong Kong as a transport, trading and logistics hub in future decades.

Figure 3.2 provides a conceptual framework for the identification and examination of the link between context, structure, and output within an organization that is used to examine the organizational performance of logistics service providers.

**Figure 3.2: Conceptual Framework of Context – Structure – Output (Extracted)**



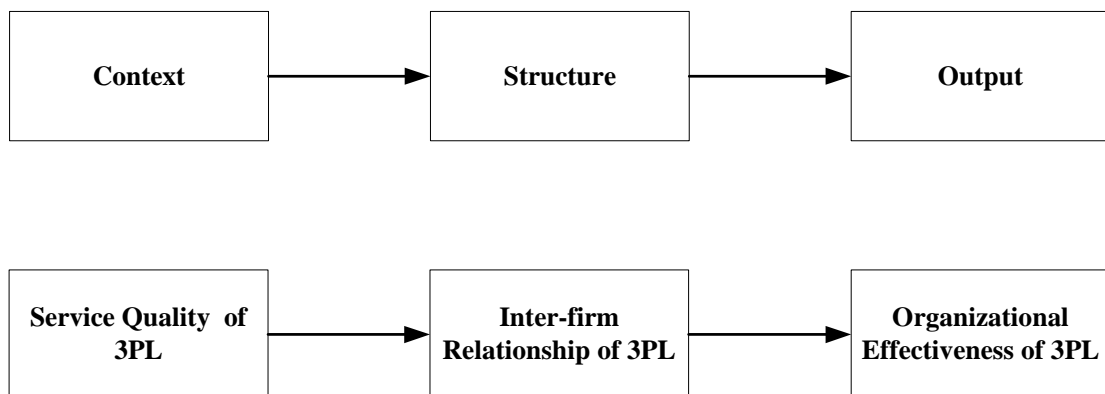
The delivery of high quality cost competitive services is essential for survival in today's business environment, and many organizations are turning their quality assessment either directly or indirectly into the measurement of customer satisfaction. Many studies emphasize the customer-based nature of quality management (Anderson et al., 1989; Hackman and Wageman, 1995; Zeithaml et al., 1990), and that companies must support customer preferences with effective operational management.

Successful marketing programs offer a product-service package that appeals to the needs and desires of a particular segment of customers. However, the gesture is futile without the ability to efficiently design, produce, support, and manage the distribution and delivery process. Efficient logistics and SCM reinforces a company's customer-oriented performance. Logistically, better 3PL customer services not only enhance an efficient service for supply chain partners, but also enrich performance effectiveness. An effective quality assessment of 3PL service would thus provide better links between 3PL service providers and supply chain partners.

In response to globalization, many multi-national companies have adopted improvement-oriented programs such as total quality management (TQM), business process reengineering, and benchmarking. Much of the recent research on operations strategy has sought to explain how effective operation strategies facilitate the development of competitive advantage in a variety of organizational settings (Anderson et al., 1989).

Organizational theory cites the context – structure – output relationship as the major corporate function that achieves organizational success. This study explores the links between the determinants of the logistics outsourcing service quality of supply chain partners (suppliers or customers) and the identification in terms of organizational structure of the inter-firm relationship between 3PL providers and customers, which in turn is linked to tangible and intangible outcomes of organizational performance. Although the proposed framework is readily applicable to all business contexts, this study focuses on 3PL because the organizational performance of logistics companies is not solely dependent on the service provider, but also on its upstream and downstream partners within a supply chain. This study reflects on effectiveness and efficiency in the fulfillment of service commitments and on service improvement methods to enhance the relationships between supply chain partners. The conceptual framework is shown in Figure 3.3.

**Figure 3.3: Conceptual framework of context – structure – output in 3PL**



### 3.5 Summary

This chapter details the theoretical grounding of this study, and shows how organizational theory is employed to measure and evaluate 3PL performance. A conceptual framework of 3PL performance measurement is developed in this chapter based on organizational theory and the concept of service management.

## CHAPTER 4

### RESEARCH MODEL AND HYPOTHESES

This chapter develops the research model and hypotheses based on the literature review and the theoretical groundwork. The chapter comprises the following sections.

4.1 Conceptual Framework of 3PL Organizational Performance

4.2 Research Model of 3PL Organizational Performance

#### **4.1 Conceptual Framework of 3PL Organizational Performance**

The conceptual framework that is shown in Figure 3.3 in Chapter 3 indicates how collaborative relationships between logistics service providers and upstream and downstream partners affect the organizational performance of logistics outsourcing. A research model is formulated to identify the direct and indirect impact of the organizational performance of 3PL service providers and their partners.

**Figure 4.1: Conceptual framework of 3PL organizational performance**

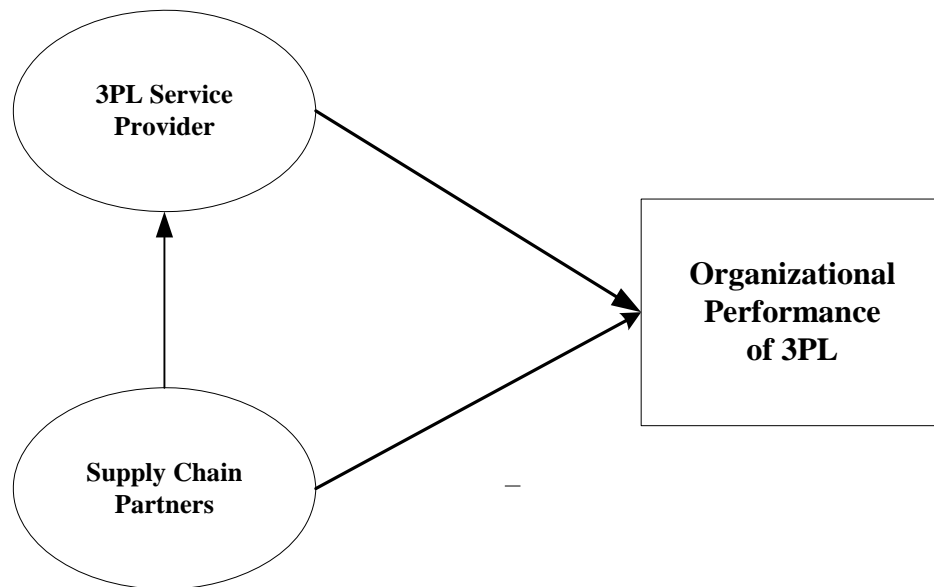


Figure 4.1 shows the framework of 3PL organizational performance. It specifies that both the logistics outsourcing company and its supply chain partners (suppliers and customers) affect the organizational performance of 3PL service providers, and that supply chain partners have an influence upon service providers.

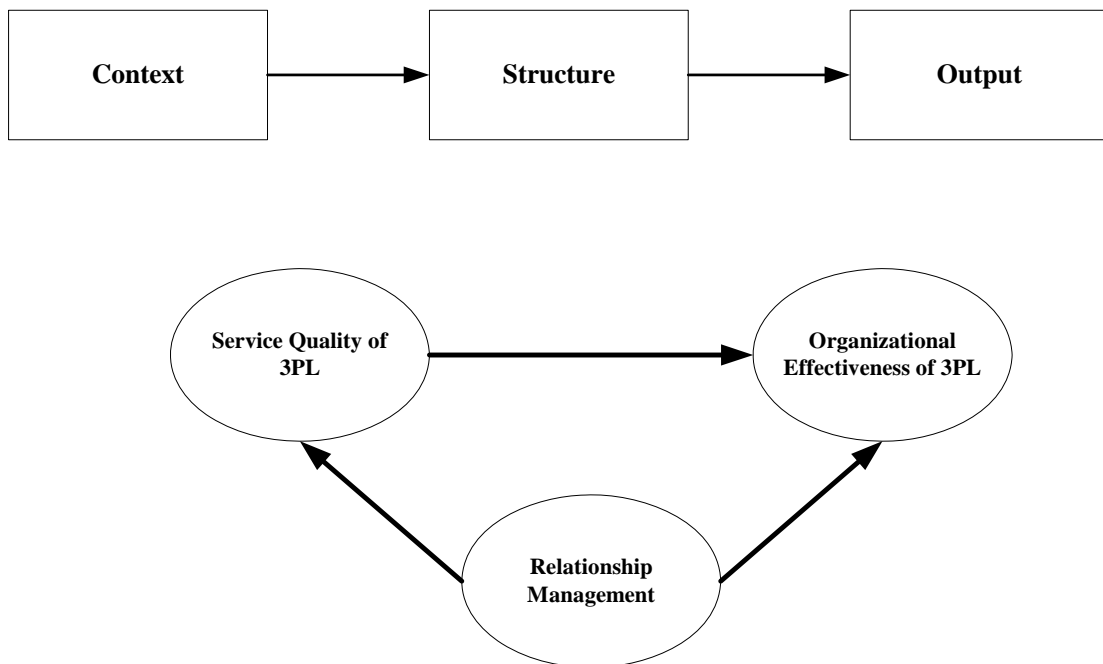
A research model is proposed to identify the context – structure – output approach to the organizational performance of logistics outsourcing companies. The following shows the details of a systemic network decision hierarchy of the performance measurement of logistics outsourcing.

#### **4.2 Research Model of 3PL Organizational Performance**

The conceptual framework of 3PL organizational performance identifies the collaborative relationship between context, structure, and output. The research model is divided into three parts: context and structure, which aims to identify the relationship between the service quality of supply chain partners and a logistics outsourcing company; structure and

output, which identifies the relationship between the service quality of 3PL service providers and their organizational performance; and external factors such as relationship management (trust and commitment), which affect the organizational performance of logistics outsourcing. Figure 4.2 shows the research model of 3PL organizational performance.

**Figure 4.2 Research model of 3PL organizational performance**



#### 4.2.1 *Service Quality of Outsourcing/Third Party Logistics (3PL)*

In the context and structure part, the SERVQUAL scale is adopted to measure the relationship between supply chain partners and the service quality of 3PL service providers. The SERVQUAL scale was developed and empirically validated during the late 1980s by Parasuraman et al. (1988, 1990). SERVQUAL was designed for application across a wide range of service industries to measure customer expectations of service quality in an ideal setting, and customer perceptions of the service quality of an actual service. Its developers have suggested that the SERVQUAL scale may be modified and adapted for particular

service industries. A number of empirical studies that are listed in Table 4.1 support the conclusion that the five dimensional structure of SERVQUAL can serve as a meaningful conceptual framework for the assessment of service quality, and that the modification of the dimensions and attributes are subject to specific contexts.

**Table 4.1: Applications of SERVQUAL and their related dimensions**

Authors	Sectors of study	Number of dimensions
Andaleeb (2001)	Hospitals	6
Dabholkar et al. (2000)	Pictorial directory industry	4
Frochot and Hughers (2000)	Historic houses	4
Johns and Tyas (1996)	Foodservice outlets	7
Kettinger and Lee (1997)	Information systems	4
Lee et al. (2000)	Hospitals	7
Lim and Tang (2000)	Hospitals	6
Mels et al. (1997)	Banks, insurance, repair service stations	2
Owlia and Aspinwall (1996)	Higher education	4
Owlia and Aspinwall (1998)	Engineering education	6
Sullivan and Walstorm (2001)	Electronic commerce	5
Tan and Theresia (2001)	Tourism	3
Wang et al. (1999)	Internet search engines	3
Watson et al. (1998)	Information systems	5
Wong et al. (1999)	Hotels	3

Source: Li et al. (2002)

According to Parasuraman et al. (1988), SERVQUAL was initially used in banking and credit card services, repair and maintenance, and long distance telephone services. It has since been used in insurance, hospitality, and airline service industries to measure customer expectations and perceptions of service quality. In this study, ten service quality dimensions have been identified: tangibles, reliability, responsiveness, communication, credibility, security, competence, courtesy, empathy or personableness, and access. Interviews with the study participants generated 97 survey items for all of the dimensions,



which were screened and reduced to 22 significant items for general application.

The SERVQUAL scale is used in this study to compare the opinions of 3PL providers and their customers, and to identify areas improvement through focus group discussions of the survey results and the development of an improvement plan. The SERVQUAL scale has had an undeniably lasting impact on corporate and academic communities (Zhao et al., 2002), and has enabled us in this study to help 3PL providers to identify important areas of corporate improvement. It also reveals that 3PL providers and customers have different corporate perceptions and expectations.

The SERVQUAL scale highlights for companies the importance of surveys in the determination of customer and staff opinions and the identification of areas for 3PL service quality improvement. The employment of the SERVQUAL scale to evaluate and develop a solid foundation for 3PL service quality (SQ) is innovative and significant.

The SERVQUAL scale is arranged to measure customer expectations and perceptions in five dimensions (Parasuraman et al., 1988), which are as follows.

Tangibles – The appearance and quality of physical facilities, equipment, and personnel.

Reliability – The service provider's ability to fulfill service commitments dependably and accurately.

Responsiveness – The service provider's willingness to help customers and provide a prompt service.

Assurance – The knowledge and courtesy of service provider employees and their ability to convey trust and confidence.

Empathy – The service provider’s caring and attentive response to individual customers.

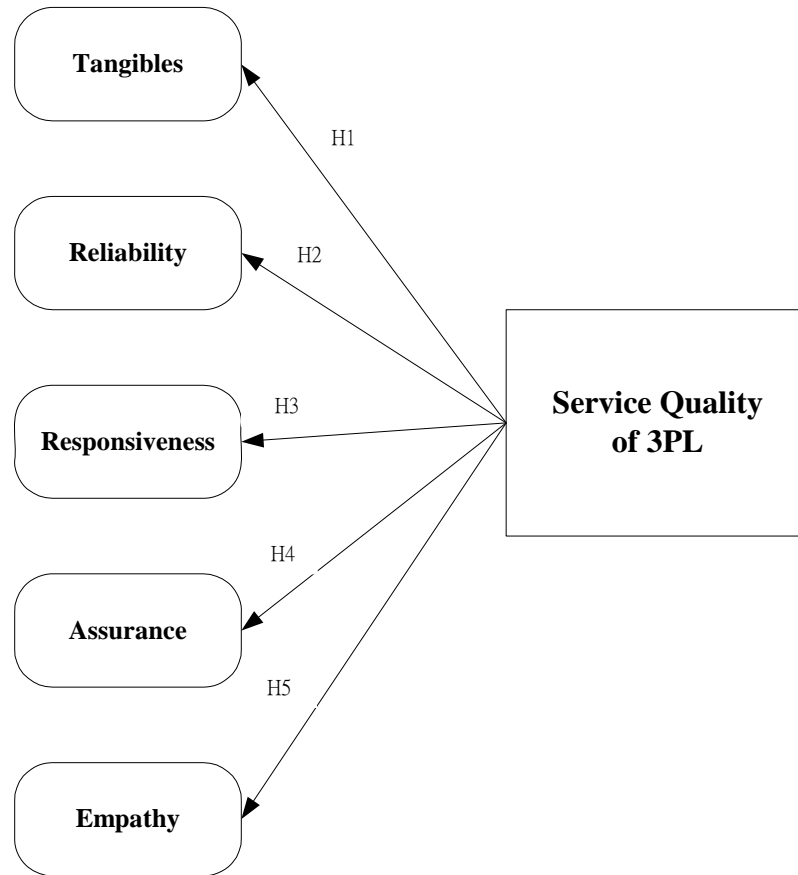
The following are the five features that pertain to 3PL services.

1. The appearance and quality of physical facilities, equipment, and personnel (Tangibles).
2. The ability to fulfill service commitments dependably and accurately (Reliability).
3. The willingness to help supply chain partners (suppliers or customers) and provide prompt service (Responsiveness).
4. The knowledge and courtesy of their ability to convey trust and confidence (Assurance).
5. Caring and individualized attention to customers (Empathy).

The hypotheses about 3PL service quality are as follows. Figure 4.3 shows the research model for 3PL service quality.

Hypothesis 1 (H1)	The better a 3PL provider’s facilities, the better the 3PL service quality.
Hypothesis 2 (H2)	The more dependably and accurately service commitments are fulfilled, the better the 3PL service quality.
Hypothesis 3 (H3)	The more willing to assist and provide prompt service the 3PL service provider, the better the 3PL service quality.
Hypothesis 4 (H4)	The more able to convey trust and confidence the 3PL service provider, the better the 3PL service quality.
Hypothesis 5 (H5)	The more caring and attentive the 3PL service provider, the better the 3PL service quality.

Figure 4.3 Research model of service quality of 3PL



#### 4.2.2 Organizational Effectiveness of Third Party Logistics (3PL)

A good organizational structure of achieves organizational effectiveness in 3PL service providers (Elmuti, 2002). All of the 3PL service providers in this study have specific goals with measurable outcomes. The surveyed organizations were asked to identify specific goals or projected benefits and to indicate both the projected and actual percentages of improvement achieved as a result of supply chain management.

The structure-output relationship is developed in this research model to identify the relationship between 3PL service providers and their supply chain partners. The relationship has five elements: productivity, financial performance and market share, cycle

time, customer service, and reputation and goodwill (Beamon, 1999; Thomas, 1999; Mentzer et al., 2000; Carr and Person, 1999; Elmuti, 2002; Lai et al., 2004; Reiner, 2005). Table 4.2 shows the specific organizational performance goals of logistics outsourcing.

**Table 4.2: Specific organizational performance goals of logistics outsourcing**

<b>Goals Selected</b>	<b>Details/Examples</b>
Productivity	Efficiency rate, high percentage of hours spent on production, and high ratio in output produced divided by input used.
Financial Performance and Market Share	Performance indicators include profit margins, return on investment, sales per employee, and high stock value to share shareholders compared to past year and to competitors.
Cycle Time	Cycle time/asset turnover.
Customer Service	Customer satisfaction rate, repeat purchase, and retention rate.
Reputation and Goodwill	Attributes made about the same organization by outsiders.

#### 4.2.2.1 *Productivity*

The productivity of service providers in business processes is enhanced through incremental improvements in the quality of 3PL services. Using information technology (IT) and knowledge management to enhance productivity will be the wave of the future (Elmuti, 2002). The management of new business processes means the development of new products concurrently and the utilization of the organization's resources and product development processes to implement this strategy. Organizations must also understand the complex interactions between various business processes, and should focus on an integrative approach to the coordination of product development processes and market research, planning and resource allocation, and strategy formulation and implementation. Thus, the following is hypothesized.

Hypothesis 6 (H6): The better the organizational performance of a 3PL service

provider, the better the productivity.

#### 4.2.2.2 *Financial Performance and Market Share*

Dwyer et al. (1987) described a continuum of different types of buyer-supplier relationships. It is believed that firms engage in cooperative buyer-supplier relationships because they expect to benefit from the relationship. As long as the firms perceive a benefit from the relationship, they will continue with cooperative 3PL and supply chain partner relationships. Noordewier et al. (1990) stated that organizational performance is an important determinant of a firm's competitiveness. The empirical research shows that long-term cooperative agreements have a positive impact on organizational performance in terms of acquisition cost when the level of uncertainty is relatively high. However, long-term cooperative agreements have no effect on performance when the level of uncertainty is relatively low.

Conversely, Heide and Miner (1992) indicated that cooperation among organizations can have harmful consequences for performance. For example, there are instances when excessive emphasis on cooperation among Japanese firms has resulted in bullying and collusion, which has had a negative impact on the firms involved. However, the use of these tactics tends to diminish in the long term and the firms eventually become cooperative to the benefit of all of the parties involved (Heide and Miner, 1992).

The development of long-term relationships with supply chain partners can lead to the improvement of a firm's financial performance (Han, 1993). According to Larson (1994), the purchasing coordination of a firm's activities can have an impact on total costs. For example, Ford Motor's use of long-term relationships has helped in the achievement of

competitive advantage in the automobile industry. Under total quality management (TQM), Ford transformed its buyer-supplier relationships from being adversarial to being cooperative. Ford's success demonstrates that companies can increase their competitiveness through the implementation of cooperative relationships (Zeller and Gillis, 1995; Caputo et al., 2004).

Organizations must also be flexible to meet changing demands and expectations in the marketplace. Not only must an organization be adaptable, but if necessary it must also be able to change quickly. An organization, especially a 3PL provider, which has the experience of being highly adaptable and dynamic, can achieve a greater market share (Selladurai, 2002). Thus, the following is hypothesized.

Hypothesis 7 (H7): The better the organizational performance of a 3PL service provider, the better the financial performance and market share.

#### 4.2.2.3 *Cycle Time*

The minimization of time to market – or cycle time – is necessary for a number of reasons (Kessler and Chakrabarti, 1996; Stalk and Hunt, 1990). A firm that is slow to market with a particular generation of technology is unlikely to fully amortize the costs of development before that generation becomes obsolete. This is especially true of dynamic industries such as electronics, in which the life cycles of products such as personal computers and semiconductors can be as short as 12 months. Companies with shorter cycle times are more likely to be first to introduce products that embody new technologies. As a result they are better positioned to capture first mover advantages (Schilling and Hill, 1998). Companies with short cycle times in 3PL can continually upgrade their products and incorporate

state-of-the-art technology when it becomes available. This enables them to better serve consumer needs, outrun their slower competitors, and generate brand loyalty. It also enables them to offer a wider range of new products to better serve market niches (Schilling and Hill, 1998).

Gupta and Wilemon (1990) identified several contributing factors to the need for an accelerated development of new products: increased competition, a rapid rate of technological change, consumer demand for new products, shortened product life cycle, and the desire to be first to market.

Most executives today recognize that 3PL offers the benefits of different perspectives and skills, and that a functional diversity toward other companies can improve the quality of products that are developed and reduce the cycle time that is needed to launch new products or services (McDougal and Smith, 1999). A reduced cycle time, in turn, contributes either directly or indirectly to the improvement of a firm's business performance. Ittner and Larcker (1997) examined the performance implications of product development cycle time using data from a survey that covered two industries (automobiles and computers) in four countries (Canada, Germany, Japan, and the United States) in which 1,991 consulting company members participated. Although a faster cycle time alone was not found to increase a firm's performance, faster product development cycles when combined with certain organizational practices were associated with a firm's perceived overall performance. The reduction of cycle time or the increase in speed to market has become more important for companies who wish to increase their chances of success in supply chains, and especially in logistics outsourcing. Thus, the following is hypothesized.

Hypothesis 8 (H8): The better the organizational effectiveness of a 3PL service

provider, the shorter the product or service cycle time.

#### 4.2.2.4 *Customer Service*

Customer service is a strategic weapon in the attraction and retention of customers, and has become one of the most significant factors in the success of manufacturers and service providers (Gale, 1994; Zeithaml, 1988, Zeithaml et al., 1996, Woodruff, 1997; Parasuraman, 1997).

Customer service is frequently cited as an important objective in supply chain management (SCM). Ellram (1990) described SCM as a means of maximizing the efficient use of resources to achieve customer service goals in a supply chain. Cooper and Ellram (1993) suggested that SCM facilitates the creation of competitive advantage and greater profitability for the channel through the co-ordination of attention to costs, the improvement of customer service, and the reduction of inventories. The objectives of SCM include the reduction of costs and the maintenance or improvement of specific levels of customer service.

Although customer service is used consistently to describe the objective of SCM, little attention has been paid to the exact role of customer service in a supply chain context. Customer service is also an operational function or outcome that contributes to the ultimate goal of customer value and satisfaction. If the service that is provided is perceived as the delivery of values that are important to the customer, then the ultimate goal of customer satisfaction and differential advantage may be achieved.

In logistics and SCM, customer service is described as an organizational process or a set of



activities within a firm or among supply chain partners. It focuses on the facilitation of customer interfacing: the delivery of products, the fulfillment of customer orders and the communication of information to customers to achieve their satisfaction. The major route to the securing of a competitive niche is through customer satisfaction. Without this concept, no business can survive, especially in today's highly competitive market. The determination of customer needs first, and the development and marketing of a product that satisfies that need are essential for successful organizations. The building of continuous, long-term relationships with customers should be the strategic basis for an organization (Selladurai, 2002). Thus, the following is hypothesized.

Hypothesis 9 (H9): The better the organizational effectiveness of a 3PL service provider, the better the customer services that it provides for its partners.

#### 4.2.2.5 *Reputation and Goodwill*

The goodwill and reputation of an organization are intangible assets that enhance the organizational effectiveness of 3PL service providers.

Although reputation is gaining an ever-higher level of attention from researchers, as shown by the recent launch of a new topic-specific journal the Corporate Reputation Review, this construct has eluded detailed measurement, which is a common phenomenon for organizational-level variables (Brown and Perry, 1994), and is often operationalized uni-dimensionally, even though it is acknowledged to be multi-dimensional (Carter and Dukerich, 1998; Berkson et al., 1999).

Different definitions of reputation have evolved over time. Fombrun and Shanley (1990)

claimed reputation to be the outcome of information that stakeholders accumulate about a firm through different signals: market signals (with respect to market performance and dividend policy); accounting signals (accounting profitability and risk); institutional signals (institutional ownership, social responsibility, media visibility, and firm size) and strategy signals (differentiation and diversification). Weigelt and Camerer (1988) viewed reputation as a set of attributes that is ascribed to a firm that can be inferred from its past actions and that produces rent. Reputation has also been defined as the socially constructed outcome of a legitimate process (for example, certification contests) (Rao, 1994).

Dutton et al. (1994) construed “reputation” and “identity” as separate appraisals of the same target. Specifically, “identity” relates to the attributions that are made to an organization by outsiders. Organizations specifically concern themselves with “reputation,” and associate an outsiders view of the firm with a candidate’s tendency to accept a job offer. There is clearly an important link between reputation and identity.

To further illustrate that reputation is multi-dimensional, the work of Carter and Deephouse is used as a reference (1999). Unintentionally, Carter and Deephouse’s historical case study of Wal-Mart provides evidence to suggest that the multi-dimensionality of reputation precludes its conceptualization as a bipolar, uni-dimensional construct. Carter and Deephouse examined Wal-Mart’s management of its negative and positive reputation among suppliers and its positive reputation among consumers. The main finding of their investigation suggests that reputation for an organization can be simultaneously positive and negative, which rules out the possibility of a single dimension or perspective (Lai et al., 2002; Zhao et al., 2002).

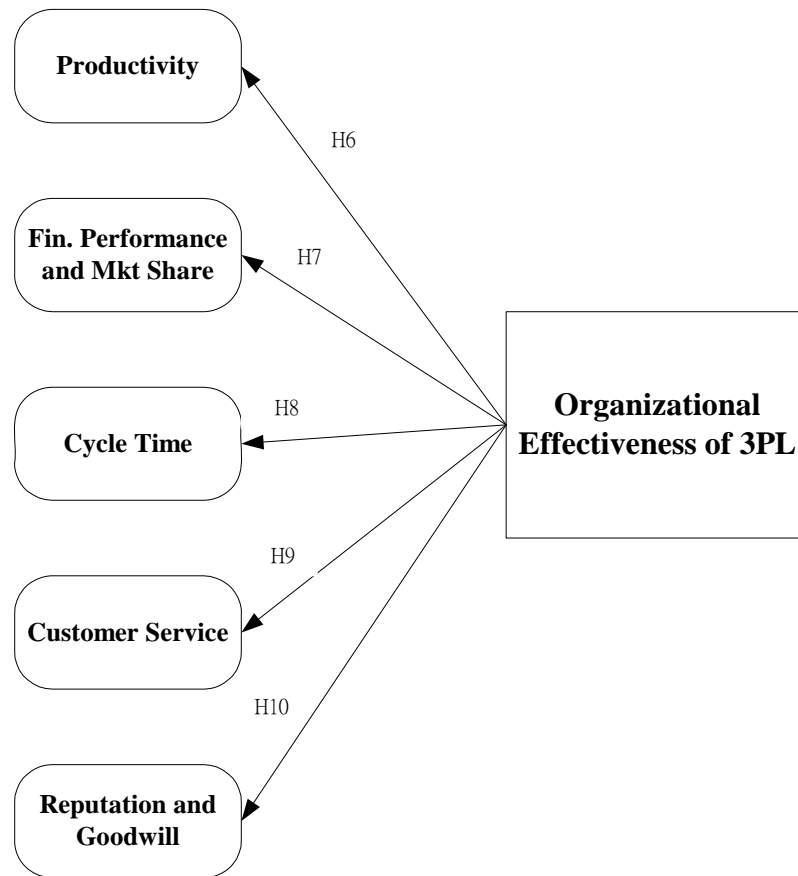
Wal-Mart’s reputation for being “tough” on suppliers is seen as being negative among

suppliers and positive among some consumers, whereas their reputation for being “good” to consumers is generally held in positive regard (Carter and Deephouse, 1999). This observation demonstrates that a single reputation domain (supplier relations) differs by perception, and that there is more than one reputation domain (consumer treatment). There are many ramifications of context, perspective, and dimensionality. An organization’s reputation for the production of high-quality products may be the weightiest dimension in a consumer’s decision, whereas an organization’s perceived reputation for profitability may be the weightiest dimension in an investment decision. Clearly, it is reasonable to suggest that positive goodwill and an improved reputation for logistics outsourcing can achieve improved organizational performance in logistics outsourcing. Thus, the following is hypothesized.

Hypothesis 10 (H10): The better the organizational effectiveness of a 3PL service provider, the better its reputation and goodwill.

Figure 4.4 shows the research model of 3PL organizational effectiveness.

Figure 4.4 Research model of 3PL organizational effectiveness



#### 4.2.3 Relationship Management of Third Party Logistics (3PL)

In addition to the context–structure–output framework, there is also has an external factor, relationship management, that affects the organizational performance of logistics outsourcing.

When 3PL service providers deliver services to their clients or customers, they often find that the services that are provided in conjunction with the product are considered to be more important by customers than the product itself. It has been revealed that a number of factors that customers consider to be most important to their overall satisfaction are service-related intangibles (Cann, 1995). Parasuraman et al. (1985) determined that many of these factors overlap with service quality. Berry and Parasuraman (1991) reported a

similar focus group study, in which the results of desirable service quality such as “being a partner,” “being an extension of my company,” and “the need to know service technician” were uncovered.

Bowen et al. (1989) claimed that it is important for manufacturing firms to focus on a customer-oriented strategy. Two of the factors that Bowen et al. (1989) proposed as critical to a customer service-oriented strategy for such firms included “recognizing the importance of intangibles” and “establishing relational markets.” 3PL service providers, who once thought that providing a good, reliable product was the key to success, have found that the customer wants more. One participant in the aforementioned focus group interviews indicated that the reliability of the product was not a factor because “you can throw rocks at the box and it will still run” (Cann, 1995). However, the same customer was very concerned about the vendor’s attitude toward helping the customer solve problems and the communication of advancements in new technology to the customer.

The exponential increase in the demand for 3PL has created an extremely competitive marketplace in which most supply chain partners have yet to generate a profit. 3PL is a consumer-oriented approach to the management of various partners within a supply chain. A good relationship management, such as one that involves *guanxi*, trust, and commitment among supply chain partners, enhances 3PL organizational performance (Elmuti, 2002).

#### 4.2.3.1 *Guanxi*

*Guanxi* refers to relationships or social connections that are based on mutual interests and benefits. It refers to a special type of relationship that bonds exchange partners through a reciprocal exchange of favors and mutual obligations (Alston, 1989; Luo, 1997). *Guanxi*

implies certain preferential treatment for exchange partners in the form of easy access to limited resources, increased accessibility to controlled information, and preferential terms that include credit authorization and protection from external competitors (Luo, 1997; Luo and Chen, 1997; Wong, 1997; Xin and Pearce, 1996).

Guanxi is believed to enhance a firm's competitive advantage by providing access to the resources of other partners (Luo, 1997). Guanxi embodies relationship-networking attributes. However, the exchange of favors among the members in a guanxi network are not strictly commercial, but are also social, and involve the exchange of both favors and affection. This feature makes guanxi a form of social investment.

In contrast, networking is a Western management term that is associated with commercial relations. Western business people overemphasize the gift-giving component of guanxi and neglects the long-term Chinese goal of building trust (Pearce and Robinson, 2000). Commitment that is established through relational bonding is combined with other external factors such as word of mouth and media reports about the seller to form an overall perception of trust (Conway and Swift, 2000). Thus, the following is hypothesized.

Hypothesis 11 (H11): The better the guanxi relationship between a 3PL service provider and its supply chain partners, the greater the intent by both parties to maintain a long-term relationship.

#### 4.2.3.2 *Trust*

Trust is an essential ingredient for a successful relationship (Dwyer et al., 1987; Morgan and Hunt, 1994). Moorman et al. (1993) defines trust as “a willingness to rely on an

exchange partner in whom one has confidence.” It is proposed that an expectation of trustworthiness is derived a proven ability to perform (expertise), reliability, and intentions.

Morgan and Hunt (1994) defined trust as the perception of “confidence in an exchange partner’s reliability and integrity.” Both definitions highlight the importance of confidence and reliability in the conception of trust. Employing a similar definition of trust, Gwinner, Gremler, and Bitner (1998) find the psychological benefit of confidence and trust to be more important than special treatment or social benefits in a customer’s relationship with a service provider.

Morgan and Hunt’s (1994) theory of trust and commitment identifies trust as a precursor to vulnerability and sacrifice. It follows that people are unlikely to be committed unless trust is already established. This theory also proposes that trust is influential in the maintenance of the relationship between a user and a service provider. The immediate high transaction costs of the fulfillment of promises may financially be worthwhile in the long-term in exchange for the maintenance of lasting trust with Chinese partners (Morgan and Hunt, 1994).

Trust is paramount for long-term a relationship between 3PL providers and customers. Commitment is based on trust and in turn generates trust. Nooteboom (1996) concludes that trust is important because transactions that are based on the implicit pre-existing and unspecified cooperative conditions of trust economize on the specification and monitoring of contracts and material incentives for cooperation. Trust is more economical for transactions because it reduces opportunism, which Williamson (1985) identifies as the main source of transaction costs. It also allows greater flexibility, because trust reduces the need for detailed contracts that are difficult (slow and costly) to modify when conditions

change. This is particularly important when the goal of cooperation is innovation and learning. Hence, trust may serve as a substitute for governance.

Although early research into inter-organizational exchange recognized the importance of trust (Arrow, 1973), the concept has only been recently thoroughly developed. The concept of trust is still somewhat subtle and diffuse, but it is now accepted that there are different forms of trust that arise from different sources.

Sako (1992) concluded that “trust is a state of mind, an expectation held by one trading partner about another, that the other behaves or responds in a predictable and mutually acceptable manner.” She maintains that predictability in behavior can exist for different reasons, and identifies three types of trust: mutual (contractual) trust, competence trust, and goodwill trust. Mutual trust is based on the adherence by two parties to a specific written or oral agreement. This type of trust is called “contractual trust,” and according to Sako is predicated upon both trading partners upholding a universalistic standard of promise fulfillment.

Technical and managerial competence is of issue for the second type of trust, “competence trust,” which is based on the expectation that trading partners will perform their role competently. Sako’s third type of trust, “goodwill trust,” is more diffuse, and is defined as “mutual expectations of open commitment to each other.” Goodwill trust is the presumption that trading partners possess a moral commitment to uphold a trading relationship (Sako defines commitment as the willingness to do more than is formally expected). Goodwill trust does not have the explicit expectation of promise fulfillment of contractual trust, or the professional expectations of competence trust. Sako concludes that someone who is worthy of goodwill trust is dependable, discrete, and can be trusted to take



initiative without also taking unfair advantage.

In summary, trust is an important relational feature of ongoing inter-organizational exchanges that may serve as a substitute for hierarchical control. It is examined in this research in relation to the management of 3PL. The following is thus hypothesized.

Hypothesis 12 (H12): The better the trust between 3PL service providers and supply chain partners, the greater the intent by both parties to maintain a long-term relationship.

#### 4.2.3.3 *Commitment*

As the interactions between two parties exhibits consistency over time, a commitment to one another and to the longevity of the relationship develops (Gundlach et al., 1995). Commitment suggests a binding agreement, in which two parties pledge to continue a relationship.

Commitment is a key feature in a long-term relationship between a 3PL provider and its partners. It is an important safeguard for relational continuity, because a committed partner will avoid unforeseen problems that may result from an abrupt termination of the relationship. Problems can also arise in a supply chain relationship, for example, a customer may want the supplier to reduce a price or improve quality. However, the supplier may refuse because it lacks the capability or incentive to fulfill the customer's request. In the following, a concept of commitment that is based on the insights of Helper (1987) is explained.

Helper applied Hirschman's (1970) general theory of "exit, voice, and loyalty" to analyze problems in supply relationships. She generalized Hirschman's analysis to include the case in which the resolution of problems requires not only efforts by the parties involved, but also by irreversible investment in physical organizational capital. Employing Hirschman's terminology, Helper identified a response to problems that may arise in a supply relationship, in which the voice strategy relies on the "carrot" of increased profits for both parties to improve products.

Helper concluded that an extensive communication system is necessary to facilitate the rich flow of information that is needed for the "let's work things out" approach of the voice strategy. This information flow requires and engenders a high degree of commitment to the relationship.

Helper's concept of commitment is a refinement of Hirschman's (1970) concept of loyalty. For Hirschman, loyalty determines the distinction between exit and voice. Helper, however, argued that loyalty has two effects in Hirschman's analysis. It is sometimes a force that facilitates the use of voice and is sometimes a response, because loyalty can blind people to the existence of problems. Helper separated these two effects by referring to the first as "commitment" and to the second as the resolution of problems by "ignoring them." Commitment thus refers to all efforts to maintain and continue a relationship.

Helper claimed that commitment has three implications. First, it is costly for customers to establish and maintain extensive communication systems with multiple suppliers. Second, there is a need for trust when there is an exchange of proprietary information. Third, customers and suppliers benefit substantially from the knowledge of each other's products and processes that is gained by working together over time. In contrast, an exit-based

strategy requires low commitment to maintain the credibility of the threat to leave. Hence, information exchange must also be low.

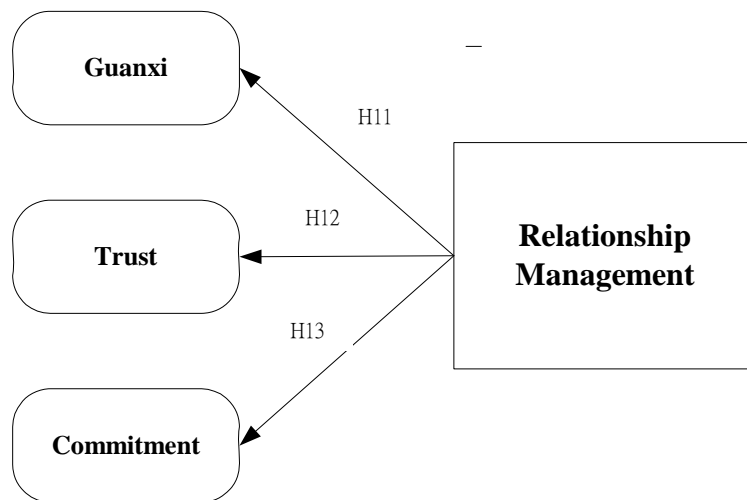
Anderson et al. (1994) suggested that cooperation is essential in a dyadic relationship, and that commitment is the consequence. Dwyer et al. (1987) argued that commitment between two parties is indicative of the most advanced stage in a relationship, and that both parties are actively involved in the maintenance of the relationship. Moran and Hunt (1994) considered commitment to be a keystone of relationship management. Once commitment is reached, emphasis in a relationship moves toward cooperation and long-term maintenance of that relationship, so that both parties continue to experience positive and profitable outcomes (Lai et al., 2005).

To conclude, commitment is important in overcoming problems that arise in a relationship between 3PL providers and supply chain partners that features a high level of specific investment, mutual adjustments, and an asymmetric flow of information. The following is thus hypothesized .

Hypothesis 13 (H13): The better the commitment between a 3PL service provider and its supply chain partners, the greater the intent by both parties to maintain a long-term relationship.

Figure 4.5 shows the research model of 3PL relationship management.

**Figure 4.5: Research model of 3PL relationship management**



#### 4.2.4 Relationship Management, Organizational Performance, and its Implications

Many 3PL service providers identify relationships with supply chain partners to achieve organizational success. This allows them to build a database of customer profiles and creates the advantage of prior knowledge of buyers. However, knowledge of customers alone is insufficient, as it is important to build relationships through 3PL service interaction.

The maintenance and enhancement of relationships are very important steps. The acquisition of new customers takes time, effort, and money. The recruitment of new customers is five times more costly than the retention of an existing customer (Mittal and Lassar, 1998; Lin et al., 2005). Thus, the retention of existing customers is considerably more economical and profitable. The longer a firm keeps a customer, the greater the long-term revenue that customer generates (Fynes et al., 2005; Lin et al., 2005). Existing customer retention also enhances service quality and 3PL organizational performance. Thus, the following is hypothesized.

Hypothesis 14 (H14): The better the relationship management of a 3PL provider, the better its service quality.

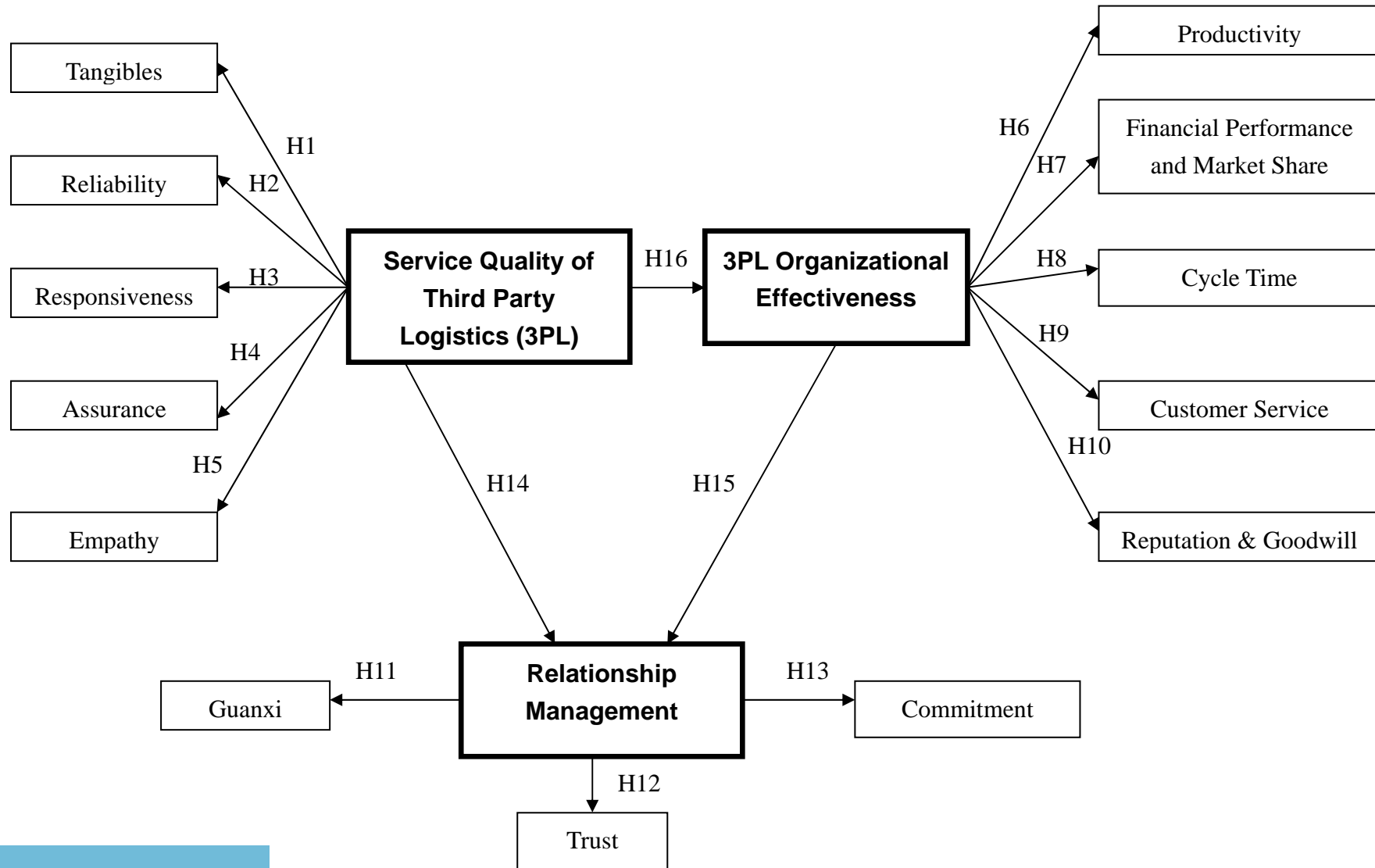
Hypothesis 15 (H15): The better the relationship management of a 3PL provider, the better its organizational effectiveness.

Between structure and output, a relationship between service quality and organizational performance of 3PL providers can be identified. The pilot study and interview with several 3PL providers in Hong Kong revealed that productivity, financial performance, market share, and customer service are important elements in the measurement of 3PL organizational performance. It is also revealed that improved 3PL service quality enhances the general organizational effectiveness and performance of 3PL providers. The following is hypothesized .

Hypothesis 16 (H16): The better the service quality of a 3PL provider, the better its general organizational effectiveness.

A research framework of 3PL organizational performance is developed. Figure 4.6 shows the first-order path model, which includes thirteen factors and three constructs for reference. The hypotheses are summarized in Table 4.3.

Figure 4.6: Performance measurement model of third party logistics (3PL)



**Table 4.3 Summary of hypotheses**

H 1	The better a 3PL provider's facilities, the better the 3PL service quality.
H 2	The more dependably and accurately service commitments are fulfilled, the better the 3PL service quality.
H 3	The more willingness to assist supply chain partners and provide prompt service, the better the 3PL service quality.
H 4	The more able to convey trust and confidence, the better the 3PL service quality.
H 5	The more caring and attentive to customers, the better the 3PL service quality.
H6	The better the organizational performance of a 3PL service provider, the better the productivity.
H7	The better the organizational performance of a 3PL service provider, the better the financial performance and market share.
H 8	The better the organizational effectiveness of a 3PL service provider, the shorter the product or service cycle time.
H 9	The better the organizational effectiveness of a 3PL service provider, the better the customer service it provides to its partners.
H 10	The better the organizational effectiveness of a 3PL service provider, the better its reputation and goodwill.
H 11	The better the guanxi relationship between a 3PL service provider and its supply chain partners, the greater the intent by both parties to maintain a long-term relationship.
H 12	The better the trust between a 3PL service provider and its supply chain partners, the greater the intent by both parties to maintain a long-term relationship.
H 13	The better the commitment between a 3PL service provider and its supply chain partners, the greater the intent by both parties to maintain a long-term relationship.
H 14	The better the relationship management of a 3PL provider, the better the 3PL service quality.
H 15	The better the relationship management of a 3PL provider, the better its organizational effectiveness.
H 16	The better the service quality of a 3PL provider, the better its general organizational effectiveness.

## CHAPTER 5

### RESEARCH METHODOLOGY

This chapter consists of the following sections for discussion of the research methodology that is used in this study.

- 5.1 Research Respondents
- 5.2 Instrument Development
- 5.3 Pilot Study
- 5.4 Research Sampling
- 5.5 Research Instrument
- 5.6 Statistical Method
- 5.7 Summary

#### 5.1 Research Respondents

This study collects data from the business partners of four identical 3PL providers and the internal staff of the four 3PL providers in Hong Kong using the revised measurement scale. To avoid confusion, the data collection was divided into two sections: the expected logistics service quality and performance and the actual logistics service quality and performance that are provided. Accordingly 2×2 sets of completed questionnaires were collected to gain information on the expected logistics service quality and performance of 3PL staff [3PL expected], the actual logistics service



quality and performance of the 3PL provider [3PL actual], the expected logistics service quality and performance of the business partners [Customer expected], and the actual logistics service quality and performance that were received from the 3PL provider [Customer Actual].

Randomly selected 3PL employees were divided into two groups. One staff group completed the questionnaire on expected logistics service quality and performance by business partners, and the other group answered the questionnaire on actual logistics service quality and performance provided. An identical survey was also given to each business partner of the four 3PL providers. Two respondents from each partner completed the questionnaire on expected logistics service quality and performance from the 3PL provider and also the questionnaire on the actual logistics service quality and performance received from the 3PL provider.

## **5.2 Instrument Development**

The performance measurement model of 3PL aims to identify the cause and effect relationship between 3PL service quality and the contractual and structural links between a 3PL service provider and its supply chain partners and relationship. To realize the research objectives, this study is designed to identify the expectation or normative and actual practice of 3PL organizational performance in the Hong Kong logistics industry. The measurement items of all of the constructs in this study are divided between the 3PL service providers and the partners of the 3PL providers.

Part I consists of 22 measurement items that examine the service quality of 3PL using the SERVQUAL scale. The respondents were asked to evaluate the extent to which

they agreed or disagreed with statements that addressed the service quality in targeted 3PL providers on a seven-point Likert scale that ranges from “1” (strongly disagree) to “7” (strongly agree). Table 5.1 shows the measurement items for 3PL service quality.

**Table 5.1: Measurement items of 3PL service quality**

<b>Factors</b>	<b>Variables</b>	<b>Authors</b>
<b>Tangible</b>	1) Has up to date equipment	Parasuraman et al. (1988), Kettinger and Lee (1997), Mels et al. (1997), Dabholkar et al. (2000), Lee et al. (2000), Sullivan and Walstrom (2001), Tan and Theresia (2001)
	2) Has attractive facilities	
	3) Has presentable, neatly dressed employees	
	4) Has literature on available services	
<b>Reliability</b>	1) Fulfills promises	
	2) Expresses sincerity in problem solving	
	3) Provides efficient and consistent service	
	4) Is punctual with service commitments	
	5) Provides error-free (target) assistance	
<b>Responsiveness</b>	1) Provides consistent punctual service	
	2) Provides prompt service	
	3) Expresses a consistent willingness to help	
	4) Is responsive to requests	
<b>Assurance</b>	1) Engenders corporate confidence	
	2) Provides transaction security (e.g., ensures minimal loss)	
	3) Is consistently courteous	
	4) Displays knowledge during inquiries	
<b>Empathy</b>	1) Provides tailor-make customer service	
	2) Has convenient office hours	
	3) Is perceptive of customer needs and problems	
	4) Has customer's interest at heart	
	5) Is understanding of specific needs	

Part II outlines the 46 measurement items of 3PL organizational effectiveness in six dimensions: productivity (PRODU), financial performance and market share (FINMA), cycle time (CYCLE), customer service (CUSTO), and goodwill and reputation (GOORE). Productivity is measured by 9 items, financial performance and market

share are measured by 9 items, cycle time is measured by 10 items, customer service is measured by 13 items, and goodwill and reputation are measured by 5 items. All of the measurement items, except for financial performance and market share (FINMA), are evaluated in a seven-point Likert scale where “1” represents strong disagreement and “7” represents strong agreement. The 9 measurement items of financial performance and market share (FINMA) are also measured on a seven-point Likert scale, where “1” represents a 1-5% growth rate and “7” represents a 30% or above growth rate. Table 5.2 shows the measurement items of 3PL organizational effectiveness.

**Table 5.2: Measurement items of 3PL organizational effectiveness**

<b>Factors</b>	<b>Variables</b>	<b>Authors</b>
<b>Productivity</b>	1) Minimizes service failure probabilities	Beamon (1999), Thomas (1999), Carr and Person (1999), Mentzer et al. (2000), Elmuti (2002)
	2) Provides business operational consultancy service	
	3) Maximizes product replacement frequency	
	4) Provides competition enhancement service	
	5) Provides quality efficient service	
	6) Provides a high order rate service	
	7) Has efficient and reliable warehouse operations	
	8) Provides efficient and reliable transportation service	
	9) Maintains a high level of productivity	
<b>Financial Performance and Market Share</b>	1) Has a _____ % net profit margin from logistics services	Dwyer et al. (1987), Noordewier et al. (1990), Zeller and Gillis, (1995), Elmuti (2002), Selladurai, (2002)
	2) Has a _____ % return on investment from logistics services	
	3) Has a _____ % growth of share values	
	4) Has a _____ % return on net assets from logistics services	
	5) Increases service value by _____ % per year to us	
	6) Has a _____ % growth rate of financial position in the logistics industry	
	7) Has a _____ % market share in the logistics industry	

	8) Has a _____ % transaction volume in the logistics industry	
	9) Has a market growth rate of _____ %	
<b>Cycle Time</b>	1) Has a shorter cycle time than the industrial average	Kessler and Chakrabarti (1996), Schilling and Hill (1998), McDougal and Smith (1999), Ittner and Larcker (1997) Elmuti (2002)
	2) Has a good equipment safety record	
	3) Has minimal stock-out levels	
	4) Has minimal back orders	
	5) Provides consistent delivery service	
	6) Has stock rotation control capability and record management (e.g., makes stock adjustments on-hand and re-orders)	
	7) Has order acceptance and a processing system	
	8) Has “pick and pack” operations	
	9) Fulfills order commitment service	
	10) Accommodates return handling	
<b>Customer Service</b>	1) Is responsive to purchase decision making	Gale (1994), Zeithaml (1988), Zenithal et al. (1996), Woodruff (1997), Parasuraman (1997), Elmuti (2002), Selladurai (2002)
	2) Provides a good “after sales” services	
	3) Responds efficiently and quickly to needs	
	4) Provides a punctual delivery service	
	5) Welcomes feedback or comments	
	6) Provides a ‘precise quantity’ service	
	7) Provides a highly satisfactory service	
	8) Responds quickly to changes	
	9) Is responsive to specific requirements	
	10) Is flexible and adaptable to changes	
	11) Employs a value-added logistics services	
	12) Provides an abnormally high value-added services	
	13) Has few customers complaints	
<b>Goodwill and Reputation</b>	1) Engenders a positive or favorable image	Weigelt and Camerer (1988), Brown and Perry (1994), Dutton et al. (1994), Carter and Deephouse (1999), Elmuti (2002)
	2) Correlates expertise with strategic missions	
	3) Is reputable within the logistics industry	
	4) Has relative experience	
	5) Has a good track record of customer service	

Part III outlines the 30 measurement items of 3PL relationship management in three dimensions: guanxi (GUANX), trust (TRUST), and commitment (COMMI). Guanxi is measured by 10 items, trust is measured by 15 items, and commitment is measured by 5 items. The respondents were asked to evaluate the extent to which they agreed or disagreed with statements that describe the relationship and business links between 3PL providers and their customers on a seven-point Likert scale that ranges from “1” (strongly disagree) to “7” (strongly agree). Table 5.3 shows the measurement items of 3PL relationship management.

**Table 5.3: Measurement items of 3PL relationship management**

Factors	Variables	Authors
<b>Guanxi</b>	1) Is cooperative during organizational changes	Alston (1989), Luo, (1997), Luo and Chen (1997), Wong (1997), Xin and Pearce (1996), Conway and Swift (2000), Pearce and Robinson (2000)
	2) Initiates inter-organizational relationships	
	3) Possesses efficient managerial skills	
	4) Values good working relationships	
	5) Has a key representative who is accessible	
	6) Has a PR representative	
	7) Has a representative who deals with promotions and “gifts”	
	8) Has a personable and affable customer service representative	
	9) Has a key representative who socializes with customers	
	10) Has an event (e.g., banquet) organizer	
	1) Adheres to a principle of complete trust	Dwyer, et al.(1987), Morgan and Hunt (1994),
	2) Is accessible during service problems	
	3) Expresses confidence in customers	
	4) Is attentive and makes inquiries	
	5) Expresses concern for personal well-being	
	6) Communicates with sincerity	
	7) Displays positive social interaction	
	8) Honors service commitments	
	9) Provides consistent service	

<b>Trust</b>	10) Provides quality service	Moorman et al. (1993), Nootboom (1996), Conway and Swift (2000)
	11) Adheres to a moral social principle	
	12) Has integrity	
	13) Adheres to a principle of ethical service	
	14) Adheres to a service principle of respect and acceptance	
	15) Has a “down to earth” approach to business	
<b>Commitment</b>	1) Demonstrates commitment	Anderson et al. (1994), Gundlach et al. (1995), Conway and Swift (2000)
	2) Demonstrates a willingness to honor commitments	
	3) Provides optimal attentiveness	
	4) Demonstrates loyalty	
	5) Is patient	

Part IV is designed to gather the demographic data of the respondents and their companies, such as position, type of industry, type of company, total number of local employees, number of year in operation, material assets and annual sales, and the personal information of the respondents, such as name and contact information.

### 5.3 Pilot Study

Before distributing the questionnaires to the targeted respondents, a pilot study was conducted with several industry experts and academic professionals. Based on their feedback, modifications were made to enhance the clarity of the items. After incorporating feedback from a pre-test, the revised questionnaire was further pilot tested on a 3PL company, and included both company employees and customers. Four sets of questionnaires were administered. Ten expected and actual questionnaires were administered to employees of a 3PL company and twenty expected and actual questionnaires were administered to the business partners of a 3PL company.

The purpose of the pilot test was to obtain feed back and to test the content validity and clarity of the measurement scale. A copy of the questionnaire, a covering lettering explaining the purpose of the pilot study (enclosed in Appendix A), and a paid envelope were sent to the respondents. Within four weeks, all ten questionnaires (both expected and actual) from the 3PL employees and eighteen questionnaires (both expected and actual) from the customers of the 3PL company were returned. As there were no reports of confusion about the questionnaire from either the 3PL company or its partners, the questionnaire was not modified.

#### **5.4 Research Sampling**

The four targeted 3PL providers that have been selected for this study are typical forwarding-based and value-added 3PL companies in Hong Kong. The four companies are StarTrans International Limited, BEL International Logistics Limited, E-Commerce Logistics Group, and JCT Logistics Limited, and have been selected to gather information on 3PL performance measurement in Hong Kong. These companies provide similar forwarding and 3PL services to their partners, and thus were able to provide similar content for this study.

##### *5.4.1 Target Respondents*

In the selection of the samples, despite potential information bias, only the key respondents from each company are considered. This is inspired by Teo and King (1997) to avoid potential perceptual discrepancies between respondents. However, it is still necessary to examine the suitability of the possible respondents. As this study aims to examine 3PL performance measurement, the target respondents of this study are the

executives of the selected 3PL providers and the executives of their business partners.

There are similarities between the selected four 3PL providers in this study. The companies are all Hong Kong based and provide forwarding (sea or air) services, value-added services (such as pick and pack, final assembly, shrink wrapping, and price tagging), and supply chain solutions. The companies all provide “one-stop shop” outsourcing business operations to their clients, which satisfies the definition of 3PL services as outlined in the literature review. Moreover, all four companies are SME-based companies with less than 150 employees, whereas the 3PL company partners are Hong Kong and mainland China manufacturers, wholesalers, and retailers. Four 3PL providers with commonalities have been selected for this study to facilitate the analysis of performance measurement between 3PL providers and their customers.

#### *5.4.2 Profile of the Target Respondents*

##### *(1) StarTrans International Limited*

Since 1972, StarTrans, which is a Hong Kong based freight-forwarding and 3PL company, has grown into a leading global freight management company. With annual revenues in excess of US\$200 million, StarTrans is well positioned to offer premium high-quality services to its customers. StarTrans has rapidly expanded its American, Asian, and European networks to achieve a dominant presence in key global markets. StarTrans has a reputable position in the air and sea freight forwarding fields, where speed, accuracy, and flexibility are imperative. The unique service that they offer ensures that customers receive the fastest delivery at the most cost-effective rates. The sea freight service, which is supplemented by an air charter program, saves costs for



customers and guarantees cargo space. The combination of the company's expertise in route planning, scheduling, and space utilization affords it the position of providing a quality cost-effective transportation mode service.

The company's expertise in the management of tailor-made garment-on-hanger orders also reduces storekeeping time. It provides "one-stop-shop" logistics packages that includes air freight, ocean freight, multi-modal transportation, warehousing and inventory management, pick-up and delivery, customs management, real-time tracking and tracing, insurance coverage, and value-added services.

## *(2) E-Commerce Logistics Limited*

E-Commerce Logistics Limited (ECL), which has its headquarters in Hong Kong, has been a leading Hong Kong and greater China 3PL service provider since 1997. ECL provides dedicated and multi-user distribution facilities, and with its IT logistics solutions and value added physical third party logistics services offers a complete supply chain management services to global brands, manufacturers, and retailers through out the region. Currently, ECL operates and manages 16 distribution centers (DC) with over 1.2 million square feet of space in Hong Kong, Taipei, Guangzhou, Zhuhai, and Shanghai. ECL provides dedicated information flows, and works with partners that in turn provide quality third party logistics services to ensure China-wide services for their customers.

ECL also enjoys a sophisticated e-logistics platform as a 3PL service provider. The ECL Warehouse Management Systems (WMS) system, which incorporates database management, an open Web platform, Palm technology, labeling, and barcode reading

systems, provides real-time information support for the “last mile” in the supply chain. ECL provides a well-rounded logistics package in Hong Kong and throughout Asia.

### *(3) BEL International Logistics Limited*

BEL International Logistics Limited is also a leading Hong Kong logistics service provider. The company provides specialized services in air and sea freight forwarding, and offers customized logistics projects that meet the specific demands of product exchange globally.

BEL was established in 1978, has about 100 employees, and has amassed talented and dedicated people to provide the best service to meet customer needs. BEL is also highly experienced in providing forwarding and logistics services for products such as computers, toys, printing products, textile goods, and garments.

To meet the increasing opportunities that are presented by the accession of China to the WTO, BEL emphasizes the expansion of the China market. It has set up liaison offices in main ports in China, such as Shanghai and Shenzhen. The business profile of BEL includes airfreight, sea freight, sea to airfreight, warehousing, value added services, and dedicated logistics packages. BEL is a good example of a Hong Kong freight forwarding and 3PL company.

### *(4) JCT Logistics Limited*

JCT Logistics is a Hong Kong based forwarding and 3PL company that was established in 1996. JCT Logistics is a major provider of warehousing, air and sea

forwarding, and logistics services. In 1998, JCT Logistics set up a warehouse in the YKK Industrial Building in Kwun Tong to provide their customers with modern warehousing and inventory management services. JCT Logistics handles electronic products, appliances, and computers. Since 2000, JCT has rented two warehouses in Tuen Mun. JCT has gradually moved into quality high end, value-added services such as the provision of 3PL-warehousing services, inventory management, freight forwarding value added services, and supply chain solutions.

## 5.5 Research Instrument

A total of 1,060 questionnaires in four groups (3PL expected, 3PL actual, customer expected, and customer actual) were distributed to four target 3PL providers and their partners. The sample size of each company is based on the company size. Hence, different numbers of questionnaires were distributed to company employees and customers. Table 5.4 shows the sample size and questionnaires that were distributed to each company.

**Table 5.4: Sample size and questionnaire distributed to each company**

Company	Star Int'l	ECL	BEL	JCT
	Distribute	Distribute	Distribute	Distribute
3PL Expected	60	60	50	60
3PL Actual	60	60	50	60
Customer Expected	100	80	80	40
Customer Actual	100	80	80	40
Sub-total	320	280	260	200

A set of three documents that contained a copy of the questionnaire, a covering letter (shown in Appendix A and B), and a paid envelope were sent to selected 3PL providers

to be distributed to their staff and customers. About two months after the date of distribution, follow-up calls, mails, and frequent visitations were made to non-respondents to encourage them to respond. When necessary, a second round of follow-up efforts was undertaken to increase the response rate.

After three months, a total of 742 questionnaires from both employees and customers of 3PL providers were received. The response rate is 70%, and Table 5.5 shows the received questionnaires in each group. Table 5.6 shows details of the data collection process.

**Table 5.5 Issue and collection of the questionnaires**

Company	Star Int'l		ECL		BEL		JCT		Total
	Distribute	Collect	Distribute	Collect	Distribute	Collect	Distribute	Collect	Collect
3PL Expected	60	51	60	36	50	42	60	40	169
3PL Actual	60	39	60	38	50	38	60	40	155
Customer Expected	100	80	80	32	80	54	40	35	201
Customer Actual	100	100	80	32	80	50	40	35	217
Sub-total	320	<b>270</b>	280	<b>138</b>	260	<b>184</b>	200	<b>150</b>	<b>742</b>

**Table: 5.6 Response rate**

Sample Size	1060
Respondents	742
Response Rate	70%
Valid Questionnaire	742
Valid Response Rate	100%

## 5.6 Statistical Method

In this study, a structural equation model is formulated to identify the contractual and structural link between 3PL service providers and their supply chain partners. As the

main objective of the study is to identify the relationship between 3PL service providers and their supply chain partners, structural equation modeling (SEM) is applied to examine the 3PL service quality, the 3PL organizational performance, and the relationship management between 3PL service providers and their supply chain partners. Gap analysis is conducted to examine the loading differences of the indicator variables to confirm the variables for both the 3PL service providers and for the 3PL customer–partner relationships to derive practical and useful information on the actual differences in 3PL logistics services.

#### *5.6.1 Structural Equation Modeling (SEM)*

SEM consists of a measurement model (or confirmatory factor model) that specifies the relationship between the observed measures and their latent constructs, and the structural model that specifies the causal relationships between the latent constructs themselves. SEM not only tests the measurement and structural models simultaneously, but also simultaneously examines the compatibility of the models with the data and the significance of the individual causal paths.

SEM is employed to investigate the relationship between context, structure, and output approach in accordance with the organizational theory to examine the contractual and structural links between a 3PL service provider and its supply chain partners. SEM is also employed to confirm the uni-dimensionality of the constructs that is, the degree to which the items load onto their latent constructs (Kline and Klammer, 2001).

There are three common statistical software packages that adopt the SEM approach: LISREL, EQS, and LINCOS. The most popular and widely used software package is

LISREL 8.5 (Hair et al., 1998), which is selected for this study to perform the SEM analysis.

LISREL uses the basic overall goodness-of-fit measures to assess the compatibility of the hypothesized model with the observable data. Researchers recommend the application of multiple criteria to assess a model's suitability to attenuate any measurement biases that are inherent in the different measures (Bollen and Long, 1993; Breckler, 1990). The general model of goodness-of-fit is assessed using the following three criteria: comparative fit index (CFI), chi-square or degrees of freedom ( $\chi^2/df$ ), and root mean square residual (RMR). CFI is preferable to the other fit indexes because it is size adaptable and avoids the underestimation of a small sample fit (Bentler, 1990). Unsurprisingly, Hunton and Beeler (1997) indicated that CFI is widely used as a key goodness-of-fit index in structural equation modeling. Table 5.7 lists the recommended values of the three measures of model suitability that were suggested by Hartwick and Barki (1994) and Segars and Grover (1993).

**Table 5.7 Recommended values of goodness-of-fit measures**

Goodness-of-Fit Measure	Recommended Value
Comparative Fit Index (CFI)	$\geq 0.9$
Chi-square/degrees of freedom ( $\chi^2/df$ )	$\leq 3.0$
Root Mean Square Residual (RMR)	$\leq 0.1$

(Adapted from Hartwick and Barki, 1994 and Segars and Grover, 1993)

Traditional analysis uses each item as a separate indicator of the relevant construct, which allows a detailed analysis for construct testing. However, according to Bagozzi and Heatherton (1994) and Mcallister and Bigley (2002), traditional analysis is

unwieldy in practice, as there is a high probability of random error in the typical items and the parameters that are estimated. The partial aggregation technique helps to reduce this problem. It combines items of the same dimension into a composite score to reduce the high probability of random error, and treats the composite score as an indicator of a higher order latent variable. For example, the five questions on reliability (RELIA) are taken as an indicator of service quality constructs.

Using this framework has a number of advantages. First, it reduces the number of measurement tools, but retains the impact of a single underlying factor. Second, the model provides separate parameter estimates that represent the degree of correspondence between the latent construct and its sub-dimensions, and also provides estimates of measurement error that allow an assessment of measurement reliability (Bagozzi and Heatherton, 1994; McCallister and Bigley, 2002).

After the application of the partial aggregation technique, the model of the measurement constructs is tested by performing a CFA, in which all of the latent variables inter-correlate freely without attribution of causal order. Existing measurement problems are resolved, and the measurement model is re-specified.

It is essential to assess a model's suitability, and also to evaluate its validity and reliability. Convergent validity measures the congruency of construct measures, and is assessed by determining the significance between an indicator's estimated coefficient and its posited underlying construct (Anderson and Gerbing, 1988).

Discriminate validity measures the uniqueness of different construct measurements. It is assessed by comparing a constrained model in which the estimated correlation

parameter between the constructs is constrained to unity with an unconstrained model. A significantly lower  $\chi^2$  value for an unconstrained model compared to a constrained model provides evidence of discriminate validity. Construct reliability also measures the internal consistency of the construct indicators, which represents the degree to which a common latent construct is indicated. As suggested by Hair et al. (1998), a commonly acceptable level of reliability is 0.7. Values above 0.7 provide assurance for researchers that the construct indicators have consistent measurements.

Anderson and Gerbing (1988) suggest a two-step approach for data analyses in SEM. With this approach, the measurement model is assessed using CFA, which also assesses the model's goodness-of-fit, validity, and reliability. When the acceptability of the measurement model is demonstrated, the structural model of the effects of 3PL performance measurement on the projected success criterion is examined.

### *5.6.2 Gap Analysis*

Gap analysis is adopted to analyze service quality, organizational effectiveness, and relationship management in terms of the difference between what a partner expects and what they actually receive. This difference or gap is one of the research focuses. In the service quality model, several gaps are noted as being important to the design and delivery of consistent quality services and 3PL performance measurement, in addition to the gaps between expectation and outcome. These gaps generally involve the ability of 3PL providers to understand partner expectations and to translate them into elements of the service that are offered.

A better understanding of all of the gaps in service provision enhances an



organization's ability to meet customer expectations. As all of the gaps in the model have roles that need to be understood, a simple approach to monitoring the most basic and critical elements in the service setting is suggested.

A key to using gap analysis as a statistically oriented approach is having a sound method of measurement and monitoring of the voices of 3PL providers and their customers. This is achieved with reasonable success through an analysis of identical statements given by 3PL providers and their customers.

In gap analysis, the different orientations of each group need to be emphasized. Customers are asked about their service expectations and providers are asked about their perceived customer expectations. The use of identical statements and an approximation of a common perceptual orientation allow the responses to be compared statistically. The comparison is most effectively carried out on a question-by-question basis. The same question is presented at regular intervals to survey other customer samples. If the statements continue to be pertinent and to yield consistent results, then they are analyzed more extensively on a multi-item scale that measures 3PL performance. Four gaps that are relevant to this study are eventually identified (Gaps 1-4 are shown in the following) that provide a statistically reliable and valid measure of 3PL performance measurement in the different groups.

Gap1 = 3PL provider expectations – 3PL provider actual experiences

Gap2 = Customer experiences – Customer actual experiences

Gap3 = 3PL Provider Expectations – Customer expectations

Gap4 = 3PL provider actual experiences – Customer actual experiences

Gap analysis is also conducted to examine the loading differences of the indicator variables, to confirm the variables from both the 3PL service providers and 3PL customers-partners, and to derive useful information from the actual differences in logistics services for 3PL service improvement.

## **5.7 Summary**

This chapter describes the study's research methodology. First, the questionnaire that was designed to collect data for analysis is described. The research sampling method is then elaborated. Finally, the statistical methods of SEM and gap analysis are presented. SEM is applied to test 3PL service quality, contractual and structural links, and the relationship management between 3PL providers and their supply chain partners. Gap analysis examines the evaluation of 3PL performance measurement between service gaps or groups.

## CHAPTER 6

### DATA ANALYSIS AND RESEARCH FINDINGS

This chapter presents the data analysis and research findings, and comprises the following sections.

- 6.1 Demographic or Sample Profile
- 6.2 Mean Scores of 3PL Performance Measurement
- 6.3 Reliability
- 6.4 Model and Research Hypotheses Refinement
- 6.5 Structural Equation Modeling (SEM) Analysis
- 6.6 Gap Analysis
- 6.7 Summary

#### **6.1 Demographic or Sample Profile**

Of the 1,060 questionnaires, 70% (742) were completed and returned. Among the questionnaires that were received, 169 (22.78%) are from the 3PL Expected group, 155 (20.89%) are from the 3PL Actual group, 201 (27.09%) are from the Customer Expected group, and 217 (29.25%) are from the Customer Actual group. The demographic information of the respondents and their companies is summarized in Table 6.1.

### *6.1.1 Total Number of Employees*

In terms of the total number of employees in the respondent companies, most of the 3PL Expected companies employ between 100 and 199 (35.3%) employees, and both the 3PL Actual companies and Customer Actual companies employ between 50 and 99 (26.0% and 48.7%) employees, whereas most of the Customer Expected companies have less than 50 employees (71.9%).

### *6.1.2 Business Operations*

Both the 3PL Expected and Customer Actual companies indicated that they have operated businesses in Hong Kong for 5 to 7 years (62.3% and 45.6%). Most of the 3PL Actual companies have operated in Hong Kong for more than 10 years, and most of the Customer Expected companies have operated in Hong Kong for 2 to 4 years (37.6%).

### *6.1.3 Value of Material Assets*

Most of the 3PL Expected companies have HKD30 to 44 million in material assets, and 44.4% of the 3PL Actual companies indicated that they have more than HKD100 million in material assets, whereas 93.5% of the Customer Expected companies have less than HKD15 million in material assets and most of the Customer Actual companies have HKD15 to 29 million in material assets.

#### *6.1.4 Annual Sales in 2002*

Most of the 3PL Expected companies had annual sales of HKD20 to 49 million in 2002 and 32.3% of 3PL Actual companies had more than HKD100 million in annual sales, whereas 80.8% of the Customer Expected companies had less than HKD5 million in annual sales in 2002 and most of the Customer Actual companies had HKD10 to 19 million in annual sales in 2002.

#### *6.1.5 Position in the Companies*

Of the respondents from the 3PL Expected companies, 47.9% are middle managers, compared to 42.5% from the Customer Actual companies, whereas 36.1% from the 3PL Actual companies and 49.5% from the Customer Expected companies are front-line managers and staff.

#### *6.1.6 Type of Industry*

Of the total respondents from the Customer Expected companies, 44.3% are in service, wholesale, and retail industries, including banking, finance, insurance, and hospitality (hotels), whereas 26.5% from the Customer Actual companies are in the textile and clothing industry.

**Table 6.1 Demographic information of the respondents and their companies**

Respondents' Demographic Data	Frequency (%)			
	3PL Expected	3PL Actual	Customer Expected	Customer Actual
<b>Total Number of Employees</b>				
Less than 50	38 (22.8%)	34 (22.7%)	159 (71.9%)	38 (19.3%)
50-99	53 (31.7%)	39 (26.0%)	33 (14.9%)	96 (48.7%)
100-199	59 (35.3%)	33 (22.0%)	17 (7.7%)	55 (27.9%)
200-499	17 (10.2%)	15 (10.0%)	11 (5.0%)	4 (2.0%)
500-999	0 (0.0%)	23 (15.3%)	0 (0.0%)	2 (1.0%)
1000 or more	0 (0.0%)	6 (4.0%)	1 (0.5%)	2 (1.0%)
<b>Total</b>	<b>167 (100.0%)</b>	<b>150 (100.0%)</b>	<b>221 (100.0%)</b>	<b>197 (100.0%)</b>
<b>Business Operations in Hong Kong</b>				
2 Years Less	15 (9.0%)	8 (5.5%)	79 (35.7%)	5 (2.6%)
2-4 Years	28 (16.8%)	12 (8.3%)	82 (37.6%)	52 (26.9%)
5-7 Years	104 (62.3%)	30 (20.0%)	35 (15.8%)	88 (45.6%)
8-10 Years	10 (6.0%)	11 (7.6%)	14 (6.3%)	7 (3.6%)
Over 10 Years	10 (6.0%)	84 (57.9%)	10 (4.5%)	41 (21.2%)
<b>Total</b>	<b>167 (100.0%)</b>	<b>145 (100.0%)</b>	<b>221 (100.0%)</b>	<b>193 (100.0%)</b>
<b>Value of Physical Assets (HKD in millions)</b>				
Less Than 15	10 (6.3%)	29 (21.8%)	202 (93.5%)	18 (10.3%)
15-29	42 (26.3%)	9 (6.8%)	6 (2.8%)	79 (45.4%)
30-49	55 (34.4%)	20 (15.0%)	2 (0.9%)	67 (38.5%)
50-99	43 (26.9%)	16 (12.0%)	4 (1.9%)	5 (2.9%)
100 or more	10 (6.0%)	59 (44.4%)	2 (0.9%)	5 (2.9%)
<b>Total</b>	<b>160 (100.0%)</b>	<b>133 (100.0%)</b>	<b>216 (100.0%)</b>	<b>174 (100.0%)</b>
<b>Annual Sales in 2002 (HKD in millions)</b>				
Less than 5	23 (14.5%)	19 (14.6%)	172 (80.8%)	8 (4.6%)
5-9	11 (6.9%)	10 (7.7%)	11 (5.2%)	25 (14.4%)
10-19	53 (33.3%)	21 (16.2%)	20 (9.4%)	121 (69.5%)
20-49	61 (38.4%)	22 (16.9%)	7 (3.3%)	6 (3.4%)
50-99	10 (6.3%)	16 (12.3%)	2 (0.9%)	7 (4.0%)
100 or more	1 (0.6%)	42 (32.3%)	1 (0.5%)	7 (4.0%)
<b>Total</b>	<b>159 (100.0%)</b>	<b>130 (100.0%)</b>	<b>213 (100.0%)</b>	<b>174 (100.0%)</b>

**Table 6.1 Demographic information of the respondents and their companies (Cont.)**

Respondents' Demographic Data	Frequency (%)			
	3PL Expected	3PL Actual	Customer Expected	Customer Actual
<b>Position in the Company</b>				
Senior Management	44 (27.0%)	18 (13.5%)	32 (14.8%)	53 (27.5%)
Middle Management	78 (47.9%)	43 (32.3%)	16 (7.4%)	82 (42.5%)
Font-line Manager	17 (10.4%)	16 (12.0%)	56 (25.9%)	17 (8.8%)
Front-line Staff	24 (14.7%)	48 (36.1%)	107 (49.5%)	40 (20.7%)
Other	0 (0.0%)	8 (6.0%)	5 (2.3%)	1 (0.5%)
<i>Total</i>	163 (100.0%)	133 (100.0%)	216 (100.0%)	193 (100.0%)
<b>Type of Industry</b>				
Biotechnology/Chemical	N.A.	N.A.	11 (5.0%)	0 (0.0%)
Construction	N.A.	N.A.	1 (0.5%)	6 (3.1%)
Electrical Appliance	N.A.	N.A.	7 (3.2%)	2 (1.0%)
Electronic/Information Technology	N.A.	N.A.	11 (5.5%)	10 (5.1%)
Industrial Machinery	N.A.	N.A.	0 (0.0%)	12 (6.1%)
Medicine/Health	N.A.	N.A.	8 (3.6%)	3 (1.5%)
Optical/ Plastic Products	N.A.	N.A.	16 (7.2%)	28 (14.3%)
Printing	N.A.	N.A.	14 (6.3%)	30 (15.3%)
Service/Wholesale/Retail	N.A.	N.A.	98 (44.3%)	15 (7.6%)
Textile and Clothing	N.A.	N.A.	24 (10.9%)	52 (26.5%)
Toys	N.A.	N.A.	4 (1.8%)	31 (15.8%)
Watches and Clock	N.A.	N.A.	3 (1.4%)	0 (0.0%)
Other	N.A.	N.A.	23 (10.4%)	7 (3.6%)
<i>Total</i>	N.A.	N.A.	221 (100.0%)	196 (100.0%)

Note: N.A. = Not available.

## 6.2 Mean Scores of 3PL Performance Measurement

Table 6.2 shows the mean and standard deviations of the performance measurement factors. The value of 5 and above of most of the scores implies that all of the factors are significant in measuring the importance of 3PL company performance.

## 6.3 Reliability

### 6.3.1 Reliability

Reliability is defined as the repeatability of measurements when they are conducted by different people on different occasions (Nunnally, 1978). Reliability implies that an instrument is stable, and is determined by the Cronbach's Alpha coefficient, which is based on the internal consistency of the scale. The higher the value of the Cronbach's Alpha coefficient, the higher the internal consistency of the item measurement of each construct, which indicates the instrument's high reliability. Nunnally (1978) claimed that a Cronbach's Alpha coefficient of greater than the recommended value of 0.60 is acceptable for exploratory research. Table 6.3 shows the Cronbach's Alpha coefficients for each instrument and the constructs of 3PL service quality, 3PL organizational effectiveness, and relationship management. That all of the coefficients are greater than 0.78 reveals that a good reliability has been achieved.



**Table 6.2 Mean and standard deviations of the constructs**

Constructs	Mean (SD)			
	3PL Expected	3PL Actual	Customer Expected	Customer Actual
<i>3PL Service Quality</i>				
Tangibles	5.75 (0.66)	5.16 (0.88)	5.23 (0.88)	5.17 (0.75)
Reliability	5.66 (0.83)	5.23 (0.94)	5.26 (0.94)	5.33 (0.90)
Responsiveness	5.80 (0.82)	5.37 (0.98)	5.35 (0.98)	5.33 (0.95)
Assurance	5.77 (0.71)	5.38 (0.83)	5.30 (0.83)	5.30 (0.86)
Empathy	5.58 (0.74)	5.28 (0.88)	5.16 (0.88)	5.28 (0.90)
<i>3PL Organizational Effectiveness</i>				
Productivity	5.50 (0.76)	5.21 (0.87)	5.01 (0.92)	5.16 (0.82)
Financial Performance	4.84 (1.25)	3.89 (1.49)	3.98 (1.18)	4.17 (1.22)
Cycle Time	5.52 (0.69)	5.29 (0.88)	4.99 (0.88)	5.05 (0.76)
Customer Service	5.62 (0.68)	5.09 (0.91)	5.02 (0.91)	5.17 (0.80)
Reputation and Goodwill	5.57 (0.84)	4.98 (0.92)	4.99 (0.92)	5.13 (0.85)
<i>Relationship Management</i>				
Guanxi	5.33 (0.82)	5.06 (0.82)	4.78 (0.82)	4.93 (0.80)
Trust	5.53 (0.72)	5.06 (0.76)	5.03 (0.76)	5.19 (0.78)
Commitment	5.63 (0.86)	5.06 (0.92)	5.07 (0.92)	5.26 (0.86)

**Table 6.3 Reliability of the instrument**

Factor	n	Cronbach's Alpha Coefficient			
		3PL Expected	3PL Actual	Customer Expected	Customer Actual
<i>3PL Service Quality</i>		<b>0.8209</b>	<b>0.9094</b>	<b>0.9274</b>	<b>0.9366</b>
Tangibles	4	0.8456	0.9050	0.8266	0.8312
Reliability	5	0.8808	0.9092	0.9452	0.9257
Responsiveness	4	0.8852	0.8934	0.9345	0.9266
Assurance	4	0.7865	0.8693	0.9225	0.9038
Empathy	5	0.8773	0.9135	0.9538	0.9409
<i>3PL Organizational Effectiveness</i>		<b>0.8210</b>	<b>0.9017</b>	<b>0.9238</b>	<b>0.9475</b>
Productivity	9	0.9029	0.9314	0.9534	0.9438
Financial Performance	9	0.9614	0.9663	0.9755	0.9763
Cycle Time	10	0.8947	0.9430	0.9368	0.9312
Customer Service	13	0.9035	0.9492	0.9594	0.9506
Reputation and Goodwill	5	0.9001	0.8998	0.9336	0.9193
<i>Relationship Management</i>		<b>0.7839</b>	<b>0.8415</b>	<b>0.8603</b>	<b>0.8222</b>
Guanxi	10	0.9025	0.9107	0.9033	0.9002
Trust	15	0.9210	0.9443	0.9649	0.9574
Commitment	5	0.9016	0.9123	0.9458	0.9375

Note: n = number of measurement items.

### 6.3.2 Content Validity

Content validity represents the comprehensive and reliable measurement of all of the dimensions of a construct by an instrument (Kidder and Judd, 1986). Flynn et al. (1995) claimed that content validity tests are subjective and biased, whereas Nunnally (1978) claimed that the standard of content validity is based on two

questions: “Does an instrument contain a representative set of items?” and “Were sensible methods of scale construction used?”

This study has 11 factors that are divided into three constructs to measure 3PL organizational performance. The three constructs are 3PL service quality, 3PL organizational effectiveness, and relationship management. In 3PL service quality, five SERVQUAL dimensions – tangibles, reliability, responsiveness, assurance, and empathy – are identified. Three factors – cycle time, customer service, and reputation and goodwill – are also identified in the measurement of 3PL organizational effectiveness after model refinement. In the measurement of relationship management, guanxi, trust, and commitment are identified.

All of the measurement items of each construct were adapted from the literature. The survey instruments were authorized by a practitioner in the pilot study to ensure the suitability of the items and the lack of ambiguity in the interpretation of the instrument items. This justifies the content validity of the instrument.

### *6.3.3 Correlation Analysis*

Correlation analysis is performed to investigate the inter-correlations between different factors across groups. Table 6.4 shows that all of the factors display moderate correlations, except for “financial performance,” which displays inconsistent patterns with other factors.

**Table 6.4 Correlation coefficients between financial performance and other factors**

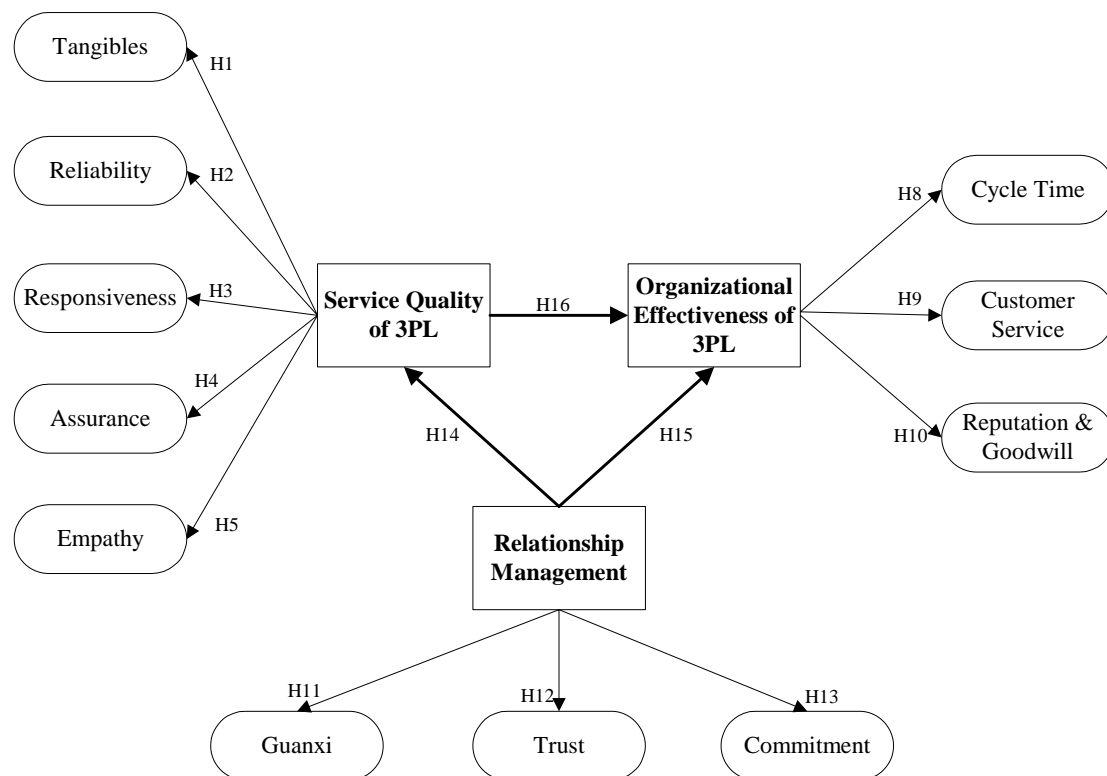
Factor	Correlation Coefficient			
	3PL Expected	3PL Actual	Customer Expected	Customer Actual
<i>Service Quality of 3PL</i>				
Tangibles	0.073	0.187*	0.076	0.117
Reliability	-0.162*	0.083	-0.076	-0.056
Responsiveness	-0.072	0.041	-0.014	-0.053
Assurance	-0.049	0.076	0.020	0.032
Empathy	0.062	0.152	-0.023	0.005
<i>Organizational Effectiveness of 3PL</i>				
Productivity	0.085	0.212**	0.037	0.31
Financial Performance	N.A.	N.A.	N.A.	N.A.
Cycle Time	0.262**	0.273**	0.169*	0.238**
Customer Service	0.166*	0.257**	0.070	0.127
Reputation and Goodwill	0.104	0.272**	0.058	0.103
<i>Relationship Management</i>				
Guanxi	0.295**	0.293**	0.268**	0.290**
Trust	0.121**	0.240**	0.005	0.038
Commitment	0.262**	0.170*	-0.100	-0.021

Note: N.A. = Not Available; \*  $p < 0.05$ ; \*\*  $p < 0.01$ .

## 6.4 Model and Research Hypotheses Refinement

Previous analysis excluded the factors of “productivity” and “financial performance” from the final model. The factor of “productivity” was excluded because there were many items that were missing from questionnaires of the respondents, and the factor of “financial performance” was excluded because of its relatively high standard deviation and low mean score compared to the other factors. The 11 factors of the refined model and the final hypotheses are shown in Figure 6.1 and Table 6.5.

Figure 6.1 Performance Measurement of 3PL



**Table 6.5: Summary of hypotheses**

H 1	The better a 3PL provider's facilities, the better 3PL service quality.
H 2	The more dependably and accurately service commitments are fulfilled, the better the 3PL service quality.
H 3	The more willingness to assist supply chain partners and provide prompt service, the better the 3PL service quality.
H 4	The more able to convey trust and confidence, the better the 3PL service quality.
H 5	The more caring and attentive to customers, the better the 3PL service quality.
H6	The better the organizational performance of a 3PL service provider, the better the productivity.
H7	The better the organizational performance of a 3PL service provider, the better the financial performance and market share.
H 8	The better the organizational effectiveness of a 3PL service provider, the shorter the product or service cycle time.
H 9	The better the organizational effectiveness of a 3PL service provider, the better the customer service that it provides to its partners.
H 10	The better the organizational effectiveness of a 3PL service provider, the better its reputation and goodwill.
H 11	The better the guanxi relationship between a 3PL service provider and its supply chain partners, the greater the intent by both parties to maintain a long-term relationship.
H 12	The better the trust between a 3PL service provider and its supply chain partners, the greater the intent by both parties to maintain a long-term relationship.
H 13	The better the commitment between a 3PL service provider and its supply chain partners, the greater the intent by both parties to maintain a long-term relationship.
H 14	The better the relationship management, the better the 3PL service quality.
H 15	The better the relationship management of a 3PL service provider, the better its organizational effectiveness.
H 16	The better the service quality of a 3PL provider, the better its general organizational effectiveness.

### 6.5 Structural Equation Modeling (SEM) Analysis

### 6.5.1 Structural Equation Modeling

There have been many empirical studies of operation priorities that have used path modeling, such as those of Swamidass and Newell (1987), Ward and Duray (2000), and Amoako-Gyampah and Boye (2001). However, most of these studies have used small sample sizes (for example, 35 companies were used in Swamidass and Newell's (1987) study), and there are inherent limitations in the path analysis method itself. Path analysis is a subset of SEM, and involves only measured variables. SEM consists of measurement and structural models, all of which are tested simultaneously. This study employs structural equation modeling to estimate the causal relationships between different constructs using a linear structural relations (LISREL) program on a sample of 159 companies. Kline and Klammer (2001) contended that LISREL examines the relationships of the variables as a unit, rather than piecemeal, as in a regression approach. The assumption of perfectly reliable measures in regression analysis is untenable, but is easily handled by LISREL (Kline and Klammer, 2001).

SEM is a confirmatory approach to data analysis that requires an *a priori* assignment of inter-variable relationships. SEM tests a hypothesized model statistically to determine the consistency of the proposed model with the sample data. The measurement models specify how the latent variables are measured in terms of the indicator variables, and address the reliability and validity of the indicator variables in measuring latent variables or hypothetical constructs. The structural equation model provides an assessment of predictive validity, specifies the direct and indirect relationships between latent variables, and describes the amount of explained and unexplained variance in the model (Byrne, 1998; Schumacker and Lomax, 1996).

The LISREL 8.5 that is supplied by Scientific Software International is used in this study to analyze the hypothesized model. A two-step model building approach is used, in which the measurement models are tested before the testing of the structural model. The rationale behind this two-step approach was discussed by Joreskog and Sorbom (1993) and Anderson and Gerbing (1988). The maximum probability estimation method is used, which has desirable asymptotic properties (for example, minimum variance and objectivity) and is scale free. The estimation method assumes the multivariate normality of the observed variables. Recent research has shown that the maximum probability method can be used for data with minor deviations from normality (Raykov and Marcoulides, 2000). To determine normality, P-P plots that can map a variable's cumulative proportions against the cumulative proportions of any of a number of test distributions are observed in a sample, and the data apparently approximates normal distribution.

### *6.5.2 Confirmatory Factor Analysis (CFA) with LISREL*

#### *6.5.2.1 CFA of 3PL Service Quality*

CFA is performed for the 3PL service quality models separately for the four groups. The results of the goodness of fit tests of these CFA models are shown in Table 6.6, and the figures show a well accepted fit for all of the models.



**Table 6.6 Results of the confirmatory factor analysis (3PL service quality)**

	<i>Df</i>	$\chi^2$	$\chi^2 / df$	RMSEA	NFI	CFI	GFI
3PL Expected	4	4.42	1.105	0.025	0.99	1.00	0.99
3PL Actual	5	47.19	9.438	0.230	0.94	0.94	0.90
Customer Expected	4	6.69	9.438	0.055	0.99	1.00	0.99
Customer Actual	4	15.39	3.848	0.11	0.98	0.99	0.97

Note:  $\chi^2$ : minimum fit function chi-square; RMSEA: root mean square error of approximation; NFI: normal fit index; CFI: comparative fit index; and GFI: goodness of fit index.

The goodness of fit index also indicates the uni-dimensionality of the items that are used in the CFA (Ahire et al., 1996). In Table 6.6, all of the goodness of fit indexes of the models are greater than or equal to 0.90, which indicates that there is sufficient uni-dimensionality.

**Table 6.7 Results of the standardized confirmatory factor loadings of 3PL service quality**

	3PL Expected	3PL Actual	Customer Expected	Customer Actual
<b>Werts Linn Jorsekog coefficient</b>	0.8678	0.9364	0.9529	0.9331
	<b>ML Estimate <math>\lambda_x</math></b>			
<b>Item</b>				
Tangibles	0.41	0.70	0.53	0.51
Reliability	0.56	0.81	0.86	0.69
Responsiveness	0.51	0.87	0.88	0.73
Assurance	0.57	0.72	0.83	0.71
Empathy	0.55	0.64	0.86	0.71

**Figure 6.2 Service Quality of 3PL Measurement Models**

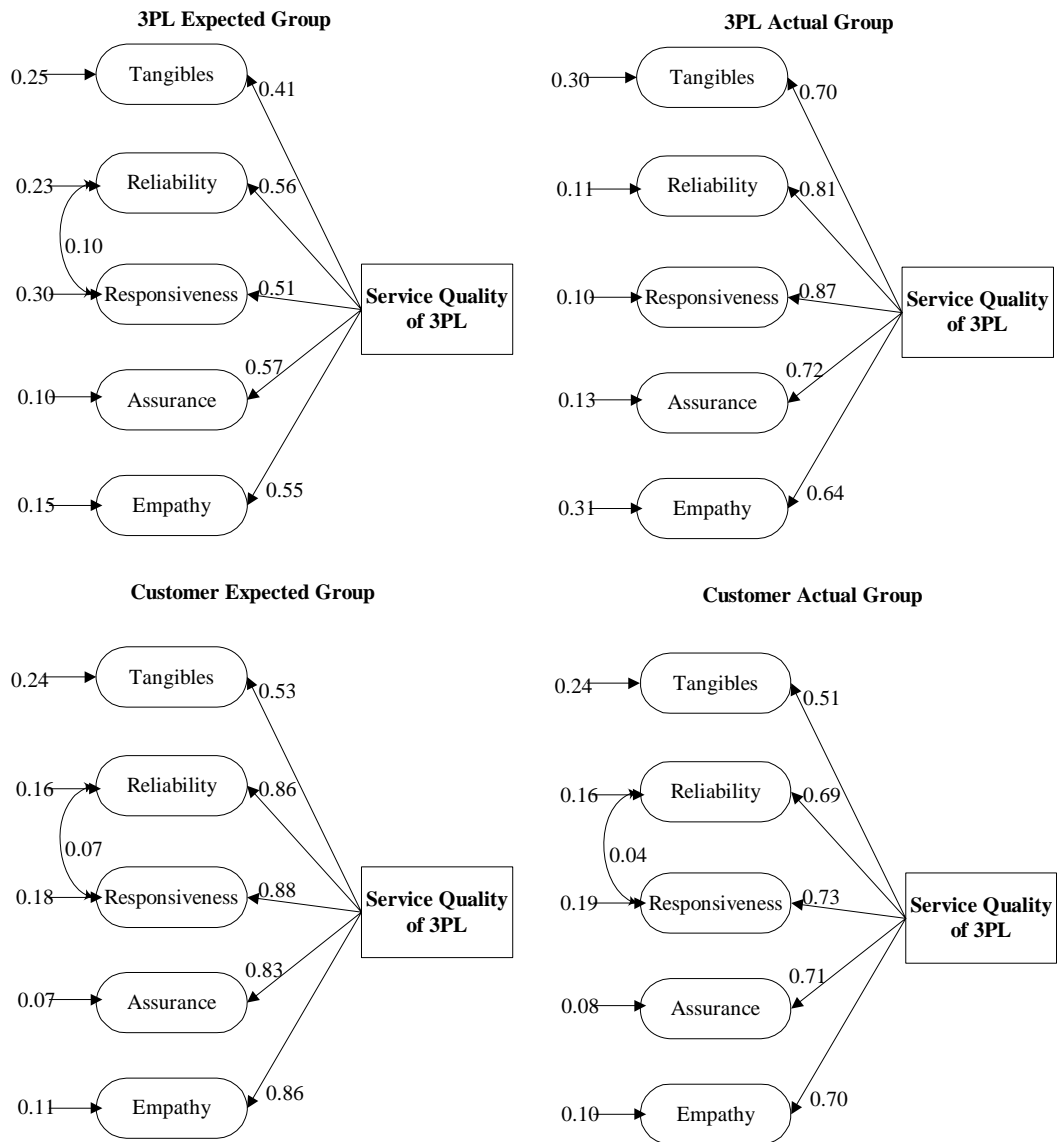


Figure 6.2 and Table 6.7 illustrate the factor loadings and the factor reliabilities of the four sets of 3PL service quality models. It is noted that the items of reliability and responsiveness are correlated both in the 3PL Expected group ( $r = 0.10$ ), Customer Expected group ( $r = 0.07$ ), and the Customer Actual group ( $r = 0.04$ ). All of the correlations are significant ( $p < 0.05$ ).

A rule of thumb is that factor loadings that are greater than 0.3 can be considered to be significant (Loehlin, 1992). Falk and Miller (1992) added that a strong relationship between the measurement item and its corresponding factor is indicated if the factor loading is greater than 0.55. It can be seen from Table 6.7 that the factor loadings indicate that all of the relationships are significant, and that of the most relationships, apart from a few items, are strong.

The Werts-Linn-Jorsekog coefficients are used as an alternative means of measuring construct reliability (Bagozzi, 1981), and are calculated and shown in Table 6.7. All of the coefficients are greater than 0.80, which is an indication of very satisfactory construct reliability.

#### *6.5.2.2 CFA of 3PL Organizational Effectiveness*

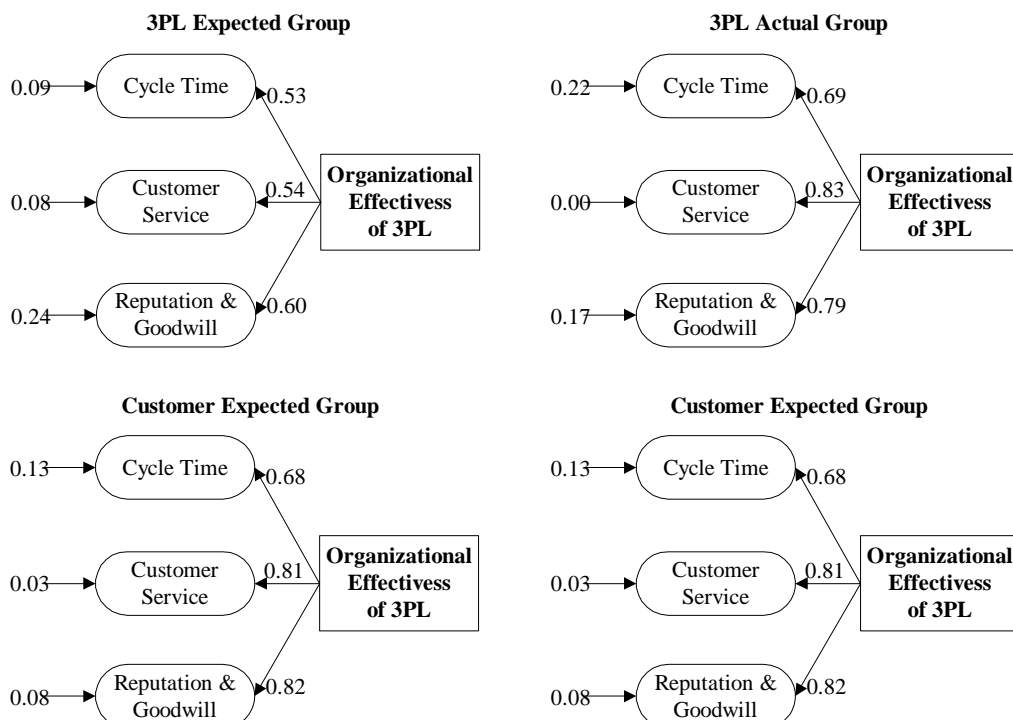
CFAs are separately performed to determine 3PL organizational effectiveness. However, as there are three factors in the model, the number of estimator parameters =  $3! = 6$ . Three factor loadings and residuals are required for estimation, and thus the number of estimators is also equal to 6. The degrees of freedom are defined as the difference between the estimator parameters and the number of estimators (Long, 1983). In the current situation, the degree of freedom is equal to zero, which means that the model is saturated and thus no goodness of fit tests are available.

**Table 6.8 Results of the standardized confirmatory factor loadings of 3PL organizational effectiveness**

	3PL Expected	3PL Actual	Customer Expected	Customer Actual	
<b>Werts Linn Jorsekog coefficient</b>	0.8718	0.9319	0.9570	0.9439	
<b>Item</b>	<b>ML Estimate <math>\lambda_x</math></b>				
	Cycle Time	0.53	0.69	0.68	0.62
	Customer Service	0.54	0.83	0.81	0.68
	Reputation and Goodwill	0.60	0.79	0.82	0.71

Figure 6.3 and Table 6.8 illustrates the factor loadings and factor reliabilities of the four 3PL organizational effectiveness models. The factor loadings reveal a significant relationship, and that all of the relationships are very strong except for cycle time and customer service in the 3PL Expected model. The Werts-Linn-Jorsekog coefficients also indicate very satisfactory construct reliability.

**Figure 6.3 Organizational Effectiveness of 3PL Measurement Models**



### 6.5.2.3 CFA of Relationship Management

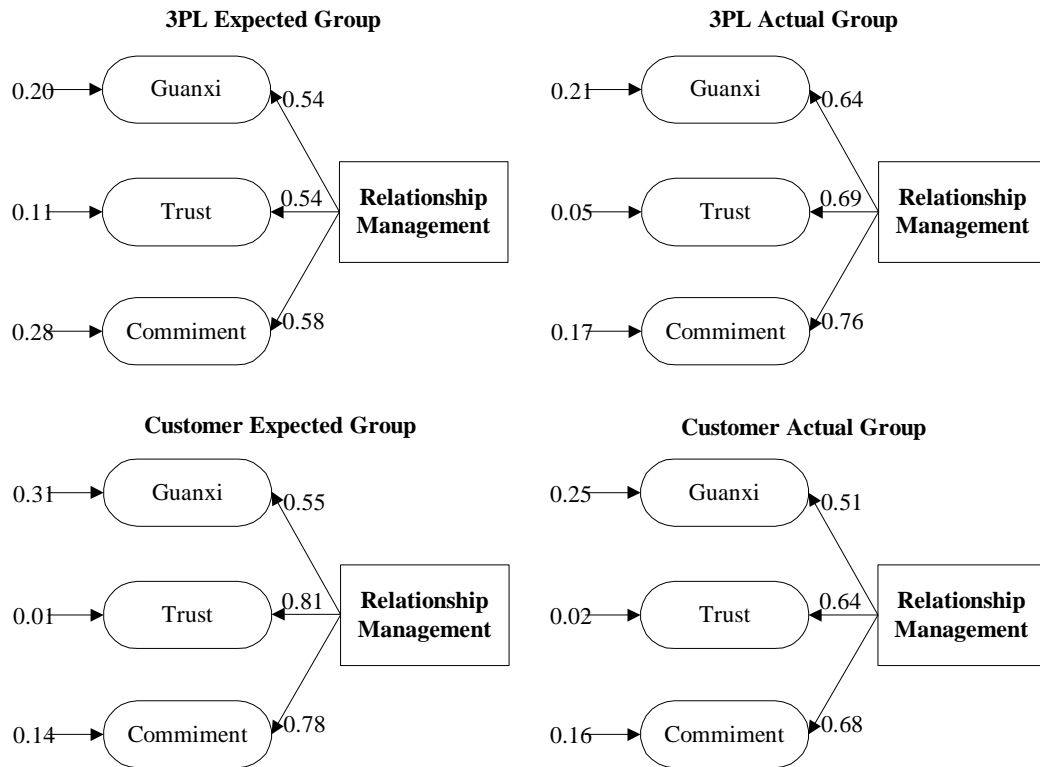
CFAs are performed for relationship management. Similar to the models of organizational effectiveness, these models are saturated, and no goodness of fit tests are available.

**Table 6.9 Results of standardized confirmatory factor loadings of relationship management**

	<b>3PL Expected</b>	<b>3PL Actual</b>	<b>Customer Expected</b>	<b>Customer Actual</b>
<b>Werts Linn Jorsekog coefficient</b>	0.8236	0.9104	0.9087	0.8894
	<b>ML Estimate <math>\lambda_x</math></b>			
<b>Item</b>				
Guanxi	0.54	0.64	0.55	0.51
Trust	0.54	0.69	0.81	0.64
Commitment	0.58	0.76	0.78	0.68

Figure 6.4 and Table 6.9 illustrate the factor loadings and factor reliabilities of the four relationship management models. The factor loadings reveal significant relationships and that most of the relationships are strong. The Werts-Linn-Jorsekog coefficients also indicate very good construct reliability.

**Figure 6.4 Relationship Management Models of 3PL Measurement Models**



*6.5.2.4 Structural Equation Models of 3PL*

Structural equation model analyses are performed for the three-factor whole model. The results of the goodness of fit tests of these models are shown in Table 6.10, and the figures show an acceptable fit for all of the models and a marginal lack of uni-dimensionality for the 3PL Actual group and the Customer Expected group.

**Table 6.10 Results of structural equation modeling**

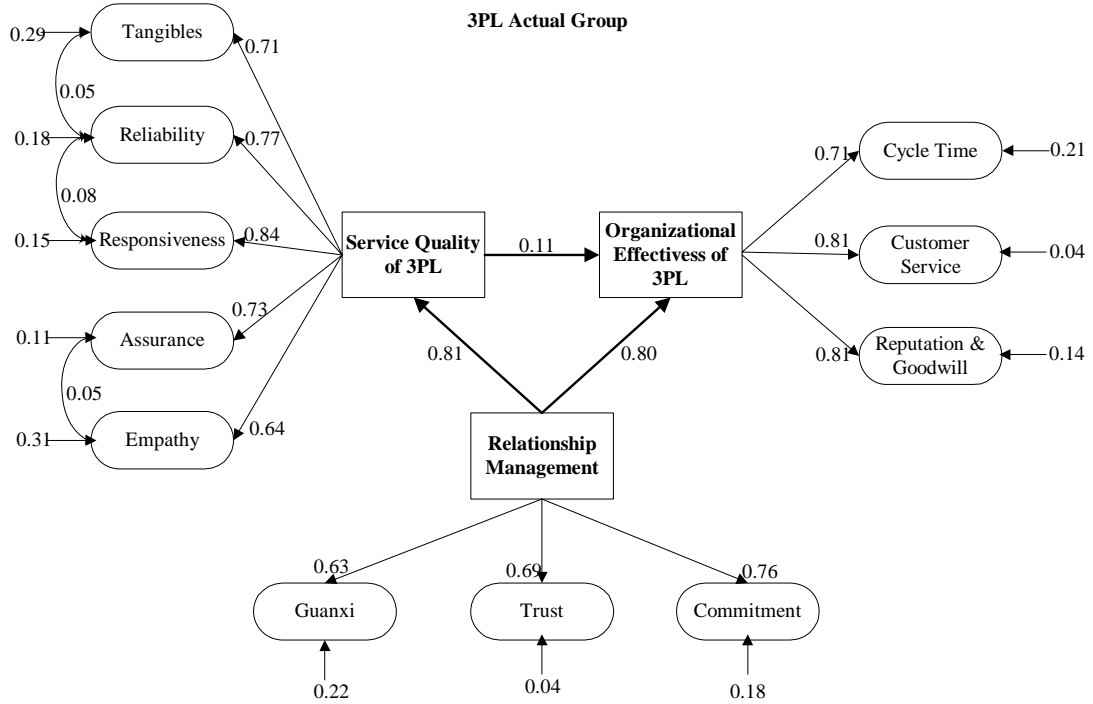
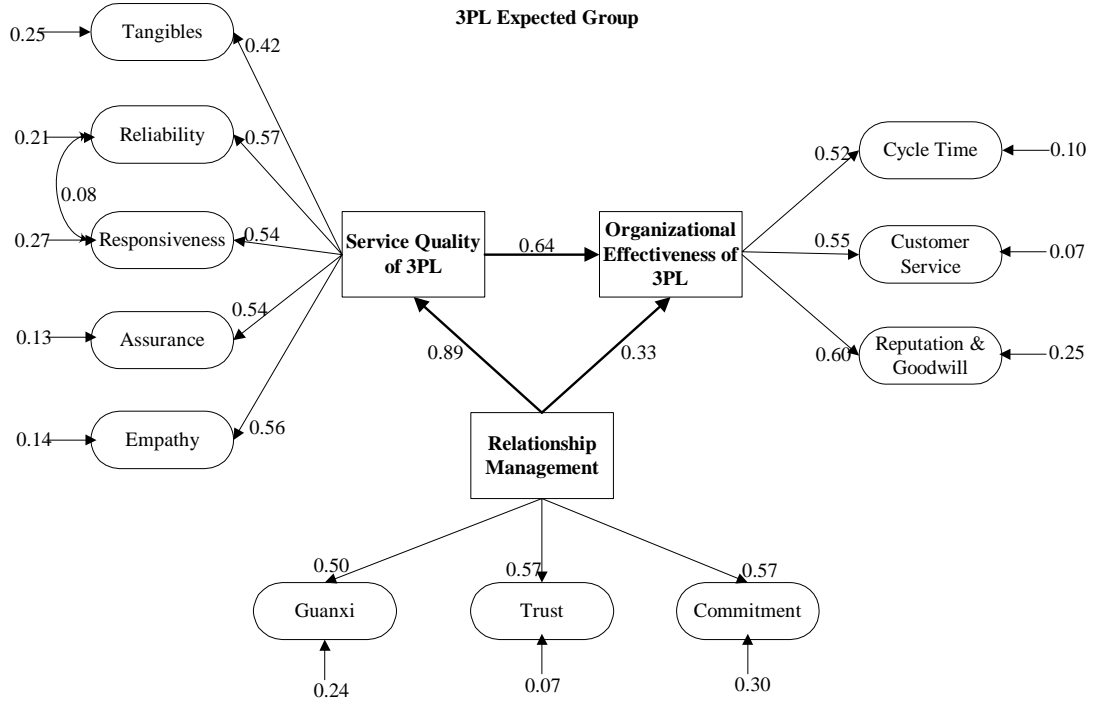
	<i>df</i>	$\chi^2$	$\chi^2 / df$	RMSEA	NFI	CFI	GFI
3PL Expected	40	84.78	2.112	0.075	0.94	0.97	0.92
3PL Actual	38	123.40	3.247	0.110	0.94	0.95	0.88
Customer Expected	40	139.70	3.247	0.110	0.95	0.97	0.88
Customer Actual	40	108.16	2.704	0.087	0.96	0.97	0.92

Note:  $\chi^2$ : minimum fit function chi-square; RMSEA: root mean square error of approximation; NFI: normed fit index; CFI: comparative fit index; and GFI: goodness of fit index.

**Table 6.11 Results of the standardized confirmatory factor loadings of the whole model**

	3PL Expected	3PL Actual	Customer Expected	Customer Actual
<b>Constructs</b>	<b>ML Estimate <math>\lambda_x</math></b>			
<i>3PL Service Quality</i>				
Werts Linn Jorsekog coefficient	0.8737	0.9290	0.9525	0.9315
Bentler Bonett coefficient	0.8529	0.7725	0.7673	0.7052
Tangibles	0.42	0.42	0.71	0.54
Reliability	0.57	0.57	0.77	0.85
Responsiveness	0.54	0.54	0.84	0.87
Assurance	0.54	0.54	0.73	0.82
Empathy	0.56	0.56	0.64	0.86
<i>3PL Organizational Effectiveness</i>				
Werts Linn Jorsekog coefficient	0.8691	0.9330	0.9587	0.9412
Bentler Bonett coefficient	0.4820	0.5208	0.6268	0.6126
Cycle Time	0.52	0.52	0.71	0.68
Customer Service	0.55	0.55	0.81	0.81
Reputation and Goodwill	0.60	0.60	0.81	0.82
<i>Relationship Management</i>				
Werts Linn Jorsekog coefficient	0.8151	0.9077	0.9123	0.8894
Bentler Bonett coefficient	0.5590	0.6641	0.5737	0.4689
Guanxi	0.50	0.50	0.63	0.56
Trust	0.57	0.57	0.69	0.79
Commitment	0.57	0.57	0.76	0.79

Figure 6.5 Three-Factor SEM Research Modes





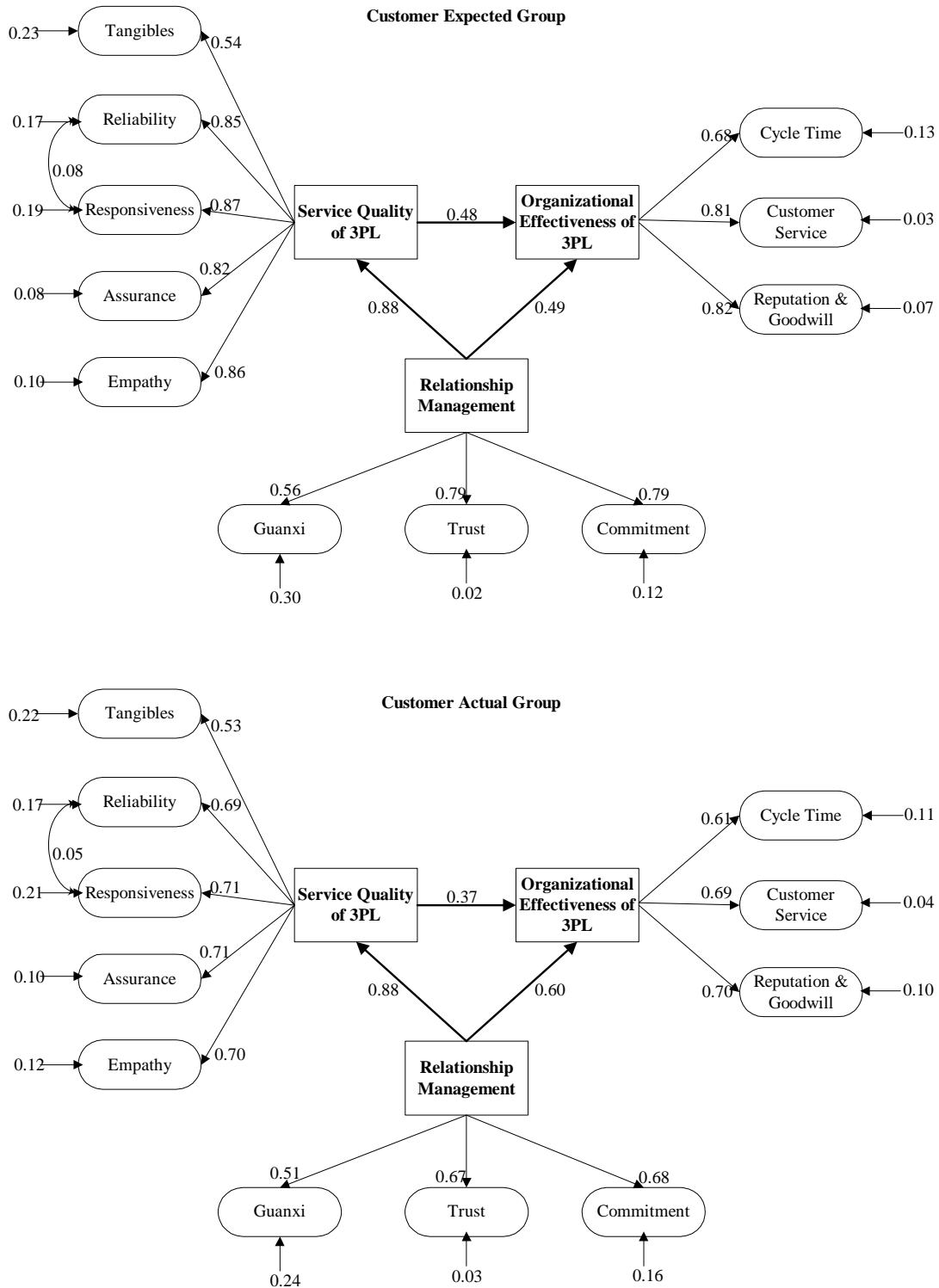


Figure 6.5 and Table 6.11 illustrate the factor loadings and the factor reliability of the four sets of 3PL service quality models. It is noted that the items of reliability and responsiveness are correlated in the 3PL Expected group ( $r = 0.08$ ), the 3PL Actual

group ( $r = 0.08$ ), the Customer Expected group ( $r = 0.08$ ), and the Customer Actual group ( $r = 0.05$ ). In addition, in the 3PL Actual group, tangibles is correlated with reliability ( $r = 0.05$ ), and assurance is correlated with empathy ( $r = 0.05$ ). All of the correlations are significant ( $p < 0.05$ ).

Table 6.11 shows that the factor loadings indicate that all of the relationships are significant, and range from moderate to strong. All of the Werts-Linn-Jorsekog coefficients are greater than 0.80, which indicates very good construct reliability.

#### *6.5.2.5 Convergent Validity and Discriminate Validity in SEM*

Convergent validity is the extent to which varying approaches to construct measurement yield the same results (Campbell and Fiske, 1959), and is indicated by the Bentler-Bonett coefficient. The Bentler-Bonett coefficient is calculated by taking the ratio of the difference between the chi-square value of the null measurement model (the null model has no hypothesized factor loading on a common construct in the CFA) and the chi square value of the specified measurement model to the chi-square value of the null model. A value of 0.90 or above demonstrates strong convergent validity. The coefficients are calculated and shown in Table 6.13, and the results reveal strong convergent validity for the 3PL service quality factors in all of the models, in 3PL organizational effectiveness in the Customer Expected and the Customer Actual models, and in relationship management in the 3PL Actual model, whereas the other factors have a low convergent validity, which implies that these construct measurements may not yield the same results.

**Table 6.12 Results of the discriminate validity tests**

<b>Factor</b>	<b>Constrained Model <math>\chi^2</math> (df)</b>	<b>Unconstrained Model <math>\chi^2</math> (df)</b>	<b><math>\chi^2</math> Differences</b>
<b>3PL Expected Group</b>			
3PL Service Quality			
3PL Organizational Effectiveness	73.41 (19)	34.45 (18)	38.96**
Relationship Management	83.31 (19)	40.47 (18)	42.84**
3PL Organizational Effectiveness			
Relationship Management	51.95 (9)	11.32 (8)	40.63**
<b>3PL Actual Group</b>			
3PL Service Quality			
3PL Organizational Effectiveness	79.46 (17)	54.27 (16)	25.19**
Relationship Management	58.65 (17)	38.04 (16)	20.61**
3PL Organizational Effectiveness			
Relationship Management	44.81 (9)	25.76 (8)	19.05**
<b>Customer Expected Group</b>			
3PL Service Quality			
3PL Organizational Effectiveness	79.46 (17)	54.27 (16)	25.19**
Relationship Management	58.65 (17)	38.04 (16)	20.61**
3PL Organizational Effectiveness			
Relationship Management	44.81 (9)	25.76 (8)	19.05**
<b>Customer Actual Group</b>			
3PL Service Quality			
3PL Organizational Effectiveness	95.08 (19)	55.59 (18)	39.49**
Relationship Management	85.60(19)	40.55 (18)	45.05**
3PL Organizational Effectiveness			
Relationship Management	67.98 (9)	30.86 (8)	37.12**

Note: \*\*  $p < 0.01$

Discriminate validity, which measures whether the constituent items estimate only the specific construct, is also assessed through the estimation of the covariance between two constructs to 1.00 and by the performance of a chi-square test (Venkatraman, 1989). The significance level is 0.05 and the degree of freedom is equal to 1. Table 6.12 shows that all of the chi-square differences are significant, which implies that

each measurement scale captures a factor that is significantly unique from the other factors, and is an indication of adequate discriminate validity (Segars and Grover, 1998).

### 6.5.3 The Results of the Hypotheses Testing

Table 6.13 shows the refined hypotheses and their test results. All of the hypotheses are positive and significant. Apart from the weak relationship between relationship management (RM) and organizational effectiveness (OE) (H15) in the 3PL Expected group, and the relationship between service quality (SQ) and organizational effectiveness (OE) (H16), for which there is an insignificant result for the 3PL Actual group and mixed results for the other three groups, all of the hypotheses are supported by the results with either strong or moderately strong relationships.

**Table 6.13 Results for the hypotheses**

Hypotheses	3PL Expected	3PL Actual	Customer Expected	Customer Actual
H1	Medium	Medium	Strong	Medium
H2	Strong	Strong	Strong	Strong
H3	Medium	Medium	Strong	Strong
H4	Medium	Medium	Strong	Strong
H5	Strong	Strong	Strong	Strong
H8	Medium	Medium	Strong	Strong
H9	Strong	Strong	Strong	Strong
H10	Strong	Strong	Strong	Strong
H11	Medium	Medium	Strong	Strong
H12	Strong	Strong	Strong	Strong
H13	Strong	Strong	Strong	Strong
H14	Strong	Strong	Strong	Strong
H15	Weak	Strong	Medium	Strong
H16	Strong	Insignificant	Strong	Weak

## 6.6 Gap Analysis

### 6.6.1 Difference between the Groups for Different Factors

Independent-sample t-tests are conducted to compare the factor scores across different groups, and significant differences are found for all of the factors between the 3PL Expected and 3PL Actual groups, and also the 3PL Expected and Customer Expected groups.

Eta squared (Cohen, 1988), which provides an indication of the magnitude of the differences between groups and also the proportion of variance in the dependent variable that is explained by the independent variable, is shown in Table 6.14. Cohen's (1988) guidelines indicate that a difference is considered to be great if the effect size reaches 0.14, moderate if the effect size reaches 0.06, and small if the effect size reaches 0.01.

All of the items are significantly different in the comparison of the 3PL Expected and 3PL Actual groups, and also in the 3PL Expected and Customer Expected groups. The eta squared value indicates small to moderate differences. In the comparison of the difference between the Customer Expected and the Customer Actual groups, no significant differences are found. In the comparison of the 3PL Actual and Customer Actual groups, only cycle time and guanxi are found to be significantly different. However, the small eta squared indicates that these differences are small.

**Table 6.14 Comparisons of the scores across factors of demographic variation 1**

	3PL Expected VS 3PL Actual	Customer Expected VS Customer Actual	3PL Expected VS Customer Expected	3PL Actual VS Customer Actual
Factor	<i>t (eta squared)</i>	<i>t (eta squared)</i>	<i>t (eta squared)</i>	<i>t (eta squared)</i>
<i>3PL Service Quality</i>				
Tangibles	6.71** (0.12)	-1.09 (N.A.)	6.83** (0.11)	-1.72 (N.A.)
Reliability	4.39** (0.06)	-0.91 (N.A.)	4.02** (0.04)	-1.27 (N.A.)
Responsiveness	4.27** (0.05)	-0.65 (N.A.)	4.61** (0.05)	-0.44 (N.A.)
Assurance	4.51** (0.06)	-1.12 (N.A.)	5.63** (0.08)	-0.17 (N.A.)
Empathy	3.37** (0.03)	-1.01 (N.A.)	4.58** (0.05)	0.15 (N.A.)
<i>3PL Organizational Effectiveness</i>				
Cycle Time	2.64** (0.02)	-1.12 (N.A.)	6.49** (0.10)	2.31* (0.01)
Customer Service	5.99** (0.10)	-1.24 (N.A.)	7.19** (0.12)	-0.46 (N.A.)
Reputation & Goodwill	5.99** (0.10)	-1.32 (N.A.)	6.14** (0.09)	-1.35 (N.A.)
<i>Relationship Management</i>				
Guanxi	2.93** (0.03)	-1.28 (N.A.)	6.33** (0.10)	2.00* (0.01)
Trust	5.61** (0.09)	-1.47 (N.A.)	5.80** (0.08)	-1.09 (N.A.)
Commitment	5.75** (0.09)	-1.72 (N.A.)	5.90** (0.09)	-1.69 (N.A.)

Note: \*  $p < .05$ , \*\*  $p < .01$ .

N.A. = Not Available.

### 6.6.2 Difference between Groups for Different Items and Different Positions of the Respondents from the 3PL providers

To further investigate the group differences, two independent-sample t-tests are conducted to compare the item scores between the 3PL Expected and the 3PL Actual groups, and also between the 3PL Expected and the Customer Expected groups. The results are shown in Table 6.15.

**Table 6.15 Comparisons of the scores across the factors of demographic variation 2**

Items	3PL Expected VS 3PL Actual		3PL Expected VS Customer Expected	
	<i>t</i>	<i>eta squared</i>	<i>t</i>	<i>eta squared</i>
<i>Tangible</i>				
Tangible Q1	5.02**	0.07	5.88**	0.09
Tangible Q2	6.17**	0.10	7.36**	0.13
Tangible Q3	5.14**	0.07	6.58**	0.11
Tangible Q4	6.22**	0.10	5.85**	0.09
<i>Reliability</i>				
Reliability Q1	5.08**	0.07	5.68**	0.08
Reliability Q2	4.29**	0.05	5.18**	0.07
Reliability Q3	3.72**	0.04	2.80**	0.02
Reliability Q4	3.91**	0.04	4.71**	0.06
Reliability Q5	3.90**	0.04	2.68**	0.02
<i>Responsiveness</i>				
Responsiveness Q1	4.45**	0.05	3.65**	0.03
Responsiveness Q2	4.99**	0.07	4.91**	0.06
Responsiveness Q3	3.07**	0.03	4.30**	0.05
Responsiveness Q4	3.08**	0.03	3.43**	0.03
<i>Assurance</i>				
Assurance Q1	1.56	0.01	3.64**	0.03
Assurance Q2	3.10**	0.03	2.92**	0.02
Assurance Q3	4.92**	0.06	6.19**	0.09
Assurance Q4	4.46**	0.05	6.55**	0.10
<i>Empathy</i>				
Empathy Q1	3.21**	0.03	3.97**	0.04
Empathy Q2	1.98*	0.01	4.28**	0.05
Empathy Q3	3.03**	0.03	3.84**	0.04
Empathy Q4	3.22**	0.03	4.74**	0.06
Empathy Q5	4.26**	0.05	5.00**	0.06

**Table 6.15 Comparisons of the scores across factors of demographic variation (Cont.)**

Items	3PL Expected VS 3PL Actual		3PL Expected VS Customer Expected	
	<i>t</i>	<i>eta squared</i>	<i>t</i>	<i>eta squared</i>
	<i>Cycle Time</i>			
Cycle Time Q1	2.34*	0.02	3.73**	0.04
Cycle Time Q2	3.08**	0.03	5.87**	0.09
Cycle Time Q3	2.05*	0.01	5.19**	0.07
Cycle Time Q4	2.13*	0.01	6.05**	0.09
Cycle Time Q5	2.88**	0.02	3.68**	0.04
Cycle Time Q6	2.92**	0.02	4.01**	0.04
Cycle Time Q7	3.24**	0.03	5.28**	0.07
Cycle Time Q8	2.67**	0.02	5.07**	0.07
Cycle Time Q9	2.77**	0.02	4.32**	0.05
Cycle Time Q10	3.98**	0.04	5.30**	0.07
<i>Customer Service</i>				
Customer Service Q1	3.38**	0.03	6.61**	0.11
Customer Service Q2	3.62**	0.04	4.22**	0.05
Customer Service Q3	4.64**	0.06	4.22**	0.05
Customer Service Q4	3.60**	0.04	4.27**	0.05
Customer Service Q5	5.12**	0.07	4.32**	0.05
Customer Service Q6	4.47**	0.05	5.33**	0.07
Customer Service Q7	3.81**	0.04	3.27**	0.03
Customer Service Q8	4.96**	0.06	5.33**	0.07
Customer Service Q9	4.43**	0.05	5.89**	0.09
Customer Service Q10	4.76**	0.06	4.74**	0.06
Customer Service Q11	4.55**	0.06	5.33**	0.07
Customer Service Q12	6.03**	0.09	5.88**	0.09
Customer Service Q13	5.55**	0.08	5.30**	0.07
<i>Reputation &amp; Goodwill</i>				
Reputation & Goodwill Q1	5.88**	0.09	5.80**	0.08
Reputation & Goodwill Q2	5.65**	0.08	5.24**	0.07
Reputation & Goodwill Q3	5.32**	0.07	5.67**	0.08
Reputation & Goodwill Q4	5.30**	0.07	6.36**	0.10
Reputation & Goodwill Q5	5.02**	0.07	5.16**	0.07



**Table 6.15 Comparisons of the scores across the factors of demographic variation (Cont.)**

Items	3PL Expected VS 3PL Actual		3PL Expected VS Customer Expected	
	<i>t</i>	<i>eta squared</i>	<i>t</i>	<i>eta squared</i>
<i>Guanxi</i>				
Guanxi Q1	2.33*	0.02	2.44*	0.02
Guanxi Q2	2.93**	0.02	3.94**	0.04
Guanxi Q3	3.64**	0.04	4.88**	0.06
Guanxi Q4	3.02**	0.03	3.76**	0.04
Guanxi Q5	2.31*	0.01	4.09**	0.04
Guanxi Q6	2.52*	0.02	4.56**	0.05
Guanxi Q7	1.96	0.01	4.38**	0.05
Guanxi Q8	1.64	0.01	3.51*	0.03
Guanxi Q9	2.53*	0.02	4.72**	0.06
Guanxi Q10	2.72**	0.02	4.10**	0.04
<i>Trust</i>				
Trust Q1	4.47**	0.05	2.10*	0.01
Trust Q2	4.31**	0.05	4.14**	0.04
Trust Q3	4.60**	0.06	4.61**	0.05
Trust Q4	4.53**	0.05	3.96**	0.04
Trust Q5	4.40**	0.05	4.93**	0.06
Trust Q6	3.64**	0.04	5.43**	0.07
Trust Q7	3.74**	0.04	5.40**	0.07
Trust Q8	3.82**	0.04	4.06**	0.04
Trust Q9	4.91**	0.06	4.50**	0.05
Trust Q10	4.49**	0.05	4.43**	0.05
Trust Q11	4.19**	0.05	3.65**	0.03
Trust Q12	4.22**	0.05	5.00**	0.06
Trust Q13	5.42**	0.08	4.48**	0.05
Trust Q14	3.89**	0.04	4.60**	0.05
Trust Q15	4.83**	0.06	4.85**	0.06
<i>Commitment</i>				
Commitment Q1	5.38**	0.08	4.66**	0.06
Commitment Q2	4.14**	0.05	3.86**	0.04
Commitment Q3	4.38**	0.05	4.69**	0.06
Commitment Q4	4.82**	0.06	5.50**	0.08
Commitment Q5	5.94**	0.09	5.83**	0.08

Note: \*  $p < .05$ ; \*\*  $p < .01$ .

In the comparison of the 3PL Expected group and the 3PL Actual group, all of the items except assurance Q1, guanxi Q7, and guanxi Q8 are significant, which implies that all of the other items are different for the PL Expected and 3PL Actual groups. The eta squared values range from small to medium, and all of the items are significant in the second t-test, which implies that they are significantly different between the 3PL Expected and the Customer Expected groups, with small to medium differences.

To avoid confusion and reduce sampling errors between the groups due to the different positions of the respondents in the 3PL providers, stratified sampling is used and two independent-sample t-tests are conducted to compare the item scores between senior managers, middle management, front-line managers, and front-line staff in the four groups. The result shows that there is no significant difference in the different positions of the respondents in 3PL providers in the four groups.

## **6.7 Summary**

This chapter presents the profile of the respondents in the study, and a detailed presentation of the CFAs and gap analyses.

The demographic data of the respondents are summarized, and include varied information about their companies and industry. Tests of reliability and the inter-correlations between the different factors are presented with descriptions, and the instruments that are used in this study are determined to be reliable and valid.

This study also employs SEM using LISREL 8.5 to examine the relationships between

the three constructs that are comprised of eleven factors. Some of the factors were deleted to achieve a better model fit, and the results of the structural path analysis of the research model provide evidence to support the hypotheses. The validity and reliability of the measurement scales are confirmed through a series of tests. Independent sample t-tests are also performed to investigate the group difference between items and the individual questions that were asked in the questionnaires.

## CHAPTER 7

### DISCUSSION AND IMPLICATIONS

Based on the data analysis and research findings that are detailed in the previous chapter, this chapter presents a discussion of the empirical results. It consists of the following sections.

- 7.1 Discussion of 3PL Organizational Performance
- 7.2 Discussion of 3PL Service Quality
- 7.3 Discussion of 3PL Organizational Effectiveness
- 7.4 Discussion of 3PL Relationship Management
- 7.5 Discussion of the Constructs of 3PL Organizational Performance
- 7.6 Discussion of the Gap Differences between the Groups
- 7.7 Implications of the Study
- 7.8 Summary

#### **7.1 Discussion of 3PL Organizational Performance**

The data analysis validates the model of 3PL organizational performance. The model is divided into three major constructs: 3PL service quality (SQ), 3PL organizational effectiveness (OE), and relationship management (RM). Five dimensions are identified in the measurement of 3PL service quality: tangibles (TANGI), reliability (RELIAB), responsiveness (RESPON), assurance (ASSUR), and empathy (EMPAT).

Three dimensions are identified in the measurement of 3PL organizational effectiveness: cycle time (CYCLE), customer service (CUSTO), and reputation and goodwill (GOORE). Finally, three dimensions are identified in the measurement of 3PL relationship management: guanxi (GUANX), trust (TRUST), and commitment (COMMI).

The primary motivation in undertaking this study is the recognition of the growing importance of outsourcing or 3PL in the achievement of multi-dimensional organizational goals. This study establishes a link between the organizational context of a 3PL provider and its latent structure, and provides a basis for understanding the effective use of 3PL performance measurement of, and for the development of effective measures to empirically investigate its adoption and implementation (Dreyer, 2000; Fawcett and Cooper 1998; Lee and Billington, 1992). The study also evaluates the adoption of 3PL services and provides firms with useful information for performance improvement opportunities (Beamon, 1998; Beamon, 1999; Gunasekaran et al., 2001).

Based on organizational theory, this study empirically identifies and validates the performance measurement of 3PL providers. The constructs for 3PL are developed and associated with organizational context and structural characteristics. Outcome performance measures are also examined.

Creative efforts are needed to design new measures in the areas of SCM performance measurement (Keebler et al., 1999; Gunasekaran et al., 2004), and this study is the first attempt to measure 3PL organizational performance. It validates organizational theory in terms of context, structure, and output, and fills the research gap in 3PL

performance measurement.

The detailed content of 3PL organizational performance in this study justifies its usefulness for further research into 3PL. The use of the study data from 3PL providers in Hong Kong demonstrates the importance of 3PL organizational performance, and also confirms the validity of previous study findings on 3PL service quality, organizational effectiveness, and relationship management.

## 7.2 Discussion of 3PL Service Quality (SQ)

In this study, the expected and actual service quality of 3PL is assessed in four groups: the expected logistics service quality of 3PL staff; the actual logistics service quality of the 3PL provider; the expected logistics service quality of the business partners of the 3PL provider; and the actual logistics service quality that is received from the 3PL provider. The results of the 3PL service quality in the four groups are generally satisfactory.

The association between tangibles and service quality (SQ) is significant and positive ( $\beta = 0.70$ ,  $p < 0.05$ ) in the 3PL Actual group, and ( $\beta = 0.53$ ,  $p < 0.05$ ) in the Customer Expected and ( $\beta = 0.51$ ,  $p < 0.05$ ) Customer Actual groups. The findings reveal that better appearance and high quality facilities and equipment lead to better 3PL service quality (Parasuraman et al., 1988). The possession of better facilities and equipment by 3PL providers, such as warehouse layout and crane and handling equipment, increases customer confidence in the use of 3PL services. However, there is only marginal support for this hypothesis in the 3PL Expected group ( $\beta = 0.41$ ,  $p <$

0.05), as physical layout or facilities do not affect expected service quality from 3PL internal staff.

The association between reliability and service quality (SQ) is significant and positive in all of the groups: ( $\beta = 0.56, p < 0.05$ ) in the 3PL Expected group, ( $\beta = 0.81, p < 0.05$ ) in the 3PL Actual group, and ( $\beta = 0.86, p < 0.05$ ) in the Customer Expected ( $\beta = 0.69, p < 0.05$ ) and Customer Actual groups. These results are consistent with the studies of Parasuraman et al. (1988) and Mels et al. (1997), in which the ability of service providers to fulfill service commitments dependably and accurately is found to be highly important for service quality, especially in the service industry. This indicates that reliable and accurate 3PL services strongly influence 3PL service quality for both 3PL service providers and their customers.

The association between responsiveness and service quality (SQ) is significant and positive in all of the groups: ( $\beta = 0.51, p < 0.05$ ) in the 3PL Expected group, ( $\beta = 0.87, p < 0.05$ ) in the 3PL Actual group, and ( $\beta = 0.88, p < 0.05$ ) in the Customer Expected ( $\beta = 0.73, p < 0.05$ ) and Customer Actual groups. These findings are consistent with previous studies that highlight the importance of a prompt response to customer needs (Parasuraman et al., 1988; Mels et al., 1997). 3PL service providers that provide a prompt service and are willing to help customers (such as quickly responding to customer complaints) achieve better service quality. Responsiveness ensures better service quality by 3PL service providers toward their customers.

The association between assurance and service quality (SQ) is also significant and positive in all of the groups: ( $\beta = 0.57, p < 0.05$ ) in the 3PL Expected group, ( $\beta = 0.72, p < 0.05$ ) in the 3PL Actual group, and ( $\beta = 0.83, p < 0.05$ ) in the Customer

Expected and ( $\beta = 0.71, p < 0.05$ ) Customer Actual groups. A more knowledgeable and courteous 3PL service is indicative of better service quality (Parasuraman et al., 1988). 3PL service providers that deliver professional knowledge and solutions to customers engender confidence. This is important for both 3PL service providers and their customers, who are likely to make more use of better quality 3PL services.

The association between empathy and service quality (SQ) is significant and positive in all of the groups: ( $\beta = 0.55, p < 0.05$ ) in the 3PL Expected group, ( $\beta = 0.64, p < 0.05$ ) in the 3PL Actual group, and ( $\beta = 0.86, p < 0.05$ ) and in the Customer Expected and ( $\beta = 0.70, p < 0.05$ ) Customer Actual groups. This is consistent with the study results of Parasuraman et al. (1988) and Mels et al. (1997), in which a better level of caring and more attention to individual customers constitutes better 3PL service quality. This indicates that caring and tailor-made 3PL services influence the 3PL service quality for both 3PL service providers and their customers.

The five generally significant factors of 3PL service quality are shown in Table 7.1.

**Table 7.1 Significant factors that explain 3PL service quality (SQ)**

Hypothesis	Service Quality of 3PL	Beta			
		3PL Expected	3PL Actual	Customer Expected	Customer Actual
H1	Tangibles	0.41**	0.70**	0.53**	0.51**
H2	Reliability	0.56**	0.81**	0.86**	0.69**
H3	Responsiveness	0.51**	0.87**	0.88**	0.73**
H4	Assurance	0.57**	0.72**	0.83**	0.71**
H5	Empathy	0.55**	0.64**	0.86**	0.70**

\*\*  $p < 0.05$ .



An analysis of the hypothesized relationships of 3PL service quality in the SERVQUAL scale shows positive and significant relationships, except for “tangibles” in the 3PL Expected group. Previous studies provide an explanation for this result (Parasuraman et al., 1991).

This study investigates the impact of 3PL service quality on organizational effectiveness, and is the first attempt to identify 3PL service quality by using a SERVQUAL scale. The study’s objective to understand the relationship between service quality and organizational effectiveness variables, and confirms that four out of five dimensions on the SERVQUAL scale are important to 3PL service quality in all of the groups.

### **7.3 Discussion of 3PL Organizational Effectiveness (OE)**

The expected and actual organizational effectiveness of 3PL is divided into four groups: the expected OE of the 3PL provider by its staff, the actual OE of the 3PL provider by its staff, the expected OE of the 3PL provider by its partners, and the actual OE of the 3PL provider by its partners. The results of 3PL organizational effectiveness (OE) in the four groups are satisfactory.

The associations between cycle time and organizational effectiveness (OE) are significant and positive ( $\beta = 0.53$ ,  $p < 0.05$ ) in the 3PL Expected group, ( $\beta = 0.69$ ,  $p < 0.05$ ) in the 3PL Actual group, and ( $\beta = 0.68$ ,  $p < 0.05$ ) in the Customer Expected and ( $\beta = 0.62$ ,  $p < 0.05$ ) Customer Actual groups. These results show that a shortened product and service cycle time leads to better organizational effectiveness

for 3PL service providers. Evidently, companies with short cycle times in 3PL can continually improve their services and incorporate state-of-the-art technology when it becomes available. This enables them to better serve consumer needs, outrun their slower competitors, and build brand loyalty. It also enables them to offer a wider range of new products to better serve market niches (Schilling and Hill, 1998).

The relationships between customer service and organizational effectiveness (OE) are significant and positive ( $\beta = 0.54$ ,  $p < 0.05$ ) in the 3PL Expected group, ( $\beta = 0.83$ ,  $p < 0.05$ ) in the 3PL Actual group, and ( $\beta = 0.81$ ,  $p < 0.05$ ) in the Customer Expected and ( $\beta = 0.68$ ,  $p < 0.05$ ) Customer Actual groups. These results are consistent with the study of Ellram (1990) and Selladurai (2002), in which customer service is an operational function or outcome that contributes to the ultimate goals of customer satisfaction. If a provided service is perceived as the delivery of something of importance to the customer, then the ultimate goal of customer satisfaction and differential advantage has been achieved. The determination of customer needs first, then the development and marketing of a product that satisfies that need are absolutely essential for successful 3PL providers. Accordingly, customer service helps to ensure the organizational effectiveness of 3PL providers.

The relationships between reputation and goodwill and organizational effectiveness (OE) are significant and positive ( $\beta = 0.60$ ,  $p < 0.05$ ) in the 3PL Expected group, ( $\beta = 0.79$ ,  $p < 0.05$ ) in the 3PL actual group, and ( $\beta = 0.82$ ,  $p < 0.05$ ) and in the Customer Expected and ( $\beta = 0.71$ ,  $p < 0.05$ ) Customer Actual groups. A good reputation and goodwill throughout a 3PL company ensures better 3PL organizational effectiveness. Reputation and goodwill act as intangible assets for 3PL providers to provide assurance of their services to their customers (Rao, 1994; Carter and

Deephouse, 1999).

An organization's reputation as a producer of high quality products is the most important and influential factor in a consumer's decision, and an organization's perceived reputation of profitability may be the most important and influential factor in an investor's decision. Clearly, a good reputation and the goodwill of 3PL service providers is vital to the achievement of 3PL organizational effectiveness.

The three generally significant factors in 3PL organizational effectiveness are shown in Table 7.2.

**Table 7.2 Significant factors that explain 3PL organizational effectiveness (OE)**

Hypothesis	Organizational Effectiveness of 3PL	Beta			
		3PL Expected	3PL Actual	Customer Expected	Customer Actual
H8	Cycle Time	0.53**	0.69**	0.68**	0.62**
H9	Customer Service	0.54**	0.83**	0.81**	0.68**
H10	Reputation and Goodwill	0.60**	0.79**	0.82**	0.71**

\*\*  $p < 0.05$ .

An analysis of the relationship between cycle time (H8), customer service (H9), and reputation and goodwill (H10) provides positive and significant results in all of the groups. The results of this study that a short cycle time for 3PL services, better customer service, and reputation and goodwill provide better 3PL organizational effectiveness and are important elements for the profitability and success of 3PL service providers are supported by previous studies.

#### 7.4 Discussion of 3PL Relationship Management (RM)

The expected and actual 3PL relationship management (RM) is assessed in four groups: the expected RM of a 3PL provider by its staff, the actual RM of a 3PL provider by its staff, the expected RM of a 3PL provider by its partners, and the actual RM of a 3PL provider by its partners. The results of 3PL relationship management (RM) in the four groups are satisfactory.

The relationship between guanxi and 3PL relationship management is significant and positive ( $\beta = 0.54$ ,  $p < 0.05$ ) in the 3PL Expected group, ( $\beta = 0.64$ ,  $p < 0.05$ ) in the 3PL Actual group, ( $\beta = 0.55$ ,  $p < 0.05$ ) and in the Customer Expected and ( $\beta = 0.51$ ,  $p < 0.05$ ) Customer Actual groups. This finding is consistent with a previous study of guanxi (Luo, 1997; Luo and Chen, 1997; Wong, 1997; Xin and Pearce, 1996).

Guanxi is believed to enhance a firm's competitive advantage by providing access to the resources of other partners (Luo, 1997) and through the embodiment of relationship-networking attributes. However, the exchange of favors among the members of a guanxi network is not only commercial, but also social, and involves the exchange of both favors and affection. This result shows that the better the guanxi relationship between a 3PL service provider and its supply chain partners, the greater the mutual intent to maintain a long-term relationship.

The relationship between trust and 3PL relationship management is significant and positive ( $\beta = 0.54$ ,  $p < 0.05$ ) in the 3PL Expected group, ( $\beta = 0.69$ ,  $p < 0.05$ ) in the

3PL Actual group, ( $\beta = 0.81, p < 0.05$ ) and in the Customer Expected and ( $\beta = 0.64, p < 0.05$ ) Customer Actual groups. This finding is consistent with a previous study that found that trust is an important relational feature of ongoing inter-organizational exchange (Williamson, 1985), may serve as a substitute for hierarchical control, and is important for the development of long-term relationships between companies and customers. The more trust that is created between a 3PL service provider and its supply chain partners, the greater the mutual intent to maintain a long-term relationship.

The association between commitment and 3PL relationship management is significant and positive ( $\beta = 0.58, p < 0.05$ ) in the 3PL Expected group, ( $\beta = 0.76, p < 0.05$ ) in the 3PL Actual group, and ( $\beta = 0.78, p < 0.05$ ) in the Customer Expected and ( $\beta = 0.68, p < 0.05$ ) Customer Actual groups. This finding reflects that agreements and commitments are important for the perpetuation of a relationship between 3PL providers and their customers. Commitment is a key feature of a long-term relationship between 3PL providers and their partners, and is an important safeguard for relational continuity (Helper, 1987) and for the resolution of problems that potentially arise in a relationship between 3PL providers and supply chain partners with high levels of specific investment, mutual adjustment, and asymmetric information (Morgan and Hunt, 1994). The stronger the commitment between a 3PL service provider and its supply chain partners, the greater the mutual intent to maintain a long-term relationship.

The three generally significant factors in 3PL relationship management are shown in Table 7.3.

**Table 7.3 Significant factors that explain 3PL relationship management (RM)**

Hypothesis	Relationship Management	Beta			
		3PL Expected	3PL Actual	Customer Expected	Customer Actual
H11	Guanxi	0.54**	0.64**	0.55**	0.51**
H12	Trust	0.54**	0.69**	0.81**	0.64**
H13	Commitment	0.58**	0.76**	0.78**	0.68**

\*\*  $p < 0.05$ .

An analysis of the relationship between guanxi (H11), trust (H12), and commitment (H13) provides positive and significant results in all of the groups. The results of this study, which are supported by previous studies, show that the better the personal connection (guanxi) between a 3PL service provider and its partners, the better the trust and commitment and the better relationship management. These are all important elements for the achievement of long-term business relationships in 3PL service provision.

## **7.5 Discussion of the Constructs of 3PL Organizational Performance**

There are three constructs in this study: service quality (SQ), organizational effectiveness (OE), and relationship management (RM). These are the latent that are variables employed to measure and evaluate the organizational performance (OP) of 3PL in four groups: the expected OP of a 3PL provider by its staff, the actual OP of a 3PL provider by its staff, the expected OP of a 3PL provider by its partners, and the actual OP of a 3PL provider by its partners. This generally supports the SEM identification of the importance of the relationship between service quality,

organizational effectiveness, and relationship management in 3PL organizational performance. The results of the constructs of 3PL in the four groups are discussed in the following.

The association between relationship management (RM) and service quality (SQ) is significant and positive ( $\beta = 0.89, p < 0.05$ ) in the 3PL Expected group, ( $\beta = 0.81, p < 0.05$ ) in the 3PL Actual group, and ( $\beta = 0.88, p < 0.05$ ) in the Customer Expected and ( $\beta = 0.88, p < 0.05$ ) Customer Actual groups. This finding reveals that the better the relationship management (such as the development of guanxi, trust, and commitment) between a 3PL provider and its partners, the better the 3PL service quality. The better the understanding between parties, the easier it is to identify customer needs and to provide tailored made 3PL services. A strong association between relationship management and service quality indicates that relationship management has a great influence on 3PL service quality.

The association between relationship management (RM) and organizational effectiveness (OE) is significant and positive ( $\beta = 0.33, p < 0.05$ ) in the 3PL Expected group, ( $\beta = 0.80, p < 0.05$ ) in the 3PL Actual group, and ( $\beta = 0.49, p < 0.05$ ) in the Customer Expected and ( $\beta = 0.60, p < 0.05$ ) Customer Actual groups. This finding reveals that the better the relationship management (such as the development of guanxi, trust, and commitment) between a 3PL provider and its partners, the better the 3PL organizational effectiveness, especially in terms of actual performance, that is, a better understanding between parties provides more accurate 3PL services. More communication and exchange of ideas when a 3PL provider provides an actual 3PL service circumvents problems and augments a strong relationship between

relationship management and organizational effectiveness in the actual 3PL service that is provided and received.

The association between service quality (SQ) and organizational effectiveness (OE) is significant and positive ( $= 0.64, p < 0.05$ ) in the 3PL Expected group; ( $\beta = 0.11, p < 0.05$ ) in the 3PL Actual group; ( $\beta = 0.48, p < 0.05$ ) in the Customer Expected and ( $\beta = 0.37, p < 0.05$ ) Customer Actual groups. This finding reveals that the better the 3PL service quality, the better a 3PL provider's organizational effectiveness. This is supported by previous study findings (Beamon, 1999; Thomas, 1999; Mentzer et al., 2000; Carr and Person, 1999; Elmuti, 2002). Better service quality, such as reliable and accurate 3PL services, and better customer care can generate profits and goodwill for a 3PL service provider. This not only enhances competitiveness, but also increases 3PL business with loyal customers.

The three generally significant constructs of 3PL organizational performance are shown in Table 7.4.

**Table 7.4 Constructs of 3PL organizational performance**

Hypothesis	Constructs	Beta			
		3PL Expected	3PL Actual	Customer Expected	Customer Actual
H14	RM to SQ	0.89**	0.81**	0.88**	0.88**
H15	RM to OE	0.33**	0.80**	0.49**	0.60**
H16	SQ to OE	0.64**	0.11**	0.48**	0.37**

\*\*  $p < 0.05$ .

An analysis of 3PL organizational performance reveals three constructs: service



quality, organizational effectiveness, and relationship management. It also identifies the context–structure–output relationships in 3PL. An examination of the three constructs of operational performance indicates the necessary conditions for mediation (Bobbitt and Ford, 1980; Ford and Schulenburg, 1982). The values of the coefficient of determination ( $R$ ) and the absolute size of the parameter estimates provide evidence that relationship management mediates the impact of 3PL service quality and partially mediates the impact of organizational effectiveness in the 3PL Expected group. This means that the perceived relationship management between 3PL service providers does not achieve the better organizational effectiveness of 3PL services.

There are several outcomes for the relationship between 3PL service quality and organizational effectiveness. For 3PL providers and customers, perceived better service quality achieves better organizational effectiveness. However, this is not supported by actual performance. A possible explanation is the mediating effect of relationship management on this relationship. It is revealed that there is a gap between perceived and actual performance that also affects the relationship between 3PL service quality and organizational effectiveness.

This finding supports claims in the literature that better service quality and relationship management contribute to 3PL organizational effectiveness.

## **7.6 Discussion of the Gap Differences between the Groups**

### *7.6.1 Discussion*

Following independent-sample t-tests among the different groups, the results suggest a significant difference between the perceptual gaps between 3PL providers and customers and the 3PL Expected and 3PL Actual groups.

The difference between the 3PL Expected and Actual groups shows that there are significant relationships between perceptual and actual 3PL services and organizational performance. In 3PL service quality there is a gap between the tangible perceived and actual 3PL services of service providers. This means that there is a difference between perceived and actual 3PL services in terms of facilities such as warehouses, distribution centers, and transport vehicles. Better 3PL company facilities actually entail better 3PL service performance. However, there is a small perceptual gap between reliability, responsiveness, assurance, and empathy. 3PL providers use the same criteria to assess responsibility, reliability, and empathy as they use to assess perceived and actual 3PL services.

In terms of 3PL organizational effectiveness, there is a gap between perceptions of customer service, reputation, and goodwill, and perceived and actual 3PL services. This means that there is a difference between expected and actual customer service requirements, such as a quick response, after-sale services, and customer complaints in 3PL services. Reputation and goodwill, including company image, brand name, and prestige, are also different for perceived and actual 3PL services. There is only a small perceptual difference for cycle time, which includes delivery time, minimum stock-out levels, stock rotation, and order acceptance, for expected and actual 3PL services.

In terms of relationship management, there is a gap between perceived and actual 3PL

services in commitment, which includes customer loyalty and patience from 3PL service providers. This means that 3PL service providers may have different criteria for the fulfillment of their commitments to their customers. There is only a small perceptual gap between guanxi and trust. The expectation of inter-organizational relationship and personal friendship are an important part of 3PL service. The development of these relationships in actual 3PL services avoids gossip and the circulation of rumors, and maintains actual service integrity.

The difference between the 3PL Expected and Customer Expected groups shows that there is a significantly different perception of expected 3PL services between 3PL service providers and partners. In 3PL service quality, there is a gap in the perception of tangibles and reliability between 3PL providers and their partners. This means that there are different perceptions of the appearance of 3PL facilities, such as warehouses, distribution centers, and transport vehicles between 3PL service providers and customers. There is also a different perception of the punctual error-free fulfillment of 3PL service commitments between 3PL service providers and partners. However, there is only a small perceptual gap in responsiveness, assurance, and empathy between 3PL service providers and customer.

In terms of 3PL organizational effectiveness, there is a gap between perceptions of cycle time, customer service, and reputation and goodwill between 3PL providers and partners. This means that there is a different perception of delivery time, minimum stock-out levels, stock rotation, and order acceptance between 3PL service providers and partners. There is also a different perception of customer service requirements, such as a quick response, after-sales service, and customer complaints, between 3PL service providers and partners. Finally, different views of reputation and goodwill,

including company image, brand name, and prestige, affect the perceived gap between 3PL service providers and partners.

In terms of relationship management, there is a gap between perceptions of commitment for 3PL providers and partners. This means that there are different perceptions of customer loyalty and patience. 3PL providers have different perceptions of the fulfillment of service commitments. However, there is only a small gap in the perception of *guanxi* and trust between 3PL service providers and customers. One of the reasons for this is that the development of inter-organizational relationships and personal friendships avoids gossip and the circulation of rumor, and maintains service integrity with customers, especially in the Hong Kong logistics industry.

### *7.6.2 Implications*

This study shows that gap analysis is a straightforward and practical way of identifying inconsistencies between the perception of 3PL service providers and their partners and actual 3PL service performance. Addressing these gaps is a logical way of formulating tactical strategies to ensure consistent expectations and experiences, thus increasing the likelihood of partner satisfaction, high quality 3PL service, organizational effectiveness, and good relationship management. More consistent expectations and actual experiences are achieved in one or both of the following ways.

The alteration of the actual behavior of 3PL service providers and expectations allows these providers to have control over expectation adjustment. However, self-initiated

actions still present a significant challenge. For example, the assumption of a genuine customer orientation is fundamental to 3PL customer service awareness (Congram and Dumesic, 1986). However, because of extensive specialization, technical product training, and a past immunity to overt competition, many 3PL providers are seemingly more task-and self-oriented, rather than customer-oriented.

The alteration of the expectations and actual behavior of 3PL service providers is possible if providers are more aware of the wide array of factors that customers consider in their evaluation of service quality. 3PL service providers must realize that the intangibility and technical complexity of a professional service lead many customers to seek and evaluate surrogate indicators of 3PL service quality, organizational effectiveness, and relationship management. Customers can broaden their view of 3PL service encounters and attendant quality determinants.

In the alteration of 3PL customer expectations and experiences, the strategy of changing the actual behavior of 3PL providers has the dual benefits of altering customer expectations and experiences. This suggests that the two approaches for the development of more consistent expectations and performance perceptions are actually interrelated, rather than separate and distinct. Before the initiation of new programs to alter customer perceptions, 3PL service providers learn more about their customer expectations and experiences. Insights from customer surveys, focus groups, or less formal research methods are likely to provide valuable information for the devising of programs to alter customer perceptions of 3PL services.

Educational and promotional communication is a significantly effective way to alter customer expectations. Today's competitive environment encourages professionals to

take subtle and in some cases aggressive steps to promote their services, especially 3PL services.

Another way to alter customer perceptions is to involve customers more in the decision making process that is relevant to their individual case. This participatory or relationship marketing approach to customer relations encourages a more positive customer experience (Crosby and Stephens, 1987), and reduces legal liability.

## **7.7 Implications of the Study**

The findings from this study make a theoretical and practical contribution to the literature on 3PL organizational performance. These contributions are discussed in the following.

### *7.7.1 Theoretical Implications*

From a theoretical perspective, this study extends research in the area of 3PL organizational performance; consolidates and operationalizes the constructs of service quality (SQ), organizational effectiveness (OE), and relationship management (RM) for further research; empirically justifies the conceptualized relationships that link context, structure, and output in 3PL organizational theory; and confirms the impact of the adoption of service quality and relationship management on 3PL provider performance.

3PL has developed into a topic of great interest, importance, and necessity for both academic researchers and practitioners. As little systematic 3PL-related research,

specifically in the area of 3PL performance measurement, has been conducted, this study extends the existing research parameters. It also extends research in the organizational performance arena through an examination of the conceptualized relationships between service quality, organizational effectiveness, and relationship management.

This study makes a conceptual and operational contribution to filling the significant gap in the existing research material on 3PL organizational performance (Beamon, 1999). 3PL organizational performance study is just developing as an academic pursuit, and requires measurement scales to quantify the concepts for the empirical investigation of conceptual models and theory building. The scale development process also contributes to the acknowledgement of an emerging alternative scale development methodology that is based on the cause and effect models and research framework.

Another theoretical implication relates to the empirical investigation of the conceptualized relationships between context, structure, and output relationships in 3PL organizational theory. Organizational theory is first applied in an investigation of 3PL organizational performance. The development and testing of a conceptual model that includes the dimensions of context and latent structure adds to the theoretical foundations of organizational theory (Bobbitt and Ford, 1980; Ford and Schulenburg, 1982). The inclusion of various context and latent structure variables in the model provides valuable insights into the direct effects of these variables on the adoption and implementation of 3PL organizational performance measurement.

Adopting service quality and relationship management for 3PL company performance

provides insights into 3PL organizational performance. At the very least, the empirical results of this study confirm those of previous studies, and strengthen organizational theory. Support is also provided for the theoretical argument that the inherent nature of 3PL organizations facilitates adoptive measures that strengthen competitive advantages (Beamon, 1999). A comprehensive model of 3PL organizational performance is developed through the integration of organizational theory, service quality, organizational effectiveness, and relationship management. This research not only empirically investigates 3PL performance measurement, but also adds to the breadth of the literature and research that is related to 3PL performance measurement, management, and strategies.

#### *7.7.2 Managerial Implications*

The results of this study have significant practical value. First, the operationalization of 3PL organizational performance provides a useful guide for managers, and particularly 3PL service providers and customers, to measure and evaluate the quality of 3PL services. The operationalization of 3PL organizational performance has the greatest implications for managers. It provides an immense opportunity for 3PL service providers to better understand a company's internal environment to improve performance, identify customer needs, and adapt new services to meet new competitive and environmental demands.

The findings of this study help to understand the types of latent structural design characteristics that facilitate and encourage 3PL performance measurement, which empowers managers with knowledge of the organizational management structures that are conducive to performance enhancement. This knowledge further facilitates



the initiation of structural changes and reduces the risk of unnecessary costly changes.

The relationship between service quality and performance effectiveness is important in the identification of organizational performance between 3PL providers and partners. Managers of 3PL service providers can promote better service quality, such as reliability and responsiveness, to achieve better company performance, and better relationship management between firms can promote better 3PL business. This study provides comprehensive 3PL service guidelines for managers for the development 3PL service standards.

An obvious implication for managers is the performance improvement of 3PL provider services that results from better service quality and relationship management. The results suggest that better service quality and relationship management convey extensive operational benefits to 3PL organizations in terms of reduced cycle time, better inventory management, and improved quality. Further analysis indicates that service quality and relationship management directly and indirectly enhance company performance. This knowledge guides 3PL service adoption strategies to maintain a competitive advantage.

### *7.7.3 Strategic Implications*

Important strategic implications are identified from the results of the study. Our findings and the managerial implications are summarized in the following.

#### *(1) Returns from strategic choice*

Compared to competition that is based solely on cost, 3PL providers can achieve better organizational effectiveness, such as a shorter cycle time, better customer service, reputation and goodwill, a higher growth rate, a higher market share, and a better return on investment (ROI). This achievement requires more sophisticated and higher value-added 3PL logistics services to supplement operations and meet customer service requirements. This study shows that 3PL providers may partly be changing the requirements of logistics users, such as manufacturers and distributors, that demand more than rudimentary cheap services. Most manufacturing production activities are currently carried out in China. However, there is a preference for logistics outsourcing related activities to 3PL providers that provide more specialized and higher value-added logistics services. Manufacturers require and are prepared to pay for such additional services.

The main implication for 3PL providers is the necessity of a review of current strategies and a decision as to whether to continue business with higher competition and a relatively lower return on investment. If 3PL providers want to achieve better organizational performance, they need to develop and offer diverse services, and migrate from a low-cost strategy. 3PL providers can achieve better performance through the obtaining of competitive advantages in both cost and quality of service, and through the development long-term relationships with customers. The results show that a considerable number of 3PL providers have successfully pursued this strategy with customers. 3PL providers can improve in multiple dimensions to achieve competitive marketplace advantages.

## (2) *Operations Objectives*

The views of both the 3PL providers and customers are important in the improvement of customer services, such as a shorter delivery lead time, meeting due date promises, providing reliable services, and meeting specific customer demands. 3PL providers can continue to focus on cost reduction, but should also put future emphasis on the development of differentiation capabilities. They need to emphasize capabilities that allow flexibility in the accommodation of changing customer needs, improvement of operational flexibility, and ability to provide new value-added customer services.

3PL providers and customers share the view that better relationship management achieves smoother 3PL delivery services . Building trust, commitment, and guanxi, which issues promises and guarantees services to customers, enhances organizational effectiveness and 3PL performance. Customer relationship management is a prime concern for 3PL providers in the improvement of service quality, business operations, and performance.

### (3) *Competing in the future*

The questionnaire respondents perceived that keen competition will be a feature of the future logistics industry. To survive, 3PL providers must be vigilant and sensitive to service quality, organizational effectiveness, business performance, and customer relationship management, and must continually seek to meet customer expectations. To achieve this, 3PL providers must make service quality improvements and reduce response times as future priorities.

There must also be regular employee training to improve human resources. Logistics executives should be aware that recent rapid developments in the Hong Kong logistics

industry may compromise the adequate supply of qualified logistics professionals. Educational institutions and the government need to provide more developmental and logistical training resources to meet the needs of the logistics industry.

This study indicates that service quality, organizational effectiveness, and relationship management are important factors, and that business performance is correlated with service design, service performance, and the ability to exercise flexibility to meet customer requirements. The impact of the economic integration of Hong Kong and mainland China is a major factor that will shape the future logistics landscape. This integration became substantial and rapid after Hong Kong's return to China governance in 1997. As a result, there has been a lessening of border restrictions between Hong Kong and mainland China that has also provided an increase in business opportunities. 3PL providers that wish to remain viable and profitable must pay more attention to the rapidly increasing regional market. This study provides evidence and guidelines for 3PL providers to enhance organizational performance and company success.

## **7.8 Summary**

This chapter provides a discussion of 3PL organizational performance, and discusses 3PL service quality, organizational effectiveness, and relationship management. The association and relationship between these factors are generally positive and significant. This finding elaborates and adds to the findings of previous studies.

The constructs of 3PL organizational performance are discussed. It is confirmed that 3PL organizational effectiveness influences both service quality and relationship

management, and that 3PL service quality also influences relationship management. The findings of this study confirm the validity of the model framework of 3PL organizational performance.

The gaps between the 3PL Expected and the 3PL Actual groups and the 3PL Expected and Customer Actual groups are discussed. The findings of the gap analyses are significant. The expected logistics service quality gaps between 3PL staff and business partners are insignificant, which reflects the relative similarity and consistency of the promised service quality of 3PL providers with the expected service quality of their business partners. This further confirms that there is a commonly shared vision of logistics service quality, in contrast to the significant differences that are identified in actual logistics service quality. The implications of the study that are related to 3PL and managerial contexts are discussed. It is concluded that 3PL organizational performance is vital for 3PL providers to achieve performance and company success. It is also vital for customers to select appropriate long-term business partners.

## CHAPTER 8

### CONCLUSION

Based on the results and discussions of this study, this chapter presents the academic contributions, fulfillment of research objectives, and limitations of the research, and discusses possible future research. Finally, a study conclusion is given. The chapter comprises the following sections.

- 8.1 Academic and Practical Contributions
- 8.2 Fulfillment of Research Objectives
- 8.3 Limitations and Future Research
- 8.4 Conclusion

#### **8.1 Academic and Practical Contributions**

This study provides a theoretical framework and research model of 3PL organizational performance that can serve as a foundation for future research on the management of logistics outsourcing or 3PL.

This study explores the possible link between service quality dimensions and 3PL performance factors. The results from the study provide empirical support for the link between the relationship dimensions of trust and commitment between 3PL providers and partners. It shows that service quality and relationship dimensions are important

elements in the successful of management of outsourcing and 3PL.

Three major constructs, namely, 3PL service quality (SQ), 3PL organizational effectiveness (OE), and relationship management (RM), are developed to identify 3PL organizational performance using an organizational theory approach.

Five dimensions are indicated that characterize 3PL service quality (SQ): tangibles (TANGI), reliability (RELIAB), responsiveness (RESPO), assurance (ASSUR), and empathy (EMPAT). Three dimensions are indicated to measure the organizational effectiveness of 3PL: cycle time (CYCLE), customer service (CUSTO), and reputation and goodwill (GOORE). Finally, three dimensions are indicated to evaluate relationship management (RM): guanxi (GUANX), trust (TRUST), and commitment (COMMI). The results of the study show that the causal relationships between service, organizational effectiveness, and relationship management are important aspects of 3PL organizational performance. The results confirm the multidimensional measurement of 3PL organizational success and provide support for the application of a similar conceptualization to 3PL organizational performance measurement.

Using the SEM method, the five dimensions of 3PL service quality, the three dimensions of 3PL organizational effectiveness, the three dimension of relationship management, and the three constructs of 3PL organizational performance are validated. After refinement of the measurement models and the validity and reliability testing of the constructs, significant measurement items are retained that provide the final version of the measurement items and their latent constructs. This final version is treated as a solid and reliable measurement tool in the implementation of 3PL organizational performance measurement for both academics and practitioners.

Gap analyses are conducted to examine the differences among the surveyed groups for indicator variables, to confirm the variables for both 3PL service providers and partners, and to derive meaningful feedback for service improvements for 3PL providers from the differences in actual logistics services. The findings of this study can be used to improve perceived and actual 3PL business performance.

This study not only fills the research gap by identifying and developing research models of 3PL organizational performance, but also provides insights for 3PL service providers and researchers to develop comprehensive 3PL strategies in the future .

## **8.2 Fulfillment of Research Objectives**

The five main research objectives of this study are fulfilled. They are discussed in the following.

This study conceptually and empirically provides key insights into the structure of 3PL organizational performance measurement. The eleven factors and three constructs are identified and have practical significance, and can serve as a basis for further studies.

The study also provides a rigorous examination of the causal relationships between the three constructs of service quality, organizational effectiveness, and relationship management, and identifies the major criteria of 3PL organizational performance. The SEM results provide practical guidelines and indicators of how to determine and actualize the important factors to attain good 3PL organizational performance.



This is the first attempt to study Hong Kong 3PL organizational performance practices. It is generalized that service quality, organizational effectiveness, and relationship management are global in context, and are not culturally specific. A comparison of this study with previous studies does not reveal significant cultural and regional differences. As many studies of 3PL have been conducted in America and Europe, this study paves the way for a new direction in Asian studies to examine the local relevance of 3PL organizational performance and its measurement.

Based on the results of the study, some practical implications for 3PL practitioners are provided. These allow management to employ appropriate strategies for the effective enhancement of 3PL organizational performance.

A gap analysis examines the perceived and actual organizational performance of providers in terms of 3PL service quality, organizational effectiveness, and relationship management. This study not only defines the importance of collaborative relationships between 3PL providers and customers and identifies different core competencies of 3PL services, but also develops a solid foundation for the development of effective 3PL organizational performance.

### **8.3 Limitations and Future Research Directions of this Study**

The limitations and future research efforts are suggested as follows.

This study mainly considers the relation between service quality (SQ), organizational effectiveness (OE), and relationship management (RM) and 3PL organizational performance. There may be other critical factors that influence 3PL organizational

performance that should be considered in future studies.

As only 742 completed and useful questionnaires were collected and there are only 98 measurement items for 3PL organizational performance, the sample results are insufficient for division into groups for data analysis. The sample size, however, is adequate for structural equation modeling (SEM). To avoid potential bias, CFI is used to assess the model's suitability. Future studies could use a larger sample.

The difficulty in obtaining respondents lengthened the questionnaire collection and follow up process to nearly three months, which thwarted second follow-up efforts. The aim of the second follow-up effort was to increase the response rate. In future research efforts, it is recommended that researchers enlist more members to contact and follow up targeted respondents, which would facilitate the conducting of a second follow-up survey and a more successful response rate.

There are several research suggestions for future study. Research could be conducted periodically to monitor trends and changes in 3PL organizational performance and strategies. In-depth studies on specific logistics areas, such as 3PL service quality, could also be conducted to examine issues such as technology adoption, information sharing, strategy formulation, operations practices, standards, and benchmarking. With the economic integration of Hong Kong and mainland China, in-depth studies could also be conducted to investigate the competitive implications for Hong Kong's 3PL service providers and the strategic and operational measures that are necessary for 3PL providers to penetrate the growing market in mainland China. Future studies might focus on obtaining a better understanding of the differences between high and low levels of performance, and the process that facilitates progression from one

performance level to the next. It would also be fruitful to compare logistics strategies and practices between different countries.

#### **8.4 Conclusion**

This study mainly examines and identifies 3PL organizational performance measurement and management, and proposes a research model to investigate the criteria that enhances 3PL service success.

After analysis of the measurement model, the structural model is tested and confirmed. The results of the structural model test show that the criteria that are most strongly related to 3PL organizational performance can be grouped into three constructs: 3PL service quality (SQ), 3PL organizational effectiveness (OE), and relationship management (RM). There are eleven additional factors in the three constructs. Tangibles (TANGI), reliability (RELIAB), responsiveness (RESPON), assurance (ASSUR), and empathy (EMPAT) are found to significantly and positively related to service quality. Cycle time (CYCLE), customer service (CUSTO), and reputation and goodwill (GOORE) are significantly and positively related to organizational effectiveness. Guanxi (GUANX), trust (TRUST), and commitment (COMMI) are significantly and positively related to relationship management.

The study results indicate that the causal relationship between service quality, organizational effectiveness, and relationship management are three important aspects of 3PL organizational performance. The results confirm the multidimensional measurement of 3PL organizational success and provide support for the application of the conceptualization to 3PL organizational performance. Gap analyses are also

conducted to examine the differences across the surveyed groups in terms of the indicator variables, to confirm the variables for both 3PL service providers and 3PL partners, and to derive useful feedback for service improvements for 3PL providers from the differences in actual logistics service. The findings of this study can be used to improve 3PL actual business performance.

This research constitutes the first comprehensive study of the organizational performance measurement and management of 3PL service providers in Hong Kong. It provides analysis of 3PL service quality, organizational effectiveness, and relationship management; identifies a research framework for 3PL organizational performance; and confirms the collaborative relationship between 3PL service providers and their partners. The findings provide valuable information and insights for logistics practitioners, policy makers, and supply chain partners.

This study also contributes to the literature on 3PL performance measurement and strategic management. It provides useful information and guidelines for practitioners to determine the important factors for 3PL organizational performance success. The gap analysis examines the difference between perceived and actual 3PL organizational performance, and not only defines the collaborative relationship and competencies of 3PL providers, but also develops a solid foundation for 3PL organizational performance measurement.

As Hong Kong prepares to position itself as a regional logistics hub, the logistics industry must be prepared to deliver world-class quality services. Logistics service providers, despite their current strategic stances, must continually upgrade and enhance their operational capabilities. Logistics practitioners can use the findings

from this study for benchmarking purposes and as a point of reference for the identification of logistical strengths and shortcomings. This research highlights the major criteria in 3PL organizational performance to achieve corporate success. Policy makers can use the findings to formulate plans and strategies to increase the competitiveness of Hong Kong 3PL providers.

The Hong Kong government has stressed the importance of maintaining Hong Kong as a center for trade and multi-dimensional operations, and ambitious infrastructure projects will be carried out over the next few years to support this focus. Government support and integration with mainland China will create numerous business opportunities for 3PL service providers.

Future research guidelines are provided in this thesis. Research could be conducted periodically to monitor trends and changes in organizational performance and 3PL strategies. In-depth studies of specific logistics areas, such as 3PL service quality, could also be conducted to examine issues such as technology advancement, information sharing, strategy formulation, operation practices, standards, and benchmarking. Given the economic integration of Hong Kong and mainland China, in-depth studies could investigate the competitive implications of such integration for Hong Kong's 3PL service providers, and the strategic and operational measures that are necessary to penetrate the rapidly expanding market. Future studies might also focus on a more thorough understanding of the differences between high and low levels of performance, and the processes that are necessary to advance from one level to the next. It would be equally fruitful to conduct a comparative study of logistics strategies and practices between countries.

In conclusion, the vigorous theoretical, methodological, and analytical content of this empirical study means that it makes an invaluable contribution to the existing literature on organizational performance. This study fills the literature gap and provides a solid foundation for further studies on the development of strategies and the benchmarking of successful 3PL organizational performance.

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## APPENDIX A

### Study Cover Letter

Dear Sir or Madam,

#### Request for Participation

You are invited to participate in a survey on the *Performance Measurement of Logistics Services* in the Hong Kong logistics industry.

The research results will facilitate the success of third party logistics service providers by highlighting the importance of quality service performance and by proscribing service improvement suggestions.

We would greatly appreciate your co-operation in filling out the enclosed questionnaire or giving it to your colleague who is responsible for your company's selection of logistics service providers.

The collected data will be kept strictly confidential, and will be used for academic purposes only. Please return the completed questionnaire in the envelope provided, or fax it to Mr. Yuen at XXXX-XXXX by **February 10 2004**.

If you have any queries, please send an e-mail to [syuen@hkbu.edu.hk](mailto:syuen@hkbu.edu.hk) or call XXXX-XXXX.

Yours faithfully,

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## **APPENDIX B**

### **Questionnaires**

**APPENDIX B1 –3PL Service Provider (Expected)**

**APPENDIX B2 –3PL Service Provider (Actual)**

**APPENDIX B3 – Customer of 3PL Service Provider (Expected)**

**APPENDIX B4 – Customer of 3PL Service Provider (Actual)**

## APPENDIX B1 – Third Party Logistics (3PL) Service Provider (Expected)

### Survey of Third Party Logistics Practices in Hong Kong

#### Questionnaire for Third Party Logistics Service Providers

This survey explores the best logistics service and organizational performance of third party logistics (3PL) providers in the Hong Kong logistics industry.

All of the information provided will be kept **CONFIDENTIAL** and used for academic purposes only. Your cooperation in the completion of the survey is highly appreciated. Thank you for your participation.

Please assess the criteria statements by putting a ✓ in the box that best represents your expectations or opinions of your company.

#### Part 1: Service Quality

Key of scale:

7	6	5	4	3	2	1
Strongly agree	Agree	Moderately agree	Neutral	Moderately disagree	Disagree	Strongly disagree

<b>My firm:</b>	<b>7</b>	<b>6</b>	<b>5</b>	<b>4</b>	<b>3</b>	<b>2</b>	<b>1</b>
1) Has “up to date” equipment							
2) Has attractive facilities							
3) Has presentable (neatly dressed ) employees							
4) Has literature on available services							
5) Fulfills promises							
6) Express sincerity in problem solving							
7) Provides efficient and consistent service							
8) Is punctual with service commitments							
9) Provides error-free service (target) assistance							
10) Provides consistent punctual service							
11) Provides prompt service							
12) Expresses a consistent willingness to help							



13) Is responsive to requests							
14) Engenders corporate confidence							
15) Provides transaction security (e.g., ensures minimal loss)							
16) Is consistently courteous							
17) Displays knowledge during inquiries							
18) Provides tailor-made customer service							
19) Has convenient office hours							
20) Is perceptive of customer needs and problems							
21) Has customer's interest at heart							
22) Is understanding of specific needs							

**Part II: Organizational Performance**

Key of scale:

7	6	5	4	3	2	1
Strongly agree	Agree	Moderately agree	Neutral	Moderately disagree	Disagree	Strongly Disagree

<b>My firm:</b>	<b>7</b>	<b>6</b>	<b>5</b>	<b>4</b>	<b>3</b>	<b>2</b>	<b>1</b>
23) Minimizes service failure probabilities							
24) Provides business operational consultancy service							
25) Maximizes product replacement frequency							
26) Provides competition enhancement service							
27) Provides quality efficient service							
28) Provides a high order rate service							
29) Has efficient and reliable warehouse operations							
30) Provides efficient and reliable transportation service							
31) Maintains a high level of productivity							

<b>My firm:</b>	<b>30+</b>	<b>26-30</b>	<b>21-25</b>	<b>16-20</b>	<b>11-15</b>	<b>6-10</b>	<b>1-5</b>
32) Has a _____ % net profit margin from logistics services							
33) Has a _____ % return on investment from logistics services							
34) Has a _____ % growth of share values							
35) Has a _____ % return on net assets from logistics services							
36) Increases service value by _____ % per year to us							
37) Has a _____ % growth rate of financial position in the logistics industry							
38) Has a _____ % market share in the logistics industry							

39) Has a _____ % transaction volume in the logistics industry							
40) Has a market growth rate of _____ %							

Key of scale:

7	6	5	4	3	2	1
Strongly Agree	Agree	Moderately Agree	Neutral	Moderately Disagree	Disagree	Strongly Disagree

<b>My firm:</b>	<b>7</b>	<b>6</b>	<b>5</b>	<b>4</b>	<b>3</b>	<b>2</b>	<b>1</b>
41) Has a shorter cycle time than the industrial average							
42) Has a good equipment safety record							
43) Has minimal stock-out levels							
44) Has minimal back orders							
45) Provides consistent delivery service							
46) Has stock rotation control capability and record management (e.g., makes stock adjustments on-hand and re-orders)							
47) Has order acceptance and a processing system							
48) Has pick and pack operations							
49) Fulfills order commitment service							
50) Accommodates return handling							
51) Is responsive to purchase decision making							
52) Provides a good after sales services							
53) Responds efficiently and quickly to needs							
54) Provides a punctual delivery service							
55) Welcomes feedback or comments							
56) Provides a precise quantity service							
57) Provides a highly satisfactory service							
58) Responds quickly to changes							
59) Is responsive to specific requirements							
60) Is flexible and adaptable to changes							
61) Employs a value-added logistics services							
62) Provides an abnormally high value-added services							
63) Has few complaints							
64) Engenders a positive or favorable image							
65) Correlates expertise with strategic missions							
66) Is reputable within the logistics industry							
67) Has relevant experience							
68) Has a good track record in customer service							

**Part III: Relationship Management**

*Key of scale:*

7	6	5	4	3	2	1
Strongly agree	Agree	Moderately agree	Neutral	Moderately disagree	Disagree	Strongly disagree

<b>My firm:</b>	<b>7</b>	<b>6</b>	<b>5</b>	<b>4</b>	<b>3</b>	<b>2</b>	<b>1</b>
69) Is cooperative during organizational changes							
70) Initiates inter-organizational relationships							
71) Possesses efficient managerial skills							
72) Values good working relationships							
73) Has a key representative who is accessible							
74) Has a PR representative							
75) Has a representative who deals with promotions and “gifts”							
76) Has a personable and affable customer service representative							
77) Has a key representative who socializes with customers							
78) Has an event (e.g., banquet) organizer							
79) Adheres to a principle of complete trust							
80) Is accessible during service problems							
81) Expresses confidence in customers							
82) Is attentive and makes inquiries							
83) Expresses concern for personal well-being							
84) Communicates with sincerity							
85) Displays positive social interaction							
86) Honors service commitments							
87) Provides consistent service							
88) Provides quality service							
89) Adheres to a moral social principle							
90) Has integrity							
91) Adheres to a principle of ethical service							
92) Adheres to a service principle of respect and acceptance							
93) Has a “down to earth” approach to business							
94) Demonstrates commitment							
95) Demonstrates a willingness to honor commitments							
96) Provides optimal attentiveness							
97) Demonstrates loyalty							
98) Is patient							

**Part IV: Company Profile/Background Information** Please ✓ one box below in each question:

1. What type of industry do you belong to?

- |  |   |
|--|---|
| <input type="checkbox"/> Automotive parts and components                               | <input type="checkbox"/> Biotechnology          |
| <input type="checkbox"/> Chemical  | <input type="checkbox"/> Construction           |
| <input type="checkbox"/> Electrical appliance  | <input type="checkbox"/> Electronic technology  |
| <input type="checkbox"/> Industrial machinery  | <input type="checkbox"/> Information technology |
| <input type="checkbox"/> Medicine/health   | <input type="checkbox"/> Optical products       |
| <input type="checkbox"/> Plastic products  | <input type="checkbox"/> Printing               |
| <input type="checkbox"/> Service industries (banking, finance, insurance, hotel, etc.) | <input type="checkbox"/> Textile and clothing   |
| <input type="checkbox"/> Toys  | <input type="checkbox"/> Watches and clocks     |
| <input type="checkbox"/> Wholesale/retail (grocery, departmental store and cosmetics)  |   |
| <input type="checkbox"/> Other, please specify: _____                                  |   |

2. What type of company do you belong to?

- |  |   |
|--|---|
| <input type="checkbox"/> Limited company     | <input type="checkbox"/> Public listed company        |
| <input type="checkbox"/> Partnership         | <input type="checkbox"/> Joint venture                |
| <input type="checkbox"/> Sole proprietorship | <input type="checkbox"/> Other, please specify: _____ |

3. What is your company's total number of employees (including full-time and part-time employees)?

- |                                       |                                       |                                  |                                  |
|---------------------------------------|---------------------------------------|----------------------------------|----------------------------------|
| <input type="checkbox"/> Less than 50 | <input type="checkbox"/> 50-99        | <input type="checkbox"/> 100-199 | <input type="checkbox"/> 200-499 |
| <input type="checkbox"/> 500-999      | <input type="checkbox"/> 1000 or more |                                  |                                  |

4. How long has your company been operating in Hong Kong?

- |  |  |                                    |
|--|--|------------------------------------|
| <input type="checkbox"/> 2 years or less | <input type="checkbox"/> 2-4 years     | <input type="checkbox"/> 5-7 years |
| <input type="checkbox"/> 8-10 years      | <input type="checkbox"/> Over 10 years |                                    |

5. What is the value of your company's material assets (in million HKD)?

- |                                       |                                      |                                |
|---------------------------------------|--------------------------------------|--------------------------------|
| <input type="checkbox"/> Less than 15 | <input type="checkbox"/> 15-29       | <input type="checkbox"/> 30-49 |
| <input type="checkbox"/> 50-99        | <input type="checkbox"/> 100 or more |                                |

6. What were your company's annual sales (in million HKD) in 2002?

- Less than 5                       5-9                       10-19  
 20-49                       50-99                       100 or more

7. What is your position in the company?

- Senior management                       Middle management  
 Front-line manager                       Front-line staff  
 Other, please specify: \_\_\_\_\_

***Part V: Further Contact Information***

1. Name/Position: \_\_\_\_\_

2. Contact number: \_\_\_\_\_

3. E-mail address: \_\_\_\_\_

4. If necessary, are you available for a personal interview?       **Yes**       **No**

5. Any suggestions/comments:

---

---

---

~ End ~

**\*\*Thank you for your kind co-operation\*\***

**\*\* All information will be used for academic purposes only**

## APPENDIX B2 – Third Party Logistics (3PL) Service Provider (Actual)

### Survey of Third Party Logistics Practices in Hong Kong

#### Questionnaire for Third Party Logistics Service Providers

This survey explores the actual logistics service and organizational performance of your company in the Hong Kong logistics industry.

All of the information provided will be kept **CONFIDENTIAL** and used for academic purposes only. Your cooperation in the completion of the survey is highly appreciated. Thank you for your participation.

Please assess the following criteria by putting a ✓ in the box that best represents your opinions on the actual practices of your company.

#### Part I: Service Quality

Key of scale:

7	6	5	4	3	2	1
Strongly agree	Agree	Moderately agree	Neutral	Moderately disagree	Disagree	Strongly disagree

<b>My firm:</b>	<b>7</b>	<b>6</b>	<b>5</b>	<b>4</b>	<b>3</b>	<b>2</b>	<b>1</b>
1) Has “up to date” equipment							
2) Has attractive facilities							
3) Has presentable (neatly dressed ) employees							
4) Has literature on available services							
5) Fulfills promises							
6) Express sincerity in problem solving							
7) Provides efficient and consistent service							
8) Is punctual with service commitments							
9) Provides error-free service (target) assistance							
10) Provides consistent punctual service							
11) Provides prompt service							
12) Expresses a consistent willingness to help							

13) Is responsive to requests							
14) Engenders corporate confidence							
15) Provides transaction security (e.g., ensures minimal loss)							
16) Is consistently courteous							
17) Displays knowledge during inquiries							
18) Provides tailor-made customer service							
19) Has convenient office hours							
20) Is perceptive of customer needs and problems							
21) Has customer's interest at heart							
22) Is understanding of specific needs							

**Part II: Organizational Performance**

Key of scale:

7	6	5	4	3	2	1
Strongly agree	Agree	Moderately agree	Neutral	Moderately disagree	Disagree	Strongly Disagree

<b>My firm:</b>	<b>7</b>	<b>6</b>	<b>5</b>	<b>4</b>	<b>3</b>	<b>2</b>	<b>1</b>
23) Minimizes service failure probabilities							
24) Provides business operational consultancy service							
25) Maximizes product replacement frequency							
26) Provides competition enhancement service							
27) Provides quality efficient service							
28) Provides a high order rate service							
29) Has efficient and reliable warehouse operations							
30) Provides efficient and reliable transportation service							
31) Maintains a high level of productivity							

<b>My firm:</b>	<b>30+</b>	<b>26-30</b>	<b>21-25</b>	<b>16-20</b>	<b>11-15</b>	<b>6-10</b>	<b>1-5</b>
32) Has a _____ % net profit margin from logistics services							
33) Has a _____ % return on investment from logistics services							
34) Has a _____ % growth of share values							
35) Has a _____ % return on net assets from logistics services							
36) Increases service value by _____ % per year to us							
37) Has a _____ % growth rate of financial position in the logistics industry							
38) Has a _____ % market share in the logistics industry							

39) Has a _____ % transaction volume in the logistics industry							
40) Has a market growth rate of _____ %							

Key of scale:

7	6	5	4	3	2	1
Strongly Agree	Agree	Moderately Agree	Neutral	Moderately Disagree	Disagree	Strongly Disagree

<b>My firm:</b>	<b>7</b>	<b>6</b>	<b>5</b>	<b>4</b>	<b>3</b>	<b>2</b>	<b>1</b>
41) Has a shorter cycle time than the industrial average							
42) Has a good equipment safety record							
43) Has minimal stock-out levels							
44) Has minimal back orders							
45) Provides consistent delivery service							
46) Has stock rotation control capability and record management (e.g., makes stock adjustments on-hand and re-orders)							
47) Has order acceptance and a processing system							
48) Has pick and pack operations							
49) Fulfills order commitment service							
50) Accommodates return handling							
51) Is responsive to purchase decision making							
52) Provides a good after sales service							
53) Responds efficiently and quickly to needs							
54) Provides a punctual delivery service							
55) Welcomes feedback or comments							
56) Provides a precise quantity service							
57) Provides a highly satisfactory service							
58) Responds quickly to changes							
59) Is responsive to specific requirements							
60) Is flexible and adaptable to changes							
61) Employs a value-added logistics services							
62) Provides an abnormally high value-added services							
63) Has few complaints							
64) Engenders a positive or favorable image							
65) Correlates expertise with strategic missions							
66) Is reputable within the logistics industry							
67) Has relevant experience							
68) Has a good track record in customer service							



**Part III: Relationship Management**

*Key of scale:*

7	6	5	4	3	2	1
Strongly agree	Agree	Moderately agree	Neutral	Moderately disagree	Disagree	Strongly disagree

<b>My firm:</b>	<b>7</b>	<b>6</b>	<b>5</b>	<b>4</b>	<b>3</b>	<b>2</b>	<b>1</b>
69) Is cooperative during organizational changes							
70) Initiates inter-organizational relationships							
71) Possesses efficient managerial skills							
72) Values good working relationships							
73) Has a key representative who is accessible							
74) Has a PR representative							
75) Has a representative who deals with promotions and “gifts”							
76) Has a personable and affable customer service representative							
77) Has a key representative who socializes with customers							
78) Has an event (e.g., banquet) organizer							
79) Adheres to a principle of complete trust							
80) Is accessible during service problems							
81) Expresses confidence in customers							
82) Is attentive and makes inquiries							
83) Expresses concern for personal well-being							
84) Communicates with sincerity							
85) Displays positive social interaction							
86) Honors service commitments							
87) Provides consistent service							
88) Provides quality service							
89) Adheres to a moral social principle							
90) Has integrity							
91) Adheres to a principle of ethical service							
92) Adheres to a service principle of respect and acceptance							
93) Has a “down to earth” approach to business							
94) Demonstrates commitment							
95) Demonstrates a willingness to honor commitments							
96) Provides optimal attentiveness							
97) Demonstrates loyalty							
98) Is patient							

**Part IV: Company Profile/Background Information** Please ✓ one box below in each question:

1. What type of industry do you belong to?

- |  |   |
|--|---|
| <input type="checkbox"/> Automotive parts and components                               | <input type="checkbox"/> Biotechnology          |
| <input type="checkbox"/> Chemical  | <input type="checkbox"/> Construction           |
| <input type="checkbox"/> Electrical appliance  | <input type="checkbox"/> Electronic technology  |
| <input type="checkbox"/> Industrial machinery  | <input type="checkbox"/> Information technology |
| <input type="checkbox"/> Medicine/health   | <input type="checkbox"/> Optical products       |
| <input type="checkbox"/> Plastic products  | <input type="checkbox"/> Printing               |
| <input type="checkbox"/> Service industries (banking, finance, insurance, hotel, etc.) | <input type="checkbox"/> Textile and clothing   |
| <input type="checkbox"/> Toys  | <input type="checkbox"/> Watches and clocks     |
| <input type="checkbox"/> Wholesale/retail (grocery, departmental store & cosmetics)    |   |
| <input type="checkbox"/> Other, please specify: _____                                  |   |

2. What type of company do you belong to?

- |  |   |
|--|---|
| <input type="checkbox"/> Limited company     | <input type="checkbox"/> Public listed company        |
| <input type="checkbox"/> Partnership         | <input type="checkbox"/> Joint venture                |
| <input type="checkbox"/> Sole proprietorship | <input type="checkbox"/> Other, please specify: _____ |

3. What is your company's total number of employees (including full-time and part-time employees)?

- |                                       |                                       |                                  |                                  |
|---------------------------------------|---------------------------------------|----------------------------------|----------------------------------|
| <input type="checkbox"/> Less than 50 | <input type="checkbox"/> 50-99        | <input type="checkbox"/> 100-199 | <input type="checkbox"/> 200-499 |
| <input type="checkbox"/> 500-999      | <input type="checkbox"/> 1000 or more |                                  |                                  |

4. How long has your company been operating in Hong Kong?

- |  |  |                                    |
|--|--|------------------------------------|
| <input type="checkbox"/> 2 years or less | <input type="checkbox"/> 2-4 years     | <input type="checkbox"/> 5-7 years |
| <input type="checkbox"/> 8-10 years      | <input type="checkbox"/> Over 10 years |                                    |

5. What is the value of your company's material assets (in million HKD)?

- |                                       |                                      |                                |
|---------------------------------------|--------------------------------------|--------------------------------|
| <input type="checkbox"/> Less than 15 | <input type="checkbox"/> 15-29       | <input type="checkbox"/> 30-49 |
| <input type="checkbox"/> 50-99        | <input type="checkbox"/> 100 or more |                                |

6. What were your company's annual sales (in million HKD) in 2002?

- Less than 5                       5-9                       10-19  
 20-49                       50-99                       100 or more

7. What is your position in the company?

- Senior management                       Middle management  
 Front-line manager                       Front-line staff  
 Other, please specify: \_\_\_\_\_

***Part V: Further Contact Information***

1. Name/Position: \_\_\_\_\_

2. Contact number: \_\_\_\_\_

3. E-mail address: \_\_\_\_\_

4. If necessary, are you available for a personal interview?       **Yes**       **No**

5. Any suggestions/comments:

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~ End ~

**\*\*Thank you for your kind co-operation\*\***

**\*\* All information will be used for academic purposes only**

## APPENDIX B3 – Customer of 3PL Service Provider (Expected)

### Survey of Third Party Logistics Practices in Hong Kong

#### Questionnaire for Customers of Third Party Logistics

This survey explores the best logistics service and organizational performance of third party logistics (3PL) providers in the Hong Kong logistics industry.

All of the information provided will be kept **CONFIDENTIAL** and used for academic purposes only. Your cooperation in the completion of the survey is highly appreciated. Thank you for your participation.

Please assess the following criteria by putting a ✓ in the box that best represents your expectations or opinions of the service provider.

#### Part I: Service Quality

Key of scale:

7	6	5	4	3	2	1
Strongly agree	Agree	Moderately agree	Neutral	Moderately disagree	Disagree	Strongly disagree

<b>Logistics service provider:</b>	<b>7</b>	<b>6</b>	<b>5</b>	<b>4</b>	<b>3</b>	<b>2</b>	<b>1</b>
1) Has “up to date” equipment							
2) Has attractive facilities							
3) Has presentable (neatly dressed) employees							
4) Has literature on available services							
5) Fulfills promises							
6) Express sincerity in problem solving							
7) Provides efficient and consistent service							
8) Is punctual with service commitments							
9) Provides error-free service (target) assistance							
10) Provides consistent punctual service							
11) Provides prompt service							
12) Expresses a consistent willingness to help							

13) Is responsive to requests							
14) Engenders corporate confidence							
15) Provides transaction security (e.g., ensures minimal loss)							
16) Is consistently courteous							
17) Displays knowledge during inquiries							
18) Provides tailor-made customer service							
19) Has convenient office hours							
20) Is perceptive of customer needs and problems							
21) Has customer's interest at heart							
22) Is understanding of specific needs							

**Part II: Organizational Performance**

Key of scale:

7	6	5	4	3	2	1
Strongly agree	Agree	Moderately agree	Neutral	Moderately disagree	Disagree	Strongly Disagree

<b>Logistics service provider:</b>	<b>7</b>	<b>6</b>	<b>5</b>	<b>4</b>	<b>3</b>	<b>2</b>	<b>1</b>
23) Minimizes service failure probabilities							
24) Provides business operational consultancy service							
25) Maximizes product replacement frequency							
26) Provides competition enhancement service							
27) Provides quality efficient service							
28) Provides a high order rate service							
29) Has efficient and reliable warehouse operations							
30) Provides efficient and reliable transportation service							
31) Maintains a high level of productivity							

<b>Logistics service provider:</b>	<b>30+</b>	<b>26-30</b>	<b>21-25</b>	<b>16-20</b>	<b>11-15</b>	<b>6-10</b>	<b>1-5</b>
32) Has a _____ % net profit margin from logistics services							
33) Has a _____ % return on investment from logistics services							
34) Has a _____ % growth of share values							
35) Has a _____ % return on net assets from logistics services							
36) Increases service value by _____ % per year to us							
37) Has a _____ % growth rate of financial position in the logistics industry							
38) Has a _____ % market share in the logistics industry							

39) Has a _____ % transaction volume in the logistics industry							
40) Has a market growth rate of _____ %							

*Key of scale:*

7	6	5	4	3	2	1
Strongly Agree	Agree	Moderately Agree	Neutral	Moderately Disagree	Disagree	Strongly Disagree

<b>Logistics service provider:</b>	<b>7</b>	<b>6</b>	<b>5</b>	<b>4</b>	<b>3</b>	<b>2</b>	<b>1</b>
41) Has a shorter cycle time than the industrial average							
42) Has a good equipment safety record							
43) Has minimal stock-out levels							
44) Has minimal back orders							
45) Provides consistent delivery service							
46) Has stock rotation control capability and record management (e.g., makes stock adjustments on-hand and re-orders)							
47) Has order acceptance and a processing system							
48) Has pick and pack operations							
49) Fulfills order commitment service							
50) Accommodates return handling							
51) Is responsive to purchase decision making							
52) Provides a good after sales service							
53) Responds efficiently and quickly to needs							
54) Provides a punctual delivery service							
55) Welcomes feedback or comments							
56) Provides a precise quantity service							
57) Provides a highly satisfactory service							
58) Responds quickly to changes							
59) Is responsive to specific requirements							
60) Is flexible and adaptable to changes							
61) Employs a value-added logistics services							
62) Provides an abnormally high value-added services							
63) Has few complaints							
64) Engenders a positive or favorable image							
65) Correlates expertise with strategic missions							
66) Is reputable within the logistics industry							
67) Has relevant experience							
68) Has a good track record in customer service							

**Part III: Relationship Management**

Key of scale:

7	6	5	4	3	2	1
Strongly agree	Agree	Moderately agree	Neutral	Moderately disagree	Disagree	Strongly disagree

<b>Logistics service provider:</b>	<b>7</b>	<b>6</b>	<b>5</b>	<b>4</b>	<b>3</b>	<b>2</b>	<b>1</b>
69) Is cooperative during organizational changes							
70) Initiates inter-organizational relationships							
71) Possesses efficient managerial skills							
72) Values good working relationships							
73) Has a key representative who is accessible							
74) Has a PR representative							
75) Has a representative who deals with promotions and “gifts”							
76) Has a personable and affable customer service representative							
77) Has a key representative who socializes with customers							
78) Has an event (e.g., banquet) organizer							
79) Adheres to a principle of complete trust							
80) Is accessible during service problems							
81) Expresses confidence in customers							
82) Is attentive and makes inquiries							
83) Expresses concern for personal well-being							
84) Communicates with sincerity							
85) Displays positive social interaction							
86) Honors service commitments							
87) Provides consistent service							
88) Provides quality service							
89) Adheres to a moral social principle							
90) Has integrity							
91) Adheres to a principle of ethical service							
92) Adheres to a service principle of respect and acceptance							
93) Has a “down to earth” approach to business							
94) Demonstrates commitment							
95) Demonstrates a willingness to honor commitments							
96) Provides optimal attentiveness							
97) Demonstrates loyalty							
98) Is patient							

**Part IV: Company Profile/Background Information** Please ✓ one box below in each question:

1. What type of industry do you belong to?

- |  |   |
|--|---|
| <input type="checkbox"/> Automotive parts and components                               | <input type="checkbox"/> Biotechnology          |
| <input type="checkbox"/> Chemical  | <input type="checkbox"/> Construction           |
| <input type="checkbox"/> Electrical appliance  | <input type="checkbox"/> Electronic technology  |
| <input type="checkbox"/> Industrial machinery  | <input type="checkbox"/> Information technology |
| <input type="checkbox"/> Medicine/health   | <input type="checkbox"/> Optical products       |
| <input type="checkbox"/> Plastic products  | <input type="checkbox"/> Printing               |
| <input type="checkbox"/> Service industries (banking, finance, insurance, hotel, etc.) | <input type="checkbox"/> Textile and clothing   |
| <input type="checkbox"/> Toys  | <input type="checkbox"/> Watches and clocks     |
| <input type="checkbox"/> Wholesale/retail (grocery, departmental store & cosmetics)    |   |
| <input type="checkbox"/> Other, please specify: _____                                  |   |

2. What type of company do you belong to?

- |  |   |
|--|---|
| <input type="checkbox"/> Limited company     | <input type="checkbox"/> Public listed company        |
| <input type="checkbox"/> Partnership         | <input type="checkbox"/> Joint venture                |
| <input type="checkbox"/> Sole proprietorship | <input type="checkbox"/> Other, please specify: _____ |

3. What is your company's total number of employees (including full-time and part-time employees)?

- |                                       |                                       |                                  |                                  |
|---------------------------------------|---------------------------------------|----------------------------------|----------------------------------|
| <input type="checkbox"/> Less than 50 | <input type="checkbox"/> 50-99        | <input type="checkbox"/> 100-199 | <input type="checkbox"/> 200-499 |
| <input type="checkbox"/> 500-999      | <input type="checkbox"/> 1000 or more |                                  |                                  |

4. How long has your company been operating in Hong Kong?

- |  |  |                                    |
|--|--|------------------------------------|
| <input type="checkbox"/> 2 years or less | <input type="checkbox"/> 2-4 years     | <input type="checkbox"/> 5-7 years |
| <input type="checkbox"/> 8-10 years      | <input type="checkbox"/> Over 10 years |                                    |

5. What is the value of your company's material assets (in million HKD)?

- |                                       |                                      |                                |
|---------------------------------------|--------------------------------------|--------------------------------|
| <input type="checkbox"/> Less than 15 | <input type="checkbox"/> 15-29       | <input type="checkbox"/> 30-49 |
| <input type="checkbox"/> 50-99        | <input type="checkbox"/> 100 or more |                                |



6. What were your company's annual sales (in million HKD) in 2002?

- Less than 5                       5-9                       10-19  
 20-49                       50-99                       100 or more

7. What is your position in the company?

- Senior management                       Middle management  
 Front-line manager                       Front-line staff  
 Other, please specify: \_\_\_\_\_

***Part V: Further Contact Information***

1. Name/Position: \_\_\_\_\_

2. Contact number: \_\_\_\_\_

3. E-mail address: \_\_\_\_\_

4. If necessary, are you available for a personal interview?       **Yes**       **No**

5. Any suggestions/comments:

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---

~ End ~

**\*\*Thank you for your kind co-operation\*\***

**\*\* All information will be used for academic purposes only**

## APPENDIX B4 – Customer of 3PL Service Provider (Actual)

### Survey of Third Party Logistics Practices in Hong Kong

#### Questionnaire for Third Party Logistics Customers

This survey explores the actual logistics service and organizational performance of third party logistics (3PL) service providers in the Hong Kong logistics industry.

All of the information provided will be kept **CONFIDENTIAL** and used for academic purposes only. Your cooperation in the completion of the survey is highly appreciated. Thank you for your participation.

Please assess the following criteria by putting a ✓ in the box that best represents the actual practice of your service provider.

#### Part I: Service Quality

Key of scale:

7	6	5	4	3	2	1
Strongly agree	Agree	Moderately agree	Neutral	Moderately disagree	Disagree	Strongly disagree

<b>Logistics service provider:</b>	<b>7</b>	<b>6</b>	<b>5</b>	<b>4</b>	<b>3</b>	<b>2</b>	<b>1</b>
1) Has “up to date” equipment							
2) Has attractive facilities							
3) Has presentable (neatly dressed) employees							
4) Provides literature on available services							
5) Fulfills promises							
6) Expresses sincerity in problem solving							
7) Provides efficient and consistent service							
8) Is punctual with service commitments							
9) Provides error-free service (target) assistance							
10) Provides consistent punctual service							
11) Provides prompt service							
12) Expresses a consistent willingness to help							

13) Is responsive to requests							
14) Engenders corporate confidence							
15) Provides transaction security (e.g., ensures minimal loss)							
16) Is consistently courteous							
17) Displays knowledge during inquiries							
18) Provides tailor-made customer service							
19) Has convenient office hours							
20) Is perceptive of customer needs and problems							
21) Has customer's interest at heart							
22) Is understanding of specific needs							

**Part II: Organizational Performance**

Key of scale:

7	6	5	4	3	2	1
Strongly agree	Agree	Moderately agree	Neutral	Moderately disagree	Disagree	Strongly Disagree

<b>Logistics service provider:</b>	<b>7</b>	<b>6</b>	<b>5</b>	<b>4</b>	<b>3</b>	<b>2</b>	<b>1</b>
23) Minimizes service failure probabilities							
24) Provides business operational consultancy service							
25) Maximizes product replacement frequency							
26) Provides competition enhancement service							
27) Provides quality efficient service							
28) Provides a high order rate service							
29) Has efficient and reliable warehouse operations							
30) Provides efficient and reliable transportation service							
31) Maintains a high level of productivity							

<b>Logistics service provider:</b>	<b>30+</b>	<b>26-30</b>	<b>21-25</b>	<b>16-20</b>	<b>11-15</b>	<b>6-10</b>	<b>1-5</b>
32) Has a _____ % net profit margin from logistics services							
33) Has a _____ % return on investment from logistics services							
34) Has a _____ % growth of share values							
35) Has a _____ % return on net assets from logistics services							
36) Increases service value by _____ % per year to us							
37) Has a _____ % growth rate of financial position in the logistics industry							
38) Has a _____ % market share in the logistics industry							

39) Has a _____ % transaction volume in the logistics industry							
40) Has a market growth rate of _____ %							

*Key of scale:*

7	6	5	4	3	2	1
Strongly Agree	Agree	Moderately Agree	Neutral	Moderately Disagree	Disagree	Strongly Disagree

<b>Logistics service provider:</b>	<b>7</b>	<b>6</b>	<b>5</b>	<b>4</b>	<b>3</b>	<b>2</b>	<b>1</b>
41) Has a shorter cycle time than the industrial average							
42) Has a good equipment safety record							
43) Has minimal stock-out levels							
44) Has minimal back orders							
45) Provides consistent delivery service							
46) Has stock rotation control capability and record management (e.g., makes stock adjustments on-hand and re-orders)							
47) Has order acceptance and a processing system							
48) Has pick and pack operations							
49) Fulfills order commitment service							
50) Accommodates return handling							
51) Is responsive to purchase decision making							
52) Provides a good after sales service							
53) Responds efficiently and quickly to needs							
54) Provides a punctual delivery service							
55) Welcomes feedback or comments							
56) Provides a precise quantity service							
57) Provides a highly satisfactory service							
58) Responds quickly to changes							
59) Is responsive to specific requirements							
60) Is flexible and adaptable to changes							
61) Employs a value-added logistics services							
62) Provides an abnormally high value-added services							
63) Has few complaints							
64) Engenders a positive or favorable image							
65) Correlates expertise with strategic missions							
66) Is reputable within the logistics industry							
67) Has relative experience							
68) Has a good track record in customer service							

**Part III: Relationship Management**

Key of scale:

7	6	5	4	3	2	1
Strongly agree	Agree	Moderately agree	Neutral	Moderately disagree	Disagree	Strongly disagree

<b>Logistics service provider:</b>	<b>7</b>	<b>6</b>	<b>5</b>	<b>4</b>	<b>3</b>	<b>2</b>	<b>1</b>
69) Is cooperative during organizational changes							
70) Initiates inter-organizational relationships							
71) Possesses efficient managerial skills							
72) Values good working relationships							
73) Has a key representative who is accessible							
74) Has a PR representative							
75) Has a representative who deals with promotions and “gifts”							
76) Has a personable and affable customer service representative							
77) Has a key representative who socializes with customers							
78) Has an event (e.g., banquet) organizer							
79) Adheres to a principle of complete trust							
80) Is accessible during service problems							
81) Expresses confidence in customers							
82) Is attentive and makes inquiries							
83) Expresses concern for personal well-being							
84) Communicates with sincerity							
85) Displays positive social interaction							
86) Honors service commitments							
87) Provides consistent service							
88) Provides quality service							
89) Adheres to a moral social principle							
90) Has integrity							
91) Adheres to a principle of ethical service							
92) Adheres to a service principle of respect and acceptance							
93) Has a “down to earth” approach to business							
94) Demonstrates commitment							
95) Demonstrates a willingness to honor commitments							
96) Provides optimal attentiveness							
97) Demonstrates loyalty							
98) Is patient							

**Part IV: Company Profile/Background Information** Please ✓ one box below in each question:

1. What type of industry do you belong to?

- |  |   |
|--|---|
| <input type="checkbox"/> Automotive parts and components                               | <input type="checkbox"/> Biotechnology          |
| <input type="checkbox"/> Chemical  | <input type="checkbox"/> Construction           |
| <input type="checkbox"/> Electrical appliance  | <input type="checkbox"/> Electronic technology  |
| <input type="checkbox"/> Industrial machinery  | <input type="checkbox"/> Information technology |
| <input type="checkbox"/> Medicine/health   | <input type="checkbox"/> Optical products       |
| <input type="checkbox"/> Plastic products  | <input type="checkbox"/> Printing               |
| <input type="checkbox"/> Service industries (banking, finance, insurance, hotel, etc.) | <input type="checkbox"/> Textile and clothing   |
| <input type="checkbox"/> Toys  | <input type="checkbox"/> Watches and clocks     |
| <input type="checkbox"/> Wholesale/retail (grocery, departmental store and cosmetics)  |   |
| <input type="checkbox"/> Other, please specify: _____                                  |   |

2. What type of company do you belong to?

- |  |   |
|--|---|
| <input type="checkbox"/> Limited company     | <input type="checkbox"/> Public listed company        |
| <input type="checkbox"/> Partnership         | <input type="checkbox"/> Joint venture                |
| <input type="checkbox"/> Sole proprietorship | <input type="checkbox"/> Other, please specify: _____ |

3. What is your company's total number of employees (including full-time and part-time employees)?

- |                                       |                                       |                                  |                                  |
|---------------------------------------|---------------------------------------|----------------------------------|----------------------------------|
| <input type="checkbox"/> Less than 50 | <input type="checkbox"/> 50-99        | <input type="checkbox"/> 100-199 | <input type="checkbox"/> 200-499 |
| <input type="checkbox"/> 500-999      | <input type="checkbox"/> 1000 or more |                                  |                                  |

4. How long has your company been operating in Hong Kong?

- |  |  |                                    |
|--|--|------------------------------------|
| <input type="checkbox"/> 2 years or less | <input type="checkbox"/> 2-4 years     | <input type="checkbox"/> 5-7 years |
| <input type="checkbox"/> 8-10 years      | <input type="checkbox"/> Over 10 years |                                    |

5. What is the value of your company's material assets (in million HKD)?

- |                                       |                                      |                                |
|---------------------------------------|--------------------------------------|--------------------------------|
| <input type="checkbox"/> Less than 15 | <input type="checkbox"/> 15-29       | <input type="checkbox"/> 30-49 |
| <input type="checkbox"/> 50-99        | <input type="checkbox"/> 100 or more |                                |

6. What were your company's annual sales (in million HKD) in 2002?

- Less than 5                       5-9                       10-19  
 20-49                       50-99                       100 or more

7. What is your position in the company?

- Senior management                       Middle management  
 Front-line manager                       Front-line staff  
 Other, please specify: \_\_\_\_\_

***Part V: Further Contact Information***

1. Name/Position: \_\_\_\_\_

2. Contact number: \_\_\_\_\_

3. E-mail address: \_\_\_\_\_

4. If necessary, are you available for a personal interview?       **Yes**       **No**

5. Any suggestions/comments:

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~ End ~

**\*\*Thank you for your kind co-operation\*\***

**\*\* All information will be used for academic purposes only**

## **CURRICULUM VITAE**

Biographical items on the author of the thesis, Mr. YUEN Sheung Man

- 1) Born on August 6, 1977.
- 2) Received the degree of Bachelor of Science (Honors) from the Hong Kong Polytechnic University, June 2001.

February 2006