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ALLIANCE PARADOX: AN EMPIRICAL STUDY OF ALLIANCE PORTFOLIO EFFECTS ON CUSTOMER SERVICE QUALITY IN THE U.S. AIRLINE INDUSTRY

by

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ABSTRACT

This dissertation studies the potential paradoxical effects of alliance participation. Over the past two decades, alliance participation has become a popular firm strategy to obtain benefits that are difficult for a firm to obtain on its own. Yet, as firms increasingly participate in alliances, boundedly rational managers may not effectively manage all aspects of alliances to achieve intended alliance outcomes. Paradoxically, alliance participation may cause harm to the participating firms.

To unveil an alliance paradox, this dissertation first examined the relationships between alliance portfolio attributes (i.e., alliance portfolio size, multilateral alliances, alliance partner country diversity, and alliance type) and customer service quality in the U.S. airline industry. Further, I examined whether alliance experience moderates the relationships between alliance portfolio attributes and customer service quality. Altogether, five hypotheses were tested.

This dissertation relied exclusively on the longitudinal quarterly data of nine U.S. major airlines over a 20-year period between 1988 and 2007 that include Alaska Airlines, American Airlines, America West, Continental, Delta, Northwest, Southwest, United Airlines, and U.S. Airways. Data pertaining to alliance variables were collected from the Securities Data Company (SDC) database. Quarterly service quality data pertaining to customer complaint, mishandled baggage, on-time arrival, and involuntary denied boarding were collected from the Air Travel Consumer Report published by the U.S. Department of Transportation (DOT). To detect the temporal effects of alliance portfolio attributes on service quality, a three-month lag was created between the alliances data and the service

quality data.

The results show that although the relationship between alliance portfolio attributes and service quality seems to be more complex than initially proposed, the overall finding confirms the existence of an alliance paradox in that increases in alliance portfolio size, partner country diversity and channel-dominated alliances (versus backward competitor-dominated alliances) are associated with decreases in certain key dimensions of service quality.

This dissertation seeks to make several important contributions. First, by exploring the alliance paradox, this dissertation attempts to demonstrate that despite the anticipated alliance benefits such as cost reduction or revenue enhancement, managers need to be aware of the cost of alliance participation with respect to customer service quality, which has paramount impact on firm performance. Second, this dissertation also contributes to services marketing literature by investigating alliance portfolio attributes as antecedents of service quality. Third, this dissertation investigates whether firm-level alliance experience moderates the relationship between alliance portfolio attributes and service quality.

I dedicate this dissertation to my wife Jun with love

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My life journey has proven that I am a blessed and lucky person. Working under the guidance of Dr. Bruce Barringer is a true testament of my blessing and luck. Without his invaluable insights, frequent encouragements and extraordinary patience, this dissertation would have never been completed.

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Last but not the least, to my aunt Yixuan Gao, my parents, my wife Jun, my son Zane and daughter Jane, thanks for defining my life this way.

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

CHAPTER ONE: INTRODUCTION

One of the most important strategic decisions that managers often have to make is: what is the most effective form of organizing certain activities? Managers typically have three broad organizational forms to choose from: market, hierarchy, and alliances. Market refers to transactional exchanges that occur in the arm's length spot market. Hierarchy occurs when a firm integrates activities into its own organizational boundary, either through internal development, or mergers and acquisitions. Alliances, defined as voluntary ongoing interfirm agreements (Ireland, Hitt, & Vaidyanath, 2002), are an intermediate organizational form between market and hierarchy.

Early inquiries of appropriate organizational forms focused primarily on the dichotomous choice of market versus hierarchy. As early as 1937, in his classic essay entitled "the nature of the firm," Ronald Coase, a Nobel laureate economist, brought up a puzzle: "[I]f markets are so effective, then why do firms ever exist? And, if firms exist because they are in fact better than market at allocating resources, then why is the economy not organized into a single huge firm?" (Silverman, 2002, p. 468). Coase argues that the choice of market versus hierarchy is determined by transaction costs.

Drawing on Coase' work, Oliver Williamson (1979) developed Transaction Cost Economics (TCE) theory. Premised on the assumptions of bounded rationality and behavioral opportunism, TCE postulates that the three specific characteristics of a transaction — uncertainty, frequency, and asset-specificity — affect managers' choice of organizational form. For instance, when exchange hazards are low (i.e., low uncertainty, low frequency and/or low asset specificity), market exchange is the appropriate form of

1

organization because it involves lowest transaction costs. In contrast, when exchange

hazards are high, hierarchy is the appropriate form of organization because the associated

transaction costs are lowest.

Over the past two decades, alliance participation has become an attractive

organizational strategy to enhance firm performance. It is evidenced by the explosive

growth of alliance formations. Das and Teng (1999) noted that alliance formation has

been increasing at the rate of 25% every year since 1985. Anand and Khanna (2000)

reported that approximately 20,000 alliances were formed worldwide within two years in

the late 1990s. This enthusiasm for alliances stems from the benefits that are difficult for

firms to obtain on their own. Some of the benefits include market entry, cost reductions,

and increased market competitiveness (Barringer & Harrison, 2000).

Consider the alliance formed between America West and Continental in 1995.

This alliance allowed both airlines to code share. Code sharing is defined as "a

commercial agreement between two [or more] airlines under which an airline operating a

service allows another airline to offer that service to the traveling public under its own

flight designator, even though it does not operate the service" (Rhoades & Lush, 1997, p.

109). Participating in code sharing alliances enabled both airlines to increase revenues

through expanded market scope, enhance passenger benefits, and reduce costs through

sharing airport facilities. First, this alliance allowed both airlines to increase revenue

through market expansion. Under the code sharing agreement, America West sold a

Continental flight under America West's name (i.e., designator code) as if America West

operated that flight, and vice versa. Both airlines accessed a broader market without

operating their own aircrafts in the extended market. Often cited as an alliance success

2

model, this alliance was said to generate approximately $40 million for Continental and $30 million for America West in revenues each year (McCartney, 1998).

Second, the America West-Continental alliance also enhanced both airlines' revenues because of their enhanced customer benefits, making other airlines competing on the same routes unpopular. The America West-Continental alliance provided at least two important benefits to their customers. First, by taking the allied flights, passengers could have a seamless travel experience, i.e., reaching more destinations with one ticket and without the trouble of re-checking baggage at connections. Second, passengers obtained enhanced frequent flier program benefits by flying the allied routes. America West's frequent fliers could earn miles on Continental's routes (e.g., Europe), where America West did not fly to on its own. As a result, Southwest lost its customers to the America West-Continental alliance and had to reduce its capacity between Phoenix (the base of America West) and Houston (the base of Continental) by 10% in 1996 and 1997 (McCartney, 1998).

Third, this alliance reduced both airlines' costs through sharing activities. Facility sharing is a very common practice of airline alliances because economies of scale can be obtained by sharing economic activities to reduce the production costs per unit. Airline alliances often reduce costs through airport facility sharing, joint advertising and promotion, and joint purchase of products and services. For example, Star alliance (a large airline alliance) began sharing electronic ticketing services among its 15 airline members in 2005. This service eliminated unnecessary operating procedures between airline alliance partners and reduced ticketing costs up to $7 per ticket (Kleymann & Seristö, 2004). Given the benefits of cost reduction, America West and Continental also

shared their activities, such as joint ticketing and baggage handling at many airports.

Alliance participation seems to be an excellent strategy to enhance firm performance. Yet, alliance management is difficult and time consuming (White & Lui, 2005; Ireland et al., 2002) because providing "seamless" travel services requires "seamless" coordination and cooperation between alliance partners. On one hand, alliance partners are independent entities after alliance formation in that there is no hierarchical authority involved between partners and each partner retains its own organizational autonomy. On the other hand, partners are also interdependent because each partner's cooperation is needed to accomplish the alliance tasks (Inkpen, 2001). This interplay of independence and interdependence demands substantial organizational flexibility, managerial time and effort to manage alliances. However, since managers are only boundedly rational (March & Simon, 1958), they are limited in their available time and effort. Despite their best effort, as the alliance activities become more complex, boundedly rational managers may fail to effectively manage alliances.

The America West-Continental alliance backfired because the complexity involved in managing the interdependent alliance tasks performed by independent airlines led to a tremendous drop in service quality (McCartney, 1998). This alliance was intended to provide "seamless" travel experience for passengers so that customers did not need to re-check baggage at connections and could use one ticket to travel on partners' flight; unfortunately, the expected "seamless" travel experience turned out to be a "bumpy" ride for several reasons. First, airlines are inherently hierarchical organizations with many system constraints and are not structurally flexible enough to change. Gregory Brenneman, Continental's president and chief operating officer, said, "It's hard to go out

and change your system and move employees around that's what creates heartburn and slows implementation down"(McCartney, 1998, p.B.1). Due to the limited availability of gates at each concourse at Phoenix airport, it took quite a while for Continental and America West to be able to operate from the same concourse at that airport. Also, When America West sold tickets to Hawaii on Continental, the two airlines could not operate from the same gate in the same terminal at Los Angeles International Airport. Such structural constraints created enormous confusion at the airports. Passengers checked in at one concourse, but later found that their flight departed from a different concourse on a different airline. Their baggage was handled by a different airline without their prior knowledge, or even worse, their baggage was lost.

Second, the required interfirm coordination may further tax the efforts and limited available time of the already busy airline managers because simply putting each other's flight numbers on their own flights did not mean that their computer systems would readily coordinate. Third, unlike R & D alliances in high-tech industries, airline alliances are unique in that they involve the entire organization to jointly produce the service experience, rather than just one group of employees. Regrettably, there is a general lack of cooperation by the employees at both airlines. In Houston, Continental ground workers often gave their flights preferential treatment over those of America West. In return, America West's treated Continental's flight with similar attitude in Phoenix. Consequently, the number of flight delays, late arrivals, flight cancellations and consumer complaints of both airlines soared (McCartney, 1998). Despite the financial benefits to both airlines and potential customer benefits, the alliance was terminated because the alliance benefits did not outweigh the problems incurred.

This America West-Continental alliance failure indicates the potential existence of a strategy paradox surrounding the relationships between alliance participation and customer service quality. Strategy paradox occurs when "the same behaviors and characteristics that maximize a firm's probability of notable success also maximize its probability of total failure" (Raynor, 2007, p. 2). Lewis (2000) stated that "paradox denotes contradictory yet interrelated elements—elements that seem logical in isolation, but absurd and irrational when appearing simultaneously" (p. 760).

An example of a strategy paradox is the 3M's efficiency-innovation paradox. In 2000 when Mr. James McNerne, the former GE executive, took over 3M's helm as its CEO, he immediately adopted GE's Six Sigma model to reduce costs and improve efficiency at 3M. Shortly after the implementation of the efficiency oriented Six Sigma, 3M's operating costs were considerably reduced, profits increased, and even the stock market price rose. However, some unintended effect happened—the product innovations miserably suffered because Six Sigma slashed investments in R & D programs and changed its innovative culture. Before the implementation of Six Sigma, one third of 3M's sales came from new products released in the past five years. A few years after Six Sigma was adopted, this ratio dropped to one-quarter. The board and managers were worried about the negative impact of Six Sigma on 3M's innovation-oriented organizational culture. Mr. George Buckley, 3M's new CEO, said

> [I]nvention is by its very nature a disorderly process…You can't put a Six Sigma process into that area and say, well, I'm getting behind on invention, so I'm going to schedule myself for three good ideas on Wednesday and two on Friday. That's not how creativity works. (Hindo, 2007, p.9)

Recently, 3M reinvigorated its innovative culture by reversing course the application of Six Sigma.

This efficiency-innovation paradox at 3M is analogous to the alliance paradox investigated in this dissertation in that expecting the various alliance benefits, managers are increasingly using alliances to improve organizational performance. Paradoxically, by doing the things that are logical and rational in isolation, managers may unwittingly set themselves up for other unintended or disappointing organizational outcomes. It is of paramount importance to study strategy paradoxes to help both researchers and practitioners to understand the complexity of multifaceted alliance participation decisions.

Focus, Research Questions and Research Methodology

The purpose of this dissertation is to unveil the paradoxical effects of alliance participation. As opposed to the general notion that alliance participation increases firm performance, this dissertation studies the downsides of alliance participation by examining the relationship between alliance portfolio attributes and service quality in the U.S. airline industry. In his recent book entitled "Strategy Paradox," Raynor (2007, p. 3) stated that "the reason most business research misses the strategy paradox is that few studies ever examine failure." Even though alliance research has investigated alliance failure (see Arino & de la Torre, 1998; Parkhe, 1993), those studies have focused exclusively on the direct effects of alliance failure on the participating firms. Instead, this study focuses on the detrimental effects of alliance failures on customers.

7

Customers are an important but most ignored stakeholder in organizational research. Peter Drucker (1974) stated that the ultimate goal of any organization is to create a customer. Unfortunately, Brief (2003, p. 187) stated that "a piece is missing that should receive significant attention by management and organization researchers: the consumer." Recently, scholars noted the importance of bringing customers into management research in that neglecting the customer is incomplete for assessing competitive asymmetries (DeSarbo, Grewal, & Wind, 2006), understanding the value creation process (Priem, 2007) and in identifying sources of sustainable competitive advantages (Adner & Zemsky, 2006). Srivastava, Fahey and Christensen (2001) suggested that creating and sustaining customer value lead to sustainable competitive advantage. Given the importance of customers, the fact that alliance research has paid little attention to customers leaves an important gap in the alliance research. Even in marketing literature where customers are a central research topic, scholars have lamented that the empirical research examining the alliance effects on customers is "scant at best" (Rindfleish & Moorman, 2003).

Shifting attention to the customers, this dissertation studies the paradoxical effects of alliance portfolio attributes on service quality in the U.S. airline industry. An alliance portfolio refers to all the existing alliances a firm simultaneously manages (Hoffmann, 2007). Since organizations are increasingly embedded in a collection of alliances, it is important to understand how a firm can effectively structure its alliance portfolio. Even though research on individual alliance management still warrants further investigation, research on alliance portfolio management will enhance our understanding of the complexity in simultaneously managing a bundle of alliances (Gulati, 1998), because the

effects of alliance participation on firm performance depend more on the firm's capability in managing its portfolio of alliances than its success or failure in managing one or two alliances (Hoffmann, 2007).

Service quality, the dependent variable in this study, is the "single most researched area in services marketing to date" (Brown, Fisk, & Bitner, 1994, p. 33). Extensive marketing studies suggest that service quality is positively related to customers' behavioral intentions (see Cronin, Brady & Hult, 2000; Olorunniwo, Hsu & Udo, 2006; Sanchez, Abad, Carrillo & Fernandez, 2007; Zeithaml, Berry, & Parasuraman, 1996). As a result, provision of quality services improves the financial performance of firms (see Aaker & Jacobson, 1994; Anderson & Zeithaml, 1984; Rust, Inman, Jia, & Zahorik, 1999; Rust, Moorman & Dickson, 2002).

In the context of this study, provision of quality services is particularly important in the U.S. airline industry because inferior services may receive not only negative customer responses, but also government punishments. The U.S. Department of Transportation (DOT) collects information of important service quality dimensions and publishes airline service quality reports on a monthly basis. In an interview, disappointed by a drop in airline service quality (e.g., increased flight delays and baggage losses), John Mica, the chairman of the House Aviation Subcommittee, said "they [the airlines] can do better and must do better, and if they don't do better, Congress has authority to wield a big stick" (McCartney, 2006, p. D.5). He even suggested that passengers sue the airlines if the airlines did not live up to their customer service commitment (McCartney, 2006).

The U.S. airline industry provides a natural setting for this study for several important reasons. First, airlines have enthusiastically sought an impressive number of

9

and different forms of alliances, which differ greatly along the value chain, such as alliances with hotels, car rental companies and other airlines. This variety of airline alliances makes possible the empirical testing of the variables of interest. Second, the U.S. airline industry provides rich archival longitudinal data sources that make this study possible. Third, since the major U.S. airlines are at least dominant-business firms (Rumelt, 1974), the confounding effects of diversified corporate effects on the customer service quality are less likely to be a concern because an airline's revenues come primarily from the passenger transportation business (Chen & Hambrick, 1995).

This research builds on the premise that effective alliance management requires a great deal of time commitment and effort by managers to manage alliances in selecting appropriate partners, adapting to, monitoring, coordinating, and controlling the alliance activities. But boundedly rational managers are constrained by their limited time and efforts (March & Simon, 1958), as alliance management complexities rise, the managers' capability in effectively managing alliances to provide quality services may decrease.

Most of the research on alliance management capability investigates whether some firms are more capable of managing alliances than others and what factors contribute to such variances in alliance management capability. Researchers have found that alliance management capability is a path dependent capability and that firms may learn to effectively manage alliances from their previous alliance experience (Rothaermel & Deeds, 2006). In particular, in the context of the U.S. airline industry, managers may benefit from their previous alliance experience. For example, Continental expected that its upcoming alliance with Northwest would be smooth because of the learning from its previous alliance experience with America West. In an interview about Continental's

upcoming alliance formation with Northwest, Mr. Gregory Brenneman, the Continental's president and chief operating officer, said "when we started with America West, we were earning our bachelor's degrees…Today, we have our Ph.D.s" (McCartney, 1998, p. B.1).

A conceptual model is presented in Figure 1 to first examine the main effects of the four portfolio attributes on service quality: alliance portfolio size, multilateral alliances, alliance partner country diversity, and alliance type. These alliance portfolio attributes are selected to answer four important questions: (1) does a firm's alliance portfolio size affect its service quality? (2) does the proportion of multilateral alliances in a firm's alliance portfolio affect its service quality? (3) does a firm's partner country diversity of its alliance portfolio affect its service quality? and (4) do different types of alliances in a firm's alliance portfolio affect its service quality? Drawing on the bounded rationality argument, these four attributes (i.e., alliance portfolio size, multilateral alliances, partner country diversity, and alliance type) are proposed as complicating factors that require more of the managers' time and effort. Hence, these four attributes are hypothesized to be negatively related to customer service quality.

Further, drawing on the recent research on alliance management capability (Hoang & Rothaermel, 2005; Rothaermel & Deeds, 2006), I examine whether firms with more alliance experience are more effective in managing alliances to provide quality services. Hence, firm-level alliance experience is included in the model as a moderator and is proposed to alleviate the negative effects of alliance portfolio size and multilateral alliances on service quality.

11
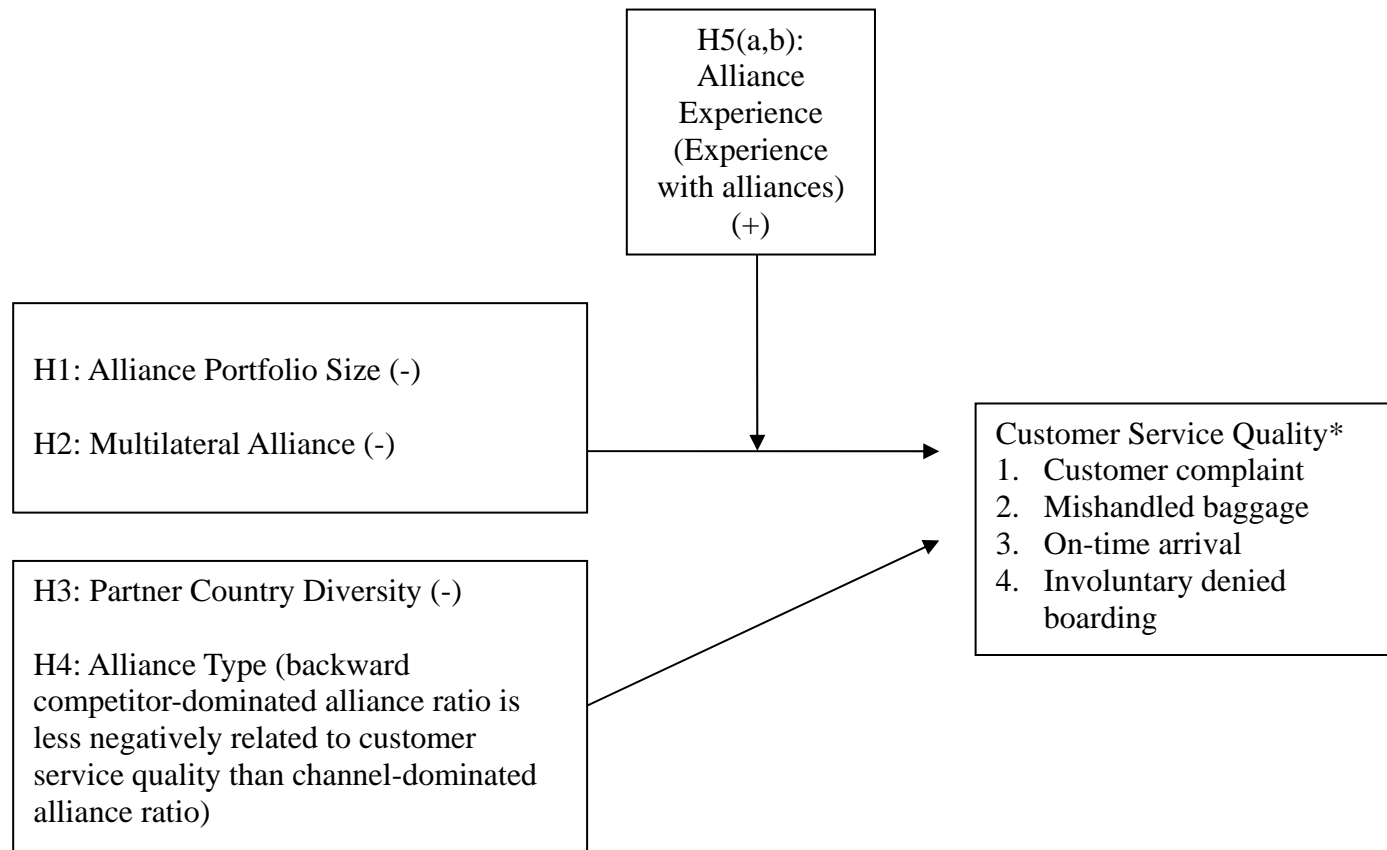
**Figure 1: Conceptual Model of Alliance Portfolio Effects
on Service Quality**

*Each dimension is tested independently

This dissertation relied on a sample of nine U.S. major airlines, using longitudinal data over a 20-year period between 1988 and 2007. The alliance data were collected from Securities Data Company (SDC) database. To test the temporal effects of alliance formation on service quality, the service quality data were collected with a three-month lag after the alliance data from reports published by the U.S. Department of Transportation (DOT).

Expected Contributions

This dissertation seeks to make three important contributions. First, this dissertation contributes to alliance research by exploring the potential dark side of alliance participation. In general, the preponderance of alliance research suggests that alliance participation, on average, creates value to the participating firms. Expecting the benefits that are difficult to obtain on their own, firms have enthusiastically sought alliances to enhance firm performance over the past two decades. Both in academic research and popular press, the general notion that alliance participation benefits participating firms is well received. Yet, managing interdependent alliance activities performed by independent firms to produce and deliver products/services creates substantial alliance management complexity. Since managers are limited in their available time and effort, as the alliance tasks become more complex, boundedly rational managers may fail to effectively manage alliances and end up with disappointing consequences on firm performance. This dissertation attempts to demonstrate that despite the potential alliance benefits, as the alliance task scope, alliance task depth and partner diversity increase in a firm's alliance portfolio, the resultant alliance management complexity may overtax the managerial time

and effort, thus causing harm to firm performance. In unveiling this potential alliance paradox, this dissertation may inform practicing managers of the unintended alliance effects on customer service quality, which is a very important organizational performance outcome. Thus, when managers make alliance participation decisions, they should also consider the service quality issues.

Second, this dissertation also contributes to services marketing literature by investigating alliance portfolio attributes as antecedents to service quality. To the best of my knowledge, this is the first empirical study to date that investigates the alliance portfolio effects on service quality. While the services and marketing research has studied the antecedents of customer service quality mostly at consumer level, employee level, and firm level and primarily relied on survey data, this dissertation uses longitudinal archival data to extend service literature by investigating the effects of alliance portfolio attributes.

Third, I intend to show that firms learn from their prior alliance experience to reduce alliance management complexity, thus alleviating the negative impacts of alliance management complexity on service quality. Previous alliance management capability research suggests that alliance experience improves alliance performance (Hoang & Rothaermel, 2005). However, little is known about whether alliance experience matters in term of customer service quality. This dissertation also intends to fill this knowledge gap.

Organization of the Dissertation

The following section describes the organization of this dissertation and provides a summary of each chapter.

Chapter one: Introduction

The overall objective of chapter 1 is to provide an overview of this dissertation. This chapter first discusses the potential paradoxical effects of alliance participation on service quality. Then, it provides a brief introduction of the research focus, research questions and research methodology. The conceptual model is presented in Figure 1. Potential contributions are also discussed.

Chapter two: Literature review

By reviewing pertinent literature, the primary objectives of this chapter are to provide a foundation for the subsequent hypotheses development and research methodology, and to discuss the nature of the airline alliance paradox. This chapter consists of four sections, which are (1) a brief literature review of alliance literature, (2) a brief literature review of service quality, (3) a discussion of the airline alliance paradox, and (4) a chapter summary.

The first section reviews alliance research on alliance formation, alliance performance, and alliance management. The alliance formation review briefly addresses the question of why firms participate in alliances. The alliance performance review investigates the extent to which alliance literature has studied outcome variables related to customer services. The alliance management review focuses on the topics related to alliance management complexity and alliance experience.

The service quality review section first illustrates why studying service quality is important. Then, it identifies two knowledge gaps that this dissertation intends to fill. The

first knowledge gap pertains to data and management in that the majority of extant service quality research has relied primarily on the perceptual measures, using survey data, while little research has used longitudinal archival data. The second knowledge gap pertains to the lack of research on the alliance effects on service quality.

The third section focuses on airline alliance paradox. It first discusses the definition of paradoxes, the importance of studying paradoxes, and then discusses the nature of the airline alliance paradox studied in this study. At the end of the chapter, a short summary is presented.

Chapter three: Research hypotheses

This chapter provides detailed discussions of each hypothesized relationship. The main effects of four alliance portfolio attributes (i.e., alliance portfolio size, alliance type, multilateral alliances, and alliance partner country diversity) are first hypothesized. Then, firms with more general alliance experience are hypothesized to have higher capability in managing alliances. Altogether, five hypotheses are proposed.

Chapter four: Research method

Chapter 4 consists of two sections: data collection and hypotheses testing. The first section describes the detailed procedure of data collection and measurement and coding of the dependent variable, independent variables, moderating variable, and control variables. In the second section, specific statistical procedures to test the hypotheses and test results are presented.

<u>Chapter five: Discussion</u>

This chapter is divided into four sections. First, it provides a discussion of results reported in chapter 4. The second section discusses the limitations of this dissertation and implications for future research. The third section discusses the implications for managers. The last section provides the conclusion of this dissertation.

CHAPTER TWO: LITERATURE REVIEW

By reviewing the pertinent literature, the purposes of this chapter are to justify the need to unveil the alliance paradox, provide theoretical foundations for advancing hypotheses presented in Figure 1, and provide rationale for the methodology employed in this dissertation (i.e., use of longitudinal archival data). The literature review is organized into four sections: alliance, service quality, airline alliance paradox and a summary.

The review of alliance literature revolves around three questions. The first question is concerned with, why do firms form alliances? To answer this question, the dominant theoretical frameworks and the relevant empirical studies are briefly reviewed. The second question focuses on the extent to which the alliance literature has studied the relationships between alliance participation and service quality. The third question asks, how can firms effectively manage alliances? To answer this question, the alliance literature pertaining to alliance management challenges and alliance experience is reviewed.

The review of service quality literature discusses the importance of service quality, and identifies the knowledge gaps pertaining to data and measurement of service quality and the antecedents of service quality. This review of service quality literature intends to (1) justify the approach of measuring customer service quality used in this dissertation and explain the advantages of using longitudinal archival data; and (2) suggest that little service quality research has investigated the alliance variables as antecedents of service quality.

The third section of this literature review is concerned with airline alliance

paradox. This section first defines paradoxes, discusses the importance of studying

paradoxes, and then discusses the nature of the airline alliance paradox. At the end of the

chapter, a chapter summary is provided.

A Brief Review of Alliance Literature

For clarity, definitions of alliances, multilateral alliances, alliance networks and

alliance portfolios are warranted, because these terms are closely related but distinct

constructs. Alliances refer to "cooperative arrangements between two or more firms to

improve their competitive position and performance by sharing resources" (Ireland, Hitt

& Vaidyanath, 2002, p. 413). Alliances encompass a broad range of interfirm

collaborations such as joint ventures, licensing agreements, research and development

projects, joint purchasing, and manufacturing activities (Barringer & Harrison, 2000;

Ring & Van de Ven, 1994).

An alliance can be further classified as a bilateral or a multilateral alliance based

on the number of partners involved in an alliance. A bilateral alliance is characterized

with dyadic interfirm collaborations between two partners. In contrast, a multilateral

alliance involves at least three alliance partners. Some scholars also use multiparty

alliances (Zeng & Chen, 2003), multifirm alliances (Hwang & Burgers, 1997), and

alliance constellations (Das & Teng, 2002; Lazzarini, 2007) to refer to multilateral

alliances. This distinction between bilateral and multilateral alliances is important,

because bilateral and multilateral alliances differ substantially with respect to alliance

management complexities such as governance complexity, coordination costs, transaction

uncertainty, degree of opportunism, and payoff structures (Hwang & Burgers, 1997; Das

& Teng, 2002; Zeng & Chen, 2003).

Recently, academic attention has shifted from single alliance management to alliance portfolio management. Hoffman (2007) argued that the effects of a firm's alliance strategy do not simply depend on the success or failure of managing one or two alliances but on the success of failure of its bundle of alliances. While both bilateral and multilateral alliances describe single alliances, scholars use 'alliance network' and 'alliance portfolio' to describe multiple alliances. An alliance network is a set of alliances connected by a focal firm (Jarrilo, 1988). Since network ties and tie strengths are not the focus of this dissertation, I use 'alliance portfolio,' which is similar to the concept of egocentric alliance network, to refer to all the existing alliances the focal firm has (Hoffman, 2007).

The next section briefly reviews the literature on alliance formation. Since there are several excellent comprehensive literature reviews on alliance formation (for reviews, see Barringer & Harrison, 2000; Inkpen, 2001; Ireland, Hitt, & Vaidyanath, 2002), a brief review is given on how the dominant organizational theories—transaction cost economics, resource dependence theory, institutional theory, resource based view, learning theory, and strategic behavior—relate to alliance formation.

Alliance formation

Few managerial decisions are as important as the choices of appropriate organizational forms. That is, where certain organizational activities should be carried out: whether an activity should be (1) performed in the arm's length market exchange (i.e., market); (2) internalized within organizational boundary through internal development, or

through merger and acquisition (i.e., hierarchy); or (3) jointly performed through alliances. Hierarchy uses authority to create and coordinate the organizational activities. Market suggests that activities are performed and coordinated between the supplier and buyers by the price mechanism (Adler, 2001). Alliances are an intermediate organizational form between hierarchy and market such that firms are independent entities after alliance formation thus activities are not coordinated through internal authority; and also firms are interdependent on each other to perform the activities which price mechanisms are not sufficient to coordinate.

In the past two decades, alliances, the intermediate form of organization, have become increasingly popular. In the following section, the alliance literature on the determinants of alliance formation is presented.

Transaction cost economics

Based on Coase's work, Oliver Williamson (1979, 1985) developed transaction cost economics (TCE) into "one of the most prominent and influential developments in the social sciences" (David & Han, 2004, p. 39). Predicated on the assumptions of behavioral opportunism and bounded rationality, TCE postulates that the exchange hazards arising from transaction costs–asset specificity, uncertainty, and frequency—determine the choice of organizational form among market, hierarchy, and hybrid (e.g., alliances). High asset specificity of a transaction occurs when the assets in a transaction are valued much lower if they are redeployed outside the transaction relationship. The level of environmental uncertainty is positively related to performance hazards. Frequent transactions require high monitoring costs. TCE predicts, for example,

that transactions with low asset specificity should be performed in market, transactions with intermediate asset specificity in hybrid form (e.g., alliances), and transactions with high asset specificity in hierarchy (David & Han, 2004).

Agency theory

Due to the separation of ownership and control between the managers and shareholders, agency theory seeks to explain why managers' choices of organizational forms arise from agency problems (Jensen & Meckling, 1976). Agency problems arise from information asymmetry, monitoring problems and moral hazard (Eisenhardt, 1989). Information asymmetry occurs when the managers have more information than others. Monitoring problems refer to the difficulties in observing and evaluating the managers' performance. Moral hazards occur when the goals of self-interested managers and their level of risk taking propensity differ from those of shareholders. Scholars have used agency perspectives to investigate how agency problems influence the managerial decisions in participating in alliances. For example, Reuer and Ragozzino (2006) investigated whether the composition of a firm's alliance portfolio can be explained by agency variables. On a sample of over 300 U.S. manufacturing firms, they found support for their agency prediction such that when the internal officers and directors own lower level of the focal firm's equity, the alliance portfolio tends to be more extensive.

Resource based view

In contrast to TCE, which focuses on transaction cost minimization, resource based view explains alliance formations are motivated by profit maximization (Colombo,

2003; Das & Teng, 2000; Lavie, 2006). According to resource based view, when a firm possesses valuable, rare, difficult-to-imitable, and non-substitutable resources and capabilities, it is expected to obtain sustainable competitive advantage (Barney, 1991). Alliance participation allows firms to "locate the optimal resource configuration in which the value of their resources is maximized relative to other possible combinations" (Ireland et al., 2002, p. 427). To configure optimal resources, research has examined whether alliance formation decisions are influenced by the resource stocks and capabilities of both the focal firm and of its potential partners (Stuart, 2000). For example, Eisenhardt and Schoonhoven (1996) found that the more industry employers the top managers have in the past, the more alliances the top managers' current firm has. Hitt et al. (2000) found that in emerging economies, firms tend to form alliances with firms that possessed more financial assets and higher technological capabilities.

Learning theory

Learning has become a popular organizational theory to explain firm behaviors (Cohen & Levinthal, 1990; March, 1991). Interfirm learning is another important rationale for alliance formation. Interfirm learning refers to "any addition to a firm's set of capabilities obtained through interaction with alliance partners" (Colombo, 2003, p. 1212). For example, Rothaermel and Deeds (2004) found that on a sample of 325 biotechnology firms, firms explore learning opportunities in new product development stage by forming R & D alliances, but sought exploitation alliances (e.g., clinical trials) to further learn about market development.

<u>Resource dependence theory</u>

From a sociological, open system perspective, resource dependence theory posits that firms form alliances to manage their dependencies on the external resources (Pfeffer & Salancik,1978). Firms are in constant exchange of resources with the external environment to support their operations. During such resource exchanges, power imbalances occur due to the differences in the level of resource dependences among the parties. Alliance participation provides opportunities to increase a focal firm's power in its exchange with the external environment by increasing other firms' dependence on the focal firm, and decreasing its own dependence on other firms. For example, Gulati and Gargiulo (1999) found that as the level of resource interdependence between firms grew, the possibility of alliances formation increased.

<u>Institutional theory</u>

Also rooted in sociology, different from economic explanations of alliance formation (e.g., TCE, agency theory), institutional theory focuses on the effects of institutional environments on firm behaviors. DiMaggio and Powell (1983) argued that the three pillars of institutions—normative structures, cognitive structures, and regulative structures—shape and constrain managers' choices of organizational forms. In other words, managers are constrained by the institutional environment to conform to the standard norms, because conformance provides legitimacy benefits that have beneficial effects on firm performance. From this perspective, research has examined the extent to which alliance formations are influenced by institutional factors. For example, Baum and Oliver (1991) found that on a sample of 1,028 Canadian childcare services, the childcare

services that formed partnerships with well-established community institutions had higher survival rates.

Strategic choice

This perspective grew out of Michael Porter's (1980; 1985) microeconomic industrial organization (I/O) arguments that the industry structures affect firm behaviors that result in the variances of firm performance (i.e., SCP). Drawing on these arguments, alliance research has studied whether alliance formations are determined by industry variables (such as interfirm competition). For example, Eisenhardt and Schoonhoven (1996) reported that the number of competitors in an industry is positively associated with alliance formation rate because of the needs to deal with the squeezed resources, stressed profits, and threatened survival. Silverman and Baum (2002) found that in Canadian biotechnology industry, firms form alliances to foreclose their alliance opportunities. In global airline industry, Gimeno (2004) found that a focal firm's alliance formation was influenced by its rivals' alliance formation patterns.

In sum, this section of alliance formation review intends to investigate what factors drive firms to participate in alliances. This review suggests that expecting potential alliance benefits, firms participate in alliances under various circumstances. The potential alliance benefits as indicated by these dominant alliance theories include cost minimization from TCE theory, resource leverage and profit maximization from resource based view, interfirm power enhancement from resource dependence perspective, organizational legitimacy from institutional theory, interfirm learning from learning perspective, strategic positioning benefits from strategic choice perspective. However,

agency theory suggests that managers may choose to participate in alliances to minimize their own employment risks and/or optimize their own compensation benefits rather than the benefits to their shareholders.

Alliance performance

The purpose of this section is to investigate the extent to which the alliance effects on customers have been examined in alliance research. Several approaches have been used to measure the effects of alliance participation. Both subjective measures (e.g., partner satisfaction) and objective measures (e.g., financial performance, alliance survival) are used in assessing alliance performance (Geringer & Herbert,1991). In general, there are three broad categories of alliance performance measures: (1) financial performance measures, (2) alliance relationship measures, and (3) strategic performance measures. Next, I review the effects of alliance participation assessed by these different measures.

Table 1: Selected Research on Alliance Formation

Authors	Major Theory	Major Findings
Ahuja (2000)	Resource based view	A firm's technical, commercial, social capital and the number of important inventions affect its the number of alliances formations.
Chung, Singh, and Lee (2000)	Resource based view	Firms with complementary resources and similar status are more likely to form alliances.
Colombo (2003)	Transaction cost and learning theory	When partners are technologically diverse, firms tend to use equity alliances to guard against partners' opportunism.
Eisenhardt and Schoonhoven (1996)	Resource based view	Alliance formation is more likely in emergent-stage markets than growth-stage markets and in markets with highly innovative strategies. The rate of alliance formation is affected by the TMT's size and previous industry exposure, and the level of previous positions held by TMT members.
Gimeno (2004)	Strategic behavior	A focal firm's alliance formation is influenced by its rivals' alliance formation decisions.
Glaister and Buckley (1998)	Transaction cost and resource dependence	Alliance formations are determined by partner size, geographical location of the alliance and the industry of the alliance.
Gulati (1995)	Transaction cost	Alliances are more likely to be equity based if they have a shared R & D component and if they are between firms from different nations. The greater the number of previous alliance, and particularly equity alliances, between the partners, the less likely the alliance is to be equity based.

Authors	Major Theory	Major Findings
Gulati and Gargigulo (1999)	Resource dependence theory	As the level of resource interdependence between firms grows, the possibility of alliance formation increases.
Hitt, Dacin, Levitas, Arregle, and Borza (2000)	Resource based view	When forming alliances, managers from emerging market emphasize partners' financial assets, technological capabilities, intangible assets and willingness to share expertise than managers from developed market.
Oxley and Sampson (2004)	Transaction cost	When forming alliance with a competitor, rather than abandoning potential gains from cooperation altogether in these circumstances, partners choose to limit the scope of alliance activities.
Poppo and Zenger (1998)	Transaction cost and learning	Integration of transaction cost and learning variables offer higher predictive power of alliance formation.
Reuer and Ragozzino (2006)	Agency theory	When internal officers and directors own lower level of the focal firm's equity, its alliance portfolio tends to be more extensive.
Shenkar and Li (1999)	Learning theory	When seeking foreign partners, local firms are likely to seek transfer of tacit or embedded knowledge via equity joint ventures than via contractual ventures.
Villalonga and McGahan (2005)	Transaction cost, learning, resource based view, and agency theory	A firm with rich technological resources is not more inclined to pursue acquisitions over alliances. The marketing resources of both the focal and target firms are either irrelevant for boundary choices or favor the choice of divestitures over alliances.

Financial performance measures

Does alliance participation affect the financial performance of firms? Financial ratios have been used to examine whether alliance participation creates superior economic value to the participating firms. Some commonly used financial ratios include sales revenue (Luo, 2002), return on investment (Luo), market valuation at IPO (DeCarolis & Deeds, 1999), market share (Dussauge, Garrette & Mitchell, 2004), return on sales, return on assets, and return on capital (Goerzen & Beamish, 2005).

The empirical findings suggest that alliance participation has significant impacts on the firms' financial performance. For example, Anand and Khanna (2000) found that when allying with producers and suppliers, small- and medium-sized firms increased their return on assets and market share. Gulati and Higgins (2003) investigated how the different types of alliances of new firms affect initial public offering (IPO). They found that ties to the prominent venture capital firms were particularly positively associated with IPO success. Goerzen and Beamish (2005) found that as alliance networks became diverse, the focal firms' return on sales, return on assets, and return on capital decreased. Dussauge, Garrette, and Mitchell (2004) examined how allying with rivals affects the market share of the partner firms. They found that the market share of the rival partners changes more than that of non-rival partners.

There are two major limitations of using financial ratios to measure alliance performance. First, firms may enter into alliances for other reasons than financial performances such as legitimacy and interfirm learning. For example, some firms may form an alliance to learn the technological knowhow from partners. Arino (2003) argued

that financial performance measures are relevant only when the alliance partners set explicit financial goals. Second, not all released accounting ratios are accurate or reflective of the actual financial effects of alliances because the differences in accounting standards and procedures in different countries confound the findings.

Alliance relationship measures

Despite the explosive growth of alliances, it is documented that over 50% of alliances failed (Barringer & Harrison, 2000). This high failure rate of alliances suggests that healthy and stable alliance relationships are difficult to maintain. This approach focuses on how to develop healthy and stable interfirm relationships. These studies examine alliance duration, termination, survival and renegotiation, mutual commitment, and partner satisfaction (Mohr & Spekman, 1994; Poppo & Zenger, 1998; Saxton, 1997). For example, Poppo and Zenger (1998) measured the extent to which the focal firm is satisfied with the overall cost of the service, the quality of the output or service provided by its partners. Parkhe (1993) studied the relationship between alliance structure and alliance dissolution.

This approach has several limitations. The primary limitation of this approach is that it does not reflect the performance asymmetry among the partners (Gulati, 1998). In other words, a successful alliance does not benefit every partner equally, whereas a terminated alliance does not mean all partners suffer. For example, Ross, Anderson and Weitz (1997) found that on a sample of 255 insurance agent relationships, the partners that committed fewer resources to the partnerships perceived higher alliance benefits than

those that contributed more. Also, an alliance may be terminated because one partner

successfully acquired the knowledge it lacked before it entered into the relationship. Thus,

alliance termination does not always suggest unsuccessful results to the participating

firms. Second, ongoing alliances do not necessarily mean successful alliance

relationships. Gulati (1998) notes that problematic alliances continue rather than are

terminated because of organizational inertia and high exit costs.

Strategic performance measures

Strategic performance measures examine the extent to which partners gain

strategic benefits that may lead to competitive advantages. Strategic performance

measures include market entry, learning effects, and goal fulfillments, rate of patenting

(Shan,Walker & Kogut, 1994), product innovation (Deeds & Hill, 1996; Kelley & Rice,

2002), speed to initial public offering (IPO) (Stuart, Hoang & Hybels, 1999), and

customer orientation (Rindfleish & Moorman, 2003). For example, Rothaermel and

Deeds (2006) studied the relationship between number of alliances and firm innovation.

They found that the relationship is inverted U-shaped. Kotabe, Martin, and Domoto

(2003) examined whether technical exchange and technology transfer affect supplier's

improvements in product design, process design, and lead time in automotive

manufacturing industry. They found that U.S. manufacturers improve their suppliers'

product quality through exchange of technical information.

In contrast to the above-mentioned supply-side strategic performance measures

that exclusively focused on the benefits to the participating firms, marketing and services

literature suggest that firms can achieve sustainable competitive advantages only when their services and products are valued by customers (Srivastava, Fahey & Christensen, 2001). With the exception of Rindfleish and Moorman (2003) and Bourdeau, Cronin,and Voorhees (2007), few published studies have examined the alliance effects on customers.

This lack of attention to customers and services is not surprising, because in the management literature, the role of customers is missing. Ford and Bowen (2008) counted the mentions of "customer," "consumer," or "services" in the abstracts of nine premier management journals, which include Academy of Management Journal, Academy of Management Review, Administrative Science Quarterly, Journal of Applied Psychology, Organizational Behavior and Human Decision Process, Strategic Management Journal, Journal of Management, Organization Science, and Personal Psychology. They found only 139 mentions of the keywords in these journals between the inceptions of each journal and the end of 2006.

Table 2: Selected Research on Alliance Performance

Authors	Performance Measure	Nature of the Performance Measure	Findings
Afuah (2000)	Relationship with alliance partners	Alliance relationship measures	Technology obsolesce of supplier firms affects alliance outcomes and performance of buyer firms.
Anand and Khanna (2000)	Learning from alliance partners	Strategic performance measure	The type of alliance affects learning from a firm's alliances. Learning effects are stronger for JVs than for licensing contracts and for R & D JVs than other types of JVs.
Almeida, Song and Grant (2002)	Patent citations	Strategic performance measure	Multinational firms perform better than alliances in terms of patent citations because of their superior capability in managing knowledge.
Arino and de la Torre (1998)	Alliance failure	Alliance relationship measures	Trust and goodwill are needed to avoid alliance failure when renegotiation of major changes takes place.
Barkema, Shenkar, Vermeulen, and Bell (1997)	Alliance longevity	Alliance relationship measures	The longevity of an IJV is negatively related to the cultural distance of the venture partners. The longevity of and IJV is also affected by the previous venturing experience the partner firms.

Authors	Performance Measure	Nature of the Performance Measure	Findings
Dussauge, Garrette, and Mitchell (2004)	Market share	Financial performance measures	The market share of the rival partners changed more than that of non-rival partners.
Goerzen and Beamish (2005)	Return on sales, return on assets and return on capital	Financial performance measures	As alliance networks became diverse, the focal firms' return on sales, return on assets and return on capital decreased.
Gulati and Higgins (2003)	IPO	Financial performance measures	Forming alliances with the prominent venture capital firms particularly contributed to IPO success.
Stuart (2000)	Innovation and sales growth	Strategic performance measure, and Financial performance measure	Firms that ally with large and innovative partners perform better than firms that lack such partners. In addition, such benefits are more salient for the small and young firms than for old and large firms.

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Alliance management

Alliances are difficult to manage because of the various risks inherent in the interfirm relationships. Barringer and Harrison (2000) provided a list of the various alliance risks, which include loss of technological knowhow, management complexity, interfirm cultural clash, and partial loss of decision autonomy. Das and Teng (2001) categorized the various alliance risks into two major types of alliance risks. The first risk is relational risk that refers to the extent to which partners are willing to cooperate. Due to bounded rationality and environmental uncertainty, managers can never draft complete contracts that anticipate all the possible problematic scenarios in the process of cooperation. This contractual incompleteness gives rise to a variety of opportunistic behaviors that may lead an opportunistic partner to focus on its own private benefits rather than the common benefits to all participating firms. The relational risk management focuses on curbing opportunistic behaviors.

Scholars have extensively examined the effects of interfirm trust and contractual mechanism on opportunistic behaviors. Trust is defined as "a psychological state comprising the intention to accept vulnerability based upon positive expectations of the intention or behavior of another" (Rousseau, Sitkin, Burt, & Camerer, 1998, p. 395). Many scholars have suggested that trust is an indispensible element for successful interfirm relationships (Ireland et al., 2002). Since trust is defined as the willingness to be vulnerable to others' behaviors, selecting trustworthy partners, effective communications, and interfirm adaptation are necessary to generate trust (Das & Teng, 1998).

Trust is a necessary but insufficient condition for alliance success because blind

trust does not benefit alliances. TCE argues that as the potential transaction costs increase (such as uncertainty and asset specificity), the more comprehensive and specific the contractual terms should be to guard against opportunistic behaviors. On the other hand, formal contracts may be a signal for distrust and even cause opportunistic behaviors. Luo (2002) found a positive relationship between cooperation and performance when contractual terms are highly specific and flexible. Poppo and Zenger (1998) found that firms tend to craft more complex and customized contracts as asset specificity increases and evaluating difficulty increases. They also found that trust and complex contracts are complements rather than substitutes in influencing satisfaction with alliance performance. They suggest that managers tend to employ greater level of relational norms as their contracts become more complex and customized, and use complex contracts as they develop greater levels of relational governance.

In brief, to reduce the relational risks that stem from partners' opportunistic behaviors, the literature suggests that interfirm trust and contractual governance are effective and complementary mechanisms. This underscores the importance of careful partner selection, crafting comprehensive, flexible, and customized contracts before alliance formation, and effective interfirm communication and adaptation after alliance formation. However, given the effectiveness of these approaches to avoid opportunism, it requires much of the managers' time and effort to apply these approaches to minimize relational risks.

The second risk is performance risk, which refers to "the probability and consequences that a firm's strategic objectives are not achieved, despite full cooperation" (Das & Teng, 2001, p. 8). Alliance management complexity grows as the alliance task

scope, alliance task depth or the partner diversity increases (White & Lui, 2005). Alliance

task scope refers to the area of the alliance task interface between the partners, and it

increases as the range of joint tasks covers broader geographic, hierarchical, market, or

technological scope of the joint task increases. Alliance task depth refer to "the intensity

of interaction between the partners and could be measured, for example, by the

man-hours that each devote to a common task" (White & Lui, 2005, p. 916). As the

alliance task scope or alliance task depth increases, the coordination needs require greater

amount of managerial time and effort to coordinate the alliance tasks. Partner diversity

refers to the extent to which the partners' profiles differ. Even though resource and

capability complementarities are motivators to participate in alliances, the partner

diversity may also be related to coordination difficulties, because differences in national

culture, organizational culture and operating routines make an alliance difficult to

manage.

The four attributes of alliance portfolios under investigation in this dissertation,

which are alliance portfolio size, multilateral alliances, alliance partner country diversity,

and alliance types, illustrate the differences in alliance management complexity. First,

since alliance portfolio size is the number of alliances an airline simultaneously manages,

as alliance portfolio size increases, so does either the alliance task scope and/or depth.

Second, multilateral alliances differ from bilateral alliances in both alliance task

scope and alliance task depth. A multilateral alliance involves at least two partners.

Participating in multilateral alliances allows firms to access broader market scope.

However, multilateral alliances require greater degree of interfirm coordination and

mutual adjustments to accommodate the needs of multiple partners than do bilateral alliances.

Third, with respect to the partner diversity, I focus on the alliance partner country diversity. An alliance involving an international partner may be particularly complex to coordinate because of the broad geographical scope, differences in the national culture, operating procedures, managerial characteristics and so forth may require greater mutual adjustments to achieve the alliance objectives.

Fourth, alliance types differ in both scope and/or depth. Airline alliances are unique and different from the alliances in high-tech industries. Based on the alliance task scope and depth, airline alliances are classified into backward competitor-dominated alliances, forward alliances, and channel-dominated alliances. In channel-dominated airline alliances that are defined as the alliances with partners from other industries, the alliance scope and depth of interaction and related coordination costs are very low. For example, when an airline forms an alliance with a hotel or a travel agent, the scope or depth of interfirm interaction is low. Competitor-dominated airline alliances, defined as alliances between airlines, are further classified into backward competitor-dominated alliances and forward competitor-dominated alliances depending on the alliance task scope and alliance task depth. Backward competitor-dominated alliances focus on the input supply of the airlines (e.g., joint resource purchase) and forward competitor-dominated alliances involve direct interactions with customers (e.g., code sharing, joint baggage handlings). For instance, a code sharing alliance, which directly interacts with customers, involves more intense interfirm coordination effort and more employees of partner airlines than does a channel-dominated alliance (e.g., an alliance with hotels, car

rental companies) or a backward competitor-dominated alliance (e.g., an alliance between airlines to jointly purchase fuel).

Alliance experience

Do firms differ from one another in their capabilities of managing these alliance risks to derive the anticipated benefits? Rothaermel and Deeds (2006) found that the alliance management capability of firms is systematically and heterogeneously distributed across firms. Most of the work on alliance management capability focuses on alliance experiences as a key source of alliance management capability. Drawing primarily from organizational learning and dynamic capability arguments, this line of research suggests that alliance management capability is a path-dependent capability accumulated from a firm's previous alliance experience (Rothaermel & Deeds, 2006). Alliance experience may help a firm build trust with repeat partners become more informed about the operational models of the alliances and set up routines to solve conflicts. Research has studied the alliance experience effects on alliance or firm performance, but not customer service quality. For example, Anand and Khanna (2000) investigated whether a firm's experience in managing alliances is related to the firm's ability to create value through alliances.

In studying the moderating effects of alliance experience on the relationship between alliance portfolio attributes and customer service quality, I focus on the general alliance experience that refers to a firm's cumulative experience with alliances (Rothaermal & Deeds, 2006). Zollo, Reuer and Singh (2002) found that relation-specific alliance experience has positive effects on alliance performance because it helps partners

routinize the alliance coordination. However, Hoang and Rothaermel (2005) found that the general alliance experience of the biotechnology partners is positively related to alliance project performance, and relation-specific experience has a negative effect on alliance project performance. Consequently, this dissertation focuses on general alliance experience rather than relation-specific experience.

Table 3: Selected Research on Alliance Management Capability

Author(s)	Research Question	Findings
Anand and Khanna (2000)	Do firms learn to manage alliances as their alliance experience accumulates?	Significant learning effects in managing joint ventures are found, but no such evidence for licensing contracts.
Deeds and Hill (1996)	Can a firm effectively manage a large number of alliances?	When the number of alliances exceeds managers' capability in managing alliances, benefits a firm can derive from an alliance decreases.
Hoang and Rothaermel (2005)	Does alliance experience increase alliance performance? What are the effects of general alliance experience and relation-specific experience affect alliance performance?	The general alliance experience of the biotechnology partners is, but not of the pharmaceutical firms, positively affected joint project performance. Yet, partner-specific experience has a negative, marginally significant effect on joint project performance.
Kale, Dyer and Singh (2002)	What factors influence firms' ability to build alliance capability and enjoy greater alliance success?	Firms with a dedicated alliance function derive greater alliance benefits than those without.
Rothaermel and Deeds (2006)	What factors affect a high-tech firm's alliance management capability?	Alliance type and alliance experience significantly affect alliance management capability.
Zollo, Reuer and Singh (2002)	Does relation-specific alliance experience benefit alliance performance?	Relation-specific alliance experience has positive effects on alliance performance because it helps partners routinize the alliance coordination.

A Brief Review of Service Quality

In organizational research, the role of customers is largely missing (Ford & Bowen, 2008). Incorporating the role of customers into organizational research is important, as Brief (2002) noted that "a consumer orientation to the study of management undoubtedly will lead scholars into uncharted territories and eventually will expand the field's boundaries" (p. 187). Among the various research topics related to customers, this dissertation focuses on service quality, which is "the single most researched area" in services marketing research (Brown, Fisk, & Bitner, 1994, p. 33). In the following section, I will review the pertinent literature to illustrate the importance of service quality and identify the knowledge gaps in the extant service quality that this dissertation intends to fill.

The importance of service quality

Service quality is one of the most important organizational outcomes in that provision of quality services leads to favorable customer behaviors and consequently enhances performance of firms (Heskett, Jone, & Loveman, 1994; Heskett, Sasser, & Schlesinger, 1997; Zeithaml, Berry, & Parasuraman, 1996). A large amount of research has studied whether customers exhibit favorable behaviors to the firms that provide quality services (e.g., Bell, Auh, & Smalley, 2005; Eisingerich & Bell, 2008; Olorunniwo & Hsu, 2006; Olorunniwo, Hsu, & Udo, 2006; Qin & Prybutok, 2008; Rafaeli, Ziklik, & Doucet, 2008; Wall & Berry, 2007).

Empirical evidence indicates positive effects of service quality and favorable customer responses, which include repurchase intentions (Brady & Cronin 2001), positive word of mouth (Swanson & Davis, 2003), customer loyalty (Tam, 2004), customer satisfaction (Brady, Cronin & Brand, 2002), customer trust (Eisingerich & Bell, 2008), and price insensitivity (de Ruyter, 1998). For example, Brady and Cronin (2001) found when customers perceive the service quality is good, they tend to repurchase more. Swanson and Davis (2003) found a positive relationship between service quality and favorable word of mouth. Tam (2004) found that service quality is positively related to repurchase intention, word of mouth, and customer loyalty. Brady et al. (2002) found positive relationships between service quality and customer satisfaction, repurchase intention, and word of mouth. Eisingerich and Bell (2008) found that customers exhibit higher trust to firms that provide quality services than those that do not. A positive relationship between perceived service quality and price insensitivity was found by de Ruyter (1998). He observed that despite higher prices, customers still remain loyal to the firms providing quality services.

The positive relationships between service quality and customer responses have received empirical support in different regions and countries (Çalik & Balta, 2006; Daskalopoulou & Petrou, 2005; Liang & Wang, 2006; Lymperopoulos, Chaniotakis, & Soureli, 2006; Wong & Sohal, 2003). For example, on a sample of Chinese retail stores, Wong and Sohal (2003) found that service quality is positively associated with customer loyalty. Using questionnaires on a sample of 1,092 bank customers in Athens, Lymperopoulos et al. (2006) found that bank service quality is the most

important factor that influences customers' decision in selecting their mortgage loan providers.

As a result of favorable customer responses to their quality services, firms can enhance brand equity (Bamert & Wehrli, 2005), efficiency, recruiting and retention of talented employees (Luo & Homburg, 2007), and financial performance (Aaker & Jacobson, 1994; Aksoy, Cooil, Groening, Keiningham, & Yalçın, 2008; Anderson, Fornell, & Mazvancheryl, 2004; Anderson & Zeithaml, 1984; Rust, Moorman, & Dickson, 2002). Brand equity literature indicates that "a firm's good brand image and strong public reputation represent another critical intangible asset that has financial content and long-term value" (Luo, 2007, p. 77). Bamert and Wehrli (2005) found that service quality is an important part of brand equity in services markets. Efficiency refers to "the conversion ratio of organizational resource inputs to desirable goal outcomes" (Luo & Homburg, 2007, p. 133). Luo and Homburg (2007) found that when customers are satisfied with its service, the firm enhances its advertising and promotion efficiency, because satisfied customers tend to spread positive word of mouth and thus save its marketing investments. Further, they noted that customer service has a positive influence on a firm's ability in hiring and retaining talented employees, because providing quality services implies a firm's financial strengths and attractiveness.

A large amount of empirical evidence suggests the positive relationship between service quality and financial performance, which is usually measured with financial ratios such as stock return (Aaker & Jacobson, 1994; Aksoy et al., 2008;

Anderson et al., 2004) , return on investment (Anderson & Zeithaml, 1984), and

return on assets (Rust et al., 2002). For example, Aaker and Jacobson (1994) found a

positive association between stock return and service quality. Interestingly, they noted

that quality services are not only valued by the shareholders who are regular

customers of the firm, but also those who are not, because a firm's commitment to

quality is viewed as a signal of its long-term promising performance. Aksoy et al.

(2008) showed that investors tend to buy stocks of the firms that provide quality

services. They noted that

> [A] $100 investment in a portfolio of firms with high customer satisfaction and an
>
> increase in customer satisfaction more than triples to $312. To put our results in
>
> perspective, the same $100 investment in the S&P 500 grows only to $205. The
>
> performance of a portfolio of firms with low customer satisfaction and a decrease
>
> in customer satisfaction is significantly weaker, with the $100 investment actually
>
> decreasing to $98. (p. 108)

Relatedly, Anderson, Fornell, and Mazvancheryl (2004, p. 181) observed that "for a

BusinessWeek 1000 firm with average assets of approximately $10 billion, a 1%

improvement in satisfaction implies an increase in the firm's value of approximately

$275 million." Anderson and Zeithaml (1984) found that service quality is positively

related to return on investment in mature industries. Rust, Moorman, and Dickson

(2002) found that quality improvements are positively related to firms' return on

assets.

As opposed to the favorable customer responses to the firms that provide

quality services, even loyal customers become the worst enemies and retaliate against the firms that provide poor services (Grégoire & Fisher, 2008). In recent years, customers have become more powerful with the emergence of internet social networking websites such as youtube.com and myspace.com. Customers can make their negative voices widely heard if they feel they have experienced poor service quality. For example, after Apple refused to repair his personal computer under warranty, Mr. Michael Whitford allegedly uploaded a video to youtube.com in which he smashed his Apple computer into pieces with a hammer. Reportedly, more than 340,000 individuals viewed his smashing action video (McGregor, 2008). Also, customers may voice their complaints directly to the top managers. In October 2007, after his US Airways flight waited on the runway for three hours, Mr. Ron Dee started sending emails to US Airways' CEO and COO from his BlackBerry cell phone every 15 minutes or so, while he was stuck on the runway. Such negative behaviors from customers are detrimental to a firms' reputation and operations (McGregor, 2008).

Empirical evidence suggests poor service leads to negative customer behaviors and decreased firm performance especially in the US airline industry. For example, Forbes (2008) found a negative relationship between service quality and customer complaints in the airline industry. Also, Zins (2001) found that poor service quality is associated with low airline image, customer satisfaction and customer loyalty. Wangenheim and Bayon (2007) found that when they experience an airline's overbooking problems, customers tend to reduce their future repurchases with that airline. Luo (2007) found a negative relationship between customer complaints and

stock returns. He observed that

> [F]or Southwest Airlines, which has a $12 billion market value, a 1% increase in
>
> DOT complaints could lead to a $262 million loss in market capitalization, all
>
> else being equal. Furthermore, for American Airlines, which has a $6.5 billion
>
> market value, a 1% decrease in DOT complaints could help the airline gain $138
>
> million in market capitalization, a substantial increase in shareholder wealth.
>
> (Luo, 2007, p. 82)

Knowledge gaps in the current customer service quality literature

Given the importance of service quality, two major limitations exist in the

current service quality literature that this dissertation intends to address. First, most of

the service quality research has relied on perceptual measures of service quality. This

approach is cross-sectional in nature and provides only limited information on causal

inference between independent and dependent variables. Second, the current research

on antecedents to service quality has primarily focused on the effects of customer

characteristics, employee management, and firm characteristics, while only limited

research has investigated the effects of alliances on service quality. Next, I will

review the literature to discuss the need to address these two limitations.

Data and measurements

The most widely accepted definition of service quality is provided by

Parasuraman, Zeithaml and Berry in 1988. Believing quality is in the eyes of the

customers, they defined quality as "the consumer's judgment about an entity's overall

excellence or superiority…[service quality] results from a comparison of expectations

with perceptions of performance" (Parasuraman, Zeithaml & Berry, 1988, p. 15) .

This definition suggests that service quality is a function of the gap between

customers' postpurchase evaluation of their service experience and their prepurchase

expectations. When the postpurchase evaluation exceeds the prepurchase expectation,

the service quality is deemed as positive. This approach is also known as the

disconfirmation approach (Spreng & Mackoy, 1996) because it contrasts the

customer's prepurchase expectation and postpurchase evaluation.

Parasuraman, Zeithaml and Berry (1985) conceptualized service quality as a

function of five gaps, i.e., consumer expectation and management perception gap (gap

1), management perception-service quality specification gap (gap 2), service quality

specifications-service delivery gap (gap 3), service delivery–external

communications gap (gap 4), and expected service-perceived service gap (gap 5). To

measure service quality, Parasuraman et al. (1988) generated 22 survey items, which

were factor-analyzed into five dimensions: tangibles (i.e., physical environment,

facilities, equipment, and personal appearance), reliability (i.e., ability to perform the

promised service reliably), responsiveness (i.e., willingness to help customers and

provide prompt service), assurance (i.e., knowledge and courtesy of employees and

their ability to convey trust and confidence), and empathy (i.e., caring, individualized

attention provided to customers). Parasuraman et al.'s measurement of service quality

is widely known as SERVQUAL. Parasuraman et al. (1988) claimed that SERVQUAL

is a concise multiple-item scale with good reliability and validity that retailers can use to better understand the service expectations and perceptions of consumers and, as a result, improve service. The instrument has been designed to be applicable across a broad spectrum of services (p. 31). In other words, SERVQUAL has two major strengths. First, as opposed to objective measures, SERVQUAL relies on customers' perceptions. Customers can evaluate the quality of a service more easily based on their own expectations than on predetermined objective specifications. Second, since it uses perceptual measures that do not involve specific technical specifications, SERVQUAL can be applied across different industries.

Despite its strengths and popularity in services marketing research, recently scholars have questioned the validity of the perceptual, survey based SERVQUAL items regarding its inclusion of prepurchase expectations, scale dimensionality, and item validity (Carrillat, Jaramillo, & Mulki, 2007; Coulthard, 2004; Ladhari, 2008). Given these limitations of SERVQUAL, scholars have called for industry- specific measures of service quality and studies using longitudinal data. Ladhari (2008) suggests that service quality measures should be industry specific, because the SERVQUAL items are inadequate to measure service quality in diverse settings.

Also, given the perceptual nature of SERVQUAL, the vast majority of service quality studies have relied on cross-sectional survey-based data, but little research has used objective, longitudinal archival data to study service quality. In a review of service quality literature, Zeithaml (2000) called for longitudinal studies and said that "virtually all of the research looking at the associations have been cross-sectional

studies spanning companies and industries… Longitudinal approaches that involve

satisfaction and financial performance data in individual firms are a needed

approach…" (p. 73).

Employing longitudinal archival data allows researchers to test temporal

precedence, which is critical to detect causality (Cook & Campbell, 1979). Although

cross-sectional survey data can test covariations between the independent and

dependent variables, significant covariations do not mean that independent variables

precede dependent variables. In order to draw causal conclusions between antecedents

and consequences, longitudinal data provide a means to create a time lag between

independent variables and dependent variables. Wooldridge (2006) noted that

> …observing the same units over time leads to several advantages over
>
> cross-sectional data or even pooled cross-sectional data… the use of more than
>
> one observation can facilitate causal inference in situations where inferring
>
> causality would be very difficult if only a single cross section were available. A
>
> second advantage of panel data is that it often allows us to study the importance
>
> of lags in behavior or the result of decision making. This information can be
>
> significant since many economic policies can be expected to have an impact only
>
> after some time has passed. (p. 12)

Antecedents of service quality

In service quality research, various antecedents of service quality have been

extensively studied with different foci on customer characteristics, employee

management, and firm characteristics, yet only limited research has studied alliance

effects. First, a group of scholars have focused on the effects of customer

characteristics on their perceptions of service quality. The customer characteristics

include customers' national culture (Laroche, Ueltschy, Abe, Cleveland, &

Yannopoulos, 2004; Tsoukatos & Rand, 2007), geography (Mittal, Kamakura, &

Govind, 2004), customers' mood, emotions (White, 2006), age, gender and income

(Anderson, Pearo & Widener, 2008), and customers' previous service experiences

(Rust et al., 1999). For example, Anderson et al. (2008) found that customers' age is

positively related to customer satisfaction but their income is negatively related to

customer satisfaction.

Another group of scholars have focused on how to manage employees to produce

quality services. This stream of research has examined the various antecedents to

service quality that include employee training (Hui, Lam, & Schaubroeck, 2001; Yoo

& Park, 2007), service scripts (Shoemaker, 1996), attitude (Brady & Cronin 2001;

Lee, Lee, & Yoo, 2000), behavior (Babbar & Koufteros, 2008; Wall & Berry, 2007),

expertise (Doucet, 2004), employee commitment (Elmadag, Ellinger, & Franke, 2008),

and personality (Hui, Cheng, & Gan, 2003; Lin, Chiu, & Hsieh, 2001). For example,

Yoo and Park (2007) found that on a sample of 129 hotels when employees have

received service quality training and share an understanding of their visions, service

standards, and service performance results, firms expect higher service quality.

Also, some scholars have focused on the effects of firm characteristics, such as

price policies (Teas & Agarwal, 2000), service environment (Baker, Grewal, &

Parasuraman, 1994), service climate (Dabholkar & Overby, 2005; Schneider. Ehrhart,

Mayer, Saltz, & Niles-Jolly, 2005), customer/market orientation (Chang & Chen,

1998; Voon, 2006), organizational capabilities (Roth & Jackson, 1995), private

branding (Herstein & Gamliel, 2006), and leadership styles (Clark, Hartline, & Jones,

2008). For example, Chang and Chen (1998) found market orientation, defined as the

extent to which firms focus on customer needs and preferences, is positively related to

service quality.

Yet, with the recent explosive growth of alliances, only a few studies have

examined the effects of alliances on customer services. Votolato and Unnava (2006)

studied the spillover effects of partners' negative information on the performance of

branding alliances. They found that partners' moral failures are more detrimental to

the branding alliance than the partner's competence failures. Rao, Lu and Ruekert

(1999) investigated whether forming alliances signals information about the focal

firm's quality to customers. They found that when a product has an important

unobservable attribute, consumers perceive its quality to be high when the focal firms'

partner can be sanctioned easily by customers in case of quality failures. Simonin and

Ruth (1998) found that the performance of the branding alliances affects customers'

subsequent evaluation of the qualities of each partner. Despite the limited research at

the alliance level, the empirical evidence suggests that alliances have significant

effects on service quality.

Especially in the airline industry, studies have shown that alliances have

substantial spillover effects on the focal airline's service quality. Bourdeau, Cronin

and Voorhees (2007) found that the service quality of Delta's remote check-in service operated by its partner has significant impact of customers' assessment of Delta's own service quality. In a qualitative study, Weber and Sparks (2004) concluded that an airline's service quality is negatively affected in case of its partners' service failure. As a consequence, the focal airline may subsequently experience customer dissatisfaction, negative word of mouth and low customer loyalty. Tsantoulis and Palmer (2008) found that the service quality of airlines in alliances does not converge. Their explanation was that "airline co-brand alliances are created for a number of reasons other than promoting one shared brand with a consistent level of quality" (p. 61).

In sum, this service quality review suggests that service quality is a very important organizational outcome in that provision of quality services is beneficial to the firm's customers and its financial performance. Yet, there are two major knowledge gaps in the current service quality research that have been identified in this literature review and this dissertation intends to fill. First, the vast majority of service quality research has relied on the perceptual, cross-sectional SERVQUAL surveys to study service quality. Scholars have called for use of longitudinal data (Zeithaml, 2000) and industry-specific measures (Ladhari, 2008) to study service quality. The use of longitudinal archival data provides greater confidence in detecting causality by creating time lags between independent and dependent variables (Wooldridge, 2006). This dissertation uses industry-specific longitudinal archival data of US airline industry collected from the US DOT's Air Travel Consumer Report to study service

quality (see chapter 4 for details of data collection).

Specifically, the four measures of airline service quality used in this dissertation include consumer complaint, involuntary denied boarding, on time arrival and mishandled baggage. These four measures have been used in other recent studies, both separately and collectively, to study airline service quality (e.g., Lapre & Tsikriktsis, 2006; Luo, 2007; Rhoades & Waguespack, 2000; Rhoades & Waguespack, 2008; Tiernan, Rhoades, & Waguespack, 2008; Tsantoulis & Palmer, 2008; Waguespack, Rhoades, & Tiernan, 2007). Some scholars used some of these four measures to study airline service quality. For example, Lapre and Tsikriktsis (2006) used consumer complaint data to study the effects of airline learning in reducing customer dissatisfaction. Also using consumer complaint data, Luo (2007) studied the effects of customer complaints on airlines' stock return. Waguespack, Rhoades and Tiernan (2007) used three of the measures (i.e., on time arrival, involuntary denied boarding and mishandled baggage) to compare the service quality between the US and the European airlines. Other scholars used all of the four measures. For example, Rhoades and Waguespack (2000, 2008) used all four measures to study the variances in airline service quality. Especially, Tiernana et al. (2008) and Tsantoulis and Palmer (2008) used these measures to study alliance effects on service quality. Apparently, these four measures are valid proxies for airline service quality, and thus are all included in this dissertation.

Equally important is the knowledge gap pertaining to the relationship between alliances and service quality. To explore the antecedents of service quality, researchers

have examined the various antecedents pertaining to customer characteristics,

employee management, and firm characteristics. Unfortunately, only limited attention

has been paid to alliance effects on service quality. Yet, several recent studies suggest

that alliances are an important source to understand the variances in service quality of

firms (e.g., Bourdeau, Cronin, & Voorhees, 2007; Weber & Spark, 2004; Tsantoulis &

Palmer, 2008). This dissertation fills the knowledge gap pertaining to the alliance

effects on service quality by introducing a set of alliance portfolio variables that are

important and have not received empirical investigation.

Airline Alliance Paradox

"Paradox denotes contradictory yet interrelated

elements—elements that seem logical in isolation but

absurd and irrational when appearing simultaneously"

(Lewis, 2000, p. 760).

"Paradox, the dynamic tensions of juxtaposed

opposites (Rosen, 1994, p. xvii)" (Lado, Boyd, Wright, &

Kroll , 2006, p. 115).

According to the definitions above, the most salient characteristic of a paradox

is its contradictory nature. For example, the famous liar paradox—a person claims

himself to always be a liar. This denotes a contradiction—is this statement itself a lie

or not?

Organizational paradoxes occur when rational actors make decisions or act to

increase firm performance but end up with unintended, disappointing effects on firm

performance. For example, Raynor (2007, p. 1) noted that

…most strategies are built on specific beliefs about the future. Unfortunately, the future is deeply unpredictable. Worse, the requirements of breakthrough success demand implementing strategy in ways that make it impossible to adapt should the future not turn out as expected. The result is the Strategy Paradox: strategies with the greatest possibility of success also have the greatest possibility of failure. Resolving this paradox requires a new way of thinking about strategy and uncertainty.

Studying paradoxes helps managers and scholars recognize the complex and often juxtaposed effects of firm behavior (Cameron & Quinn, 1988). "The use of paradox can promote divergent or 'oppositional' thinking, cultivate interest, and increase a theory's generative potency…Companies may succeed or fail based on differences in their capability to manage paradox" (Lado et al., 2006, p. 115). Poole and Van de Ven (1989, p. 562) also noted that "use of paradox can deepen our understanding by enabling scholars to address logical contradiction (or conundrums) in a theory and to identify tensions and oppositions in order to develop more encompassing theories." Furthermore, Poole and Van de Ven (1989) pointed out that most of the current theories are built on internally consistent theories of limited scope, but relatively little attention has been paid to the opposing views of organizational theories. They argued "internally consistent theories do not always lead to good theories…because organizational theories attempt to capture a multifaceted reality with a finite, internally consistent statement, they are essentially incomplete" (Poole & Van de Ven,1989, p. 562).

Recently, there has been a growing interest in investigating paradoxes in management research. For example, Audia, Locke, and Smith (2000) investigated the paradoxical consequences of past firm success. They found that past success leads to

greater strategic persistence after a radical environmental change, and such persistence hurt performance. Sterman, Repenning, and Kofman (1997) studied the contradictory effects of quality improvements on the financial performance of firms. They found that when adopting quality improvement programs like TQM, firms experience lower short-run financial performance, but have higher long-term financial performance.

The paradox under investigation here is an alliance paradox in the U.S. airline industry, which occurs as airline managers make rational decisions to enhance firm performance by participating in a wide range of alliances, but firms experience erosion in customer service quality as a result of failure to manage increased alliance complexity. However, managing the alliances requires substantial amount of time and effort by the airline managers. Since the airline managers are already busy individuals, as the level of alliance complexity increases, they may fail to effectively manage alliances. In situations where market is not a viable option, many firms prefer alliances to hierarchical organization (i.e., internal development, or merger and acquisition), because alliances require less investment, provide more flexibility, and expedite market entry.

In the context of U.S. airline industry, the fierce competition puts airlines' survival often at stake. Since the U.S. airline deregulation in 1978, due to the partial loss of market protection of their markets, airlines have faced fierce market competition. Between 1979 and 1989, 14 airlines exited the U.S. airline industry (Williams, 2001), and 5 out of 11 U.S. major airlines (i.e., ATA airlines, Delta, Northwest, United Airlines, and US Airways) simultaneously filed for bankruptcy in 2005. Airline managers constantly face pressures to contain costs and enhance revenues merely to secure organizational survival. However, there are regulatory

constraints that make going it alone unpopular. For example, market expansion is severely constrained by regulations, limited availability of airport infrastructure, and high acquisition costs of aircrafts. Some regulations stipulate that an airline needs government approval to fly a desired route and that a majority of an airline's equity be held by a domestic organization. The limited availability of infrastructure (e.g., available terminal space and slots) is another important barrier for an airline to access some markets on its own. Moreover, market expansion through merger and acquisition incurs considerably higher costs such as purchase of new aircrafts to accommodate the increased passenger volume. Alliance participation helps airlines circumvent the above-mentioned constraints. For instance, a code sharing alliance allows airlines to access the markets of their partners that have been already approved by the government and to use their partners' airport infrastructure (Kleymann & Seristö, 2004).

Participating in alliances has emerged as an appealing strategy to reduce costs and enhance revenues. In several aspects, alliance participation can help airlines enhance revenues. First, participating in alliances with other airlines facilitates market scope expansion of the airlines by avoiding the constraints of serving extended markets by itself. For example, code sharing agreements allow airlines to expand their market scope to reach their partners' market. Also, airline alliances can increase their revenues with enhanced customer benefits. Such customer benefits include the frequent flyer programs with other airlines, hotels, car rental companies, theme parks, and "seamless" travel to a greater number of destinations without the hassle of checking baggage at connections.

The central theme of the airline alliance paradox lies in the fact that since airlines are forced to reduce costs and enhance revenues merely to survive, alliance

participation is a viable and attractive strategy. However, given these benefits, as the

alliance task scope, alliance task depth and alliance partner diversity increase, airline

managers' capability of managing the alliance complexity may decrease. This may

lead to inferior customer service quality that has profound long term impact on firm

performance. Customer service quality is especially important in the U.S. airline

industry. Luo (2007) found that one percent increase in customer complaints could

lead Southwest Airlines to a $262 million loss in its stock returns, and one percent

decrease in customer complaints would provide American Airlines a substantial gain

of $138 million from the stock market. Thus, alliance participation creates a potential

paradox.

Summary

The purpose of this chapter was to investigate the extent to which the extant

research has studied alliance effects on service quality and provide a theoretical

foundation for the relationships presented in Figure 1 by reviewing the pertinent

alliance research and service quality research.

In the alliance section, I reviewed topics on alliance formation, alliance

performance and alliance risks. The alliance formation research suggests that firms

are motivated by various alliance benefits to form alliances, such as cost efficiency

improvement, fast market entry and competitive positioning. The vast majority of

alliance formation literature has been built on the supply-side arguments to investigate

how alliance benefits, costs and risks affect alliance formation, alliance structuring,

and alliance performance.

The review of alliance performance suggests that the majority of performance measures focused on the alliance benefits or risks that occur to the participating firms, while little is known about how the customers are affected. Alliance research has examined the various consequences of alliances concerned with the financial performance (e.g., IPO, DeCarolis & Deeds, 1999), health and stability of alliance relationship (e.g., alliance survival, Dussauge et al., 2004), and strategic benefits (e.g., innovation, Deeds & Hill, 1996). Yet, the alliance research overlooked the alliance effects on customers.

The review of alliance management focuses on the alliance management complexity issues, discusses how the independent variables in this dissertation vary in term of alliance complexity, and also discusses how the alliance experience may affect alliance performance.

The review on service quality first noted the limitations of current measurement of service quality. Despite the compelling appeal of SERVQUAL, its perceptual nature has resulted in a lack of research using longitudinal archival data. However, recent marketing studies have began using objective, longitudinal data to measure key dimensions of service quality. For example, Lapre and Tsikriktsis (2006) and Luo (2007) used longitudinal customer complaint data as a proxy for customers' perception of inferior service quality. Following this approach, this dissertation uses objective longitudinal data to measure the key components of quality services.

The literature review on service quality antecedents suggests that various antecedents of customer service quality have been investigated at customer, employee, and firm level, along with a limited research at alliance level. However, no empirical research has tapped into alliance portfolio effects as determinants. The empirical results on service quality consequences underscore the urgency and importance of

bridging the knowledge gap between alliance portfolio management and service quality because quality services are positively associated with both customers' behavioral intentions and the firm's financial performances.

It is critical to understand how a firm can effectively organize its activities around a portfolio of alliances in which it is involved in. Gulati (1998) noted

…as firms entered alliances with growing frequency, many prominent firms, such as General Electric, Corning, Motorola, IBM, and Hewlett Packard, have found themselves in hundreds of alliances. While issues concerning the management of individual alliances are still important and merit further consideration, new issues resulting from managing a portfolio of alliance have arisen. This opens up numerous questions about the cooperative capabilities of firms. (p. 294)

The review of airline alliance paradox suggests that a paradox occurs when rational managers intend to enhance firm performance, but end up with a disappointing firm performance (Raynor, 2007). The review indicates the importance of investigating organizational paradoxes. Particularly in the U.S. airline industry, rational managers are pressured to cut costs and increase revenues. Participating in alliances is a very variable strategy to obtain these objectives. However, paradoxical effects may occur when the alliance management complexity exceeds alliance management capability of the managers.

In conclusion, the extant supply-side perspectives of alliance literature have largely overlooked the alliance effects on the demand-side, i.e., the customers/consumers. Recently, management scholars noted that focusing on supply-side perspectives while overlooking the customers on the demand side is incomplete in assessing competitive asymmetries (DeSarbo, Grewal, & Wind, 2006), and identifying sources of sustainable competitive advantages (Adner & Zemsky

61

2006). Srivastava, Fahey and Christensen (2001) suggested that creating and sustaining customer value that customers perceive through service experiences lead to inimitable competitive advantage. Given the importance of customers, the fact that little alliance research has paid attention to customers is an important and unfilled gap in the strategy research. Even in marketing where the consumer has been a central research focus, scholars have lamented that the empirical research examining the alliance effects on customers is "scant at best" (Rindfleish & Moorman, 2003). To fill this literature gap, this is the first empirical research to study the antecedents of service quality at alliance portfolio level.

CHAPTER THREE: HYPOTHESES DEVELOPMENT

Chapter 2 reviewed research pertaining to alliances, service quality and airline alliance paradox. Built on the literature review, this chapter hypothesizes the relationships presented in Figure 1. In the following section, the direct effects of four alliance portfolio attributes on service quality are investigated: alliance portfolio size, multilateral alliances, alliance partner country diversity, and alliance type. Further, I hypothesize a focal firm's alliance experience moderates the effects of alliance portfolio size and multilateral alliances on customer service quality.

Hypotheses Development

Alliance portfolio size

Alliance portfolio size is the number of alliances a firm simultaneously manages. Since participating in a large number of alliances potentially enables firms to access valuable resources, technological expertise, and information, alliance portfolio size may enhance firm performance. Several studies reported positive relationships between the number of alliances and firm performance. Chang (2004) found that internet startups' alliance portfolio size is positively related to their speed of IPO launch. Baum, Calabrese and Silverman (2000) found that in the Canadian biotechnology industry, young large alliance portfolio size of the young firms is associated with higher stock prices.

However, if alliance participation is always associated with higher performance, why do firms not participate in as many alliances as possible? Deeds and Hill (1996) argued that the relationship between alliance portfolio size and firm

performance is curvilinear, rather than linearly positive, because of diminishing returns from excessive alliance participation. Diminishing return refers to the declining alliance benefits to the focal firm as the alliance portfolio size grows beyond an optimal number of alliances. Deeds and his colleagues (Deeds & Hill, 1996; Rothaermel & Deeds, 2006) reported an inverted U relationship between alliance portfolio size and product innovations in the biotechnology industry. In brief, the preponderance of empirical results suggests that the alliance portfolio size is positively related to firm performance, at least before it reaches some optimal point.

In the context of this study, airlines have aggressively formed many alliances to reduce costs and enhance revenues. The various forms of alliance arrangements include code sharing, block seat sales, frequent flyer programs, joint maintenance, joint advertising and promotion, sharing of ground facilities, joint baggage handling, joint fuel purchase, joint computer reservation systems, as well as joint insurances and parts pooling (Rhoades & Lush, 1997; Goh & Uncles, 2003). These various alliances provide potential benefits to both the airlines and their customers. First, alliances can increase revenue, reduce operating costs through economies of scale, and improve market competitiveness. Agreements like code sharing facilitate market expansion. Airlines can take advantage of economies of scale to reduce costs by sharing airport facilities, joint advertising and promotion, and collective purchase of fuel and other parts (Oum & Park, 1997). For example, using data on four global strategic alliances, Iatrou and Alamdari (2005) found that airline alliances lead to an increase of 9.4% in customer volume, because airlines can serve a broader market. Park and Zhang (2000) reported that alliances increase airlines' market share by 21% and decrease marginal costs by 46%. Second, alliances also provide benefits to customers. For instance, airline alliances allow customers to reach a greater number of destinations without the

hassles of baggage checking at the connections. By traveling allied airlines, customers have more flight choices, enhanced frequent flyer benefits, and possibly lower fares. Park and Zhang found that partners in international airline alliances can reduce fares by 19%.

What is the relationship between alliance portfolio size and service quality in the U.S. airline industry? Despite the aforementioned alliance benefits, I posit a negative relationship between alliances and service quality for several reasons. First, as the number of alliance grows, managers' capability in preventing relational risks decreases. Managers are intendedly rational but only limitedly so. March and Simon (1958) argued that "the boundaries of rationality …have consisted primarily of the properties of human beings as organisms capable of evoking and executing relatively well defined programs but able to handle programs only of limited complexity" (p. 171). Participating in a large alliance portfolio increases the managers' difficulties in selecting partners, building trust, and crafting sufficiently complete contracts to guard against opportunistic behaviors.

Also, increased complexity and uncertainty in operating procedures require multiple routines to coordinate alliance activities. Since alliance partners are mutually interdependent to achieve alliance objectives (Inkpen, 2001), mutual interdependence leads to shared control and management, which increase the complexity of alliance management. Because partners remain independent, there is uncertainty as to what one party expects the other party to do. To alleviate the alliance complexity and uncertainty, establishing stable interfirm routines and coordination enhances the effectiveness of collaboration (Zollo et al., 2002). Firms need to develop multiple sets of routines to develop, produce, and sell their services as well as a set of coordinating routines to manage these activities. However, as the alliance portfolio size grows, the

boundedly rational managers have limited time and effort in each alliance routine, resulting in lower service quality. Thus, given the potential alliance benefits to the firm, I expect a negative relationship between alliance portfolio size and service quality.

H 1 : alliance portfolio size is negatively related to service quality.

Multilateral alliance

By definition, each alliance involves at least two partners. As defined earlier, an alliance that involves more than two partners is referred to as a multilateral alliance. In some circumstances, an alliance requires the involvement of multiple partners to obtain greater alliance benefits. Participating in multilateral alliances has become a popular practice. Makino and Beamish (1999) found that 55% of the 737 alliances in their study are multilateral alliances. For example, Star Alliance, SkyTeam, and Oneworld alliances enable airlines to reach broader markets and contain costs by sharing facilities or joint purchasing input materials.

When participating in multilateral alliances, firms face higher complexity than in bilateral alliances, which may incur substantial impacts on the focal firm's service quality. Zeng and Chen (2003) argued that multilateral alliances differ from bilateral alliances in several aspects. In multilateral alliances, a partner is more likely to free ride and to realize its own private benefits rather than the alliance's common benefits. Since achieving higher quality service incurs organizational efforts and costs (Roth & Jackson, 1995) and opportunistic behaviors are more difficult to detect in multilateral alliances (Zeng & Chen, 2003), a partner in a multilateral alliance is more likely to

avoid the efforts and costs of providing quality services for other partners. Also, Gulati and Singh (1998) noted that as the number of partners increases in an alliance, the level of trust between partners may be lower. In multilateral alliances, trust building is more difficult because it is less likely that a large group of partners will trust all others in the alliance.

Greater interim interdependence in multilateral alliances requires more coordination efforts (Zeng & Chen, 2003). Because partners in an alliance depend on each other's contributions, as the number of partners in an alliance becomes large, interdependence in the service production and delivery process grows. According to information processing theory, interdependence is positively related to the amount of information a focal partner needs to collect, interpret and process (Bergh, 1998). Altogether, these factors may constrain managers' capabilities in ensuring service quality as the proportion of multilateral alliances in an alliance portfolio increases.

H2: multilateral alliance ratio is negatively related to service quality.

Alliance partner country diversity

Allying with foreign partners allows firms to expand market access, and obtain economies of economies of scale or scope. For instance, airlines form both competitor-dominated alliances (e.g., with international airlines) and channel-dominated alliances (e.g., with international travel agents, foreign hotel chains) with foreign partners. Such alliances involve collaborations with managers from with different national, cultural, social, political, and economic backgrounds.

I define alliance country diversity as the number of unique countries in which

the partners in the focal firms' alliance portfolio are based. I expect that alliance partner country diversity of an alliance portfolio has negative effects on service quality for two reasons. First, there are greater relational risks because partners from different countries have different trust propensity. Parkhe (1993) suggested that trust is highly "culture-specific." Second, misunderstandings and mistakes are likely to occur as country diversity increases. Jones, Hesterly and Borgatti (1997) stated that when alliance managers share similar macroculture, the interfirm coordination is easier and more effective. They explained,

> …macroculture specifies roles, role relationships, and conventions—accepted approaches and solutions to problems—to be employed by participants; thus macroculture coordinates interdependent activities among independent entities so that complex task may be completed. …Macroculture evolves out of the institutional and national culture. (p. 929)

Similar institutional and cultural backgrounds may reduce misunderstanding between the partners, and reduce coordination difficulties.

In addition, collaborating with a large number of foreign partners exposes the firm to higher environmental uncertainty, which may also constrain managers' ability to manage the service production (Bergh, 1998). Together, these arguments suggest that alliance partner country diversity may increase the level of alliance complexity and thus have negative effects on customer service quality.

H3: alliance partner country diversity in a focal firm's alliance portfolio is negatively related to service quality such that the higher alliance partner country diversity is, the lower its service quality is.

Alliance type

Alliance is a generic term that covers a wide range of collaborative relationships such as equity joint ventures, licensing arrangements, shared product development projects, minority equity relationships, and joint purchasing and manufacturing (Barringer & Harrison, 2000; Inkpen, 2001). Different types of alliances affect the firm's performance differently, since "the nature and type of resource allocation will be different, as will be competitive dynamics, bargaining power, and performance measure" (Inkpen, 2001, p. 411). Researchers have used different typologies to classify alliances such as horizontal versus vertical alliances (Kotabe & Swan, 1995), exploration versus exploitation alliances (Rothaermel & Deeds, 2006), link versus scale alliances (Dussauge, Garrette, & Mitchell, 2000, 2004), and channel-dominated versus competitor-dominated alliances (Rindfleish & Moorman, 2003).

In this dissertation, I use channel-dominated and competitor-dominated alliance typology. Rindfleish and Moorman (2003) defined a channel-dominated alliance as an alliance in which the majority of its partners are from other industries. They defined a competitor-dominated alliance as an alliance that is mostly composed of competitors in the focal firm's industry. They found that the decision to participating in channel-dominated versus competitor-dominated alliances has significant impact on firms' customer orientation.

In the airline industry, airlines form competitor-dominated alliances with small and large, domestic and global airlines to increase hub traffic, expand market access and reduce costs. Also, airlines form many channel-dominated alliances with firms from other industries such as travel agents, hotel chains, car rental companies, and credit card companies to provide related services.

White and Lui (2005) noted that the differences in alliance task scope and complexity are associated with different level of alliance management challenges. Further, in this dissertation, competitor-dominated airline alliances are classified into backward competitor-dominated and forward competitor-dominated alliances to capture the different level of alliance management challenges. Backward competitor-dominated alliances focus on the supply activities on an airline's value chain (e.g., joint resource purchase), whereas forward competitor-dominated alliances involve direct interactions with customers (e.g., code sharing, joint baggage handlings). For instance, a code sharing alliance, which directly interacts with customers, involves more intense interfirm coordination effort and higher involvement of employees of partner airlines than does a channel-dominated alliance (e.g., an alliance with hotels, car rental companies) or a backward competitor-dominated alliance (e.g., an alliance between airlines to jointly purchase fuels).

What is the relationship between alliance types and service quality? I expect that backward competitor-dominated alliances are associated with the least amount of alliance management complexity, channel-dominated alliances with the moderate and forward competitor-dominated alliances with the greatest. In other words, backward competitor-dominated alliances are least negatively related to service quality, channel-dominated alliances are moderately negatively related to service quality, and forward competitor-dominated alliances are most negatively related to service quality for several reasons. First, forward competitor-dominated alliances, such as code sharing and joint baggage handling that involve the highest level of intensity of interfirm coordination and employee interactions with customers, require the highest amount of managerial coordination effort. Second, in contrast, backward

competitor-dominated alliances focus primarily on cost containments through joint resource purchase and technical maintenance arrangements, which do not require intense coordination or direct customer interactions, thus may require little managerial time and attention. Third, channel-dominated alliances are only moderately complex to manage. In channel-dominated alliances such as alliances with hotels, an airline does not have to involve a large number of employees to intensely coordinate alliance activities, or adjust its core operations to accommodate its partners' operations as usually the case in forward competitor-dominated alliances. But a channel-dominated alliance requires a higher level of coordination efforts than does backward competitor-dominated alliances, because a channel-dominated alliance involves interactions with customers.

However, a close examination of the data suggests that nearly 70% of alliances are forward competitor-dominated alliances. Since it may be possible that most of the variances in customer service quality may be accounted for by forward competitor-dominated alliances, I compare only the effects of the proportion of backward competitor-dominated alliances in an alliance portfolio with that of channel-dominated alliances on service quality such that

H4: backward competitor-dominated alliance ratio is less negatively related to customer service quality than channel-dominated alliance ratio.

Alliance experience

Allying per se does not automatically lead to alliance benefits because the relational and performance risks may dampen the anticipated alliance benefits.

Managing these risks is a difficult organizational activity due to the inherent complexities and uncertainties. Firms differ systematically in their capabilities of managing alliances (Rothaermel & Deeds, 2006). Therefore, alliance management capability, defined as "a firm's ability to effectively manage multiple alliances" (Rothaermel & Deeds, 2006, p. 403), is a key source of competitive advantage.

Most of the research on alliance management capability investigates whether alliance management capability is primarily derived from alliance experiences. The notion of alliance experience is that firms may learn to effectively manage alliances. For example, in an interview about Continental's upcoming alliance formation with Northwest, Mr. Gregory Brenneman, the Continental's president and chief operating officer, said "When we started with America West, we were earning our bachelor's degrees…Today, we have our Ph.D.s" (McCartney, 1998, p. B.1).

Learning theory suggests that the absorptive capability of the firm depends on its existing stock of knowledge (Anand & Khanna, 2000). Cohen and Levinthal (1990, p. 128) suggested that "prior related knowledge confers an ability to recognize the value of new information, assimilate it, and apply it to commercial ends. These abilities collectively constitute what we call a firm's absorptive capability." Rothaermel and Deeds (2006) argued that firms with more alliance experience have higher absorptive capability in learning to manage alliances, because firms learn to effectively manage relational risks and performance risks by building interfirm trust, becoming more informed about the operational models of the alliances, and setting up routines to solve conflicts.

Recent research suggests that alliance experience has significant positive effects on alliance performance. For example, Zollo and Winter (2002) found that alliance experience with the same partner over time positively impacted the alliance

performance of subsequent alliance between these two partners. Rothaermel and Deeds (2006) found that a firm's alliance experience improves its product innovations. Reuer, Zollo and Singh (2002) reported that firms with alliance experiences in similar technological fields are less likely to engage in post formation governance changes in a subsequent alliance. Anand and Khanna (2000) found that firms with greater prior alliance experience have significantly higher stock market returns from alliance announcements than firms without alliance experience. Simonin (1997) found that firms with greater alliance experience have higher abilities to effectively select alliance partners and manage alliance conflicts.

In sum, I believe that firms with more general alliance experience have higher alliance management capabilities and are thus more effective in managing alliances. This dissertation focuses on the moderating effects of general alliance experience rather than relation-specific alliance experience, because there is evidence that general alliances may account for more variations in alliance performance. For example, Hoang and Rothaermel (2005) found that the general alliance experience has positive effects on biotechnology firm's innovations rather than relation-specific alliance experience. Thus, alliance experience may increase business process capabilities in selecting partners, building interfirm trust, setting up effective interfirm routines in the process of joint producing and delivering a product or a service (Ray, Barney & Muhanna, 2004). Hence, firms with more alliance experience may be more effective in managing alliances to ensure service quality.

H5: alliance experience moderates the direct effects of alliance portfolio attributes on service quality such that firms with more alliance experience are more effective in managing alliances to ensure service quality.

Specifically, in this dissertation, I examine the moderating effects of alliance experience on the relationship between alliance portfolio size and customer service quality and the relationship between multilateral alliance ratio and customer service quality. Thus, I further hypothesize

H5a: as alliance experience increases, the relationship between alliance portfolio size and customer service quality becomes more positive (or less negative).

H5b: as alliance experience increases, the relationship between multilateral alliance ratio and customer service quality becomes more positive (or less negative).

CHAPTER FOUR: RESEARCH METHOD

This chapter focuses on the research methodology employed to test the hypotheses and consists of two sections. The first section describes the detailed procedure of data collection and variable measurements. The second section presents the hypotheses testing procedures and results.

Data Collection

Sample

The hypotheses were tested on a sample of nine U.S. major airlines over a 20-year period between 1988 and 2007, which include American Airlines, America West, Alaska, Continental, Delta, Southwest, Northwest, United Airlines and U.S. Airways. According to DOT's definition, an airline is classified as major if it has at least one percent of total U.S. domestic passenger revenues. These nine major airlines were selected because their data are most continuously available throughout the 20-year period under investigation except for America West that was acquired by U.S. Airways in 2006. Also, other researchers have used these nine airlines in their longitudinal studies related to customer service (e.g., Lapre & Tsikriktsis, 2006; Luo, 2007).

The timeframe between 1988 and 2007 was chosen for two reasons. First, only after 1988 the data pertaining to the four dimensions of customer service quality are consistently available from DOT's air travel consumer reports. Beginning October, 1987, DOT required major airlines to report their monthly statistics of mishandled

baggage, involuntary denied boarding, on-time arrival and consumer complaints.

Second, the SDC database, the source from which the alliance data were collected,

provides consistent and reliable alliance formation information only after 1988

(Sampson, 2007).

Measures

    Dependent variable

To study the temporal effects of alliance formation on customer service quality,

quarterly service data were collected with a three-month lag after alliance data. Since

this is the first study that examines the alliance portfolio effects on customer service

quality using longitudinal archival data, the extant literature does not provide

guidance on the appropriate length of lag between the alliance and the customer

service quality data. I chose the three-month lag because recently Lapre and

Tsikriktsis (2006) chose a three-month lag to study how the U.S. airlines improve

customer satisfaction, also using the data published in the DOT air travel consumer

reports.

The quarterly service quality data were collected from Airline Travel

Consumer Reports published by the U.S. Department of Transportation (DOT)

between 1988 and 2007. Four key dimensions of service quality were used to measure

airline service quality, which are on-time arrival, involuntary denied boarding,

mishandled baggage, and consumer complaints. These four dimensions are widely

used to study airline services. For example, the popular Airline Quality Ratings (AQR)

created by Brent Bowen and Dean Headley in 1991 also uses these four dimensions to

measure airline customer service quality. Bowen and Headley (1991) argued that

different from the SERVQUAL approach that relies on customers' subjective evaluation of the airline services, these four dimensions of airline customer service quality provide consistent, comparable and objective data, thus, offering advantages over "soft" survey data in conducting longitudinal analyses.

Instead of creating an aggregate measure of airline service quality like AQR, this dissertation tests the hypotheses on each of the four dimensions independently for two reasons. The first reason pertains to AQR's weighting problem. AQR's weighting of each of the four dimensions was based on opinions derived from a survey of airline industry experts. Yet, these industry experts may view the importance of these dimensions differently than actual consumers. Second, testing these alliance effects these four dimensions separately may reveal richer insights, because it may be possible that alliances affect each dimension differently. Other airline service quality researchers have also studied each dimension independently. For example, Waguespack et al. (2007) compared key service quality dimensions between EU major airlines and US major airlines and found that US major airlines have lower on-time arrival rate but better baggage handling rate than their EU counterparts. Since this dissertation adopts the perspective of service as a total experience (Bowen & Ford, 2002), studying each dimension independently allows this dissertation to detect possible different alliance effects on each of them.

The data pertaining to these four dimensions between 1998 and 2007 were collected from DOT's official website (http://airconsumer.ost.dot.gov/). Since the data published on DOT's official website begin from 1998, the data between 1988 and 1997 were obtained from microfiche films. Next, I introduce the definitions and data collection of these four dimensions.

Consumer complaints

This statistic is the quarterly average number of complaints per 100,000 passengers. Passengers could file complaints directly with DOT by mail, phone, or in person. The DOT consumer complaint report covers a wide range of service quality issues in 12 categories, including flight problems (such as cancellations, delays), oversales, reservations, ticketing, boarding, fares, refunds, baggage, customer service, disability, advertising, discrimination, animals and others. Where quarterly data were not available, the quarterly average was calculated based on monthly data.

Involuntary denied boarding

DOT defines it as the number of denied boardings per 10,000 passengers who are denied boarding an oversold flight despite their confirmed reservations. This statistic does not include passengers who are affected by cancelled, delayed or diverted flights. Quarterly data were available and collected.

On-time arrival

This statistic is the percentage of flights that arrive on time. According to DOT, a flight is "on time" if it arrives less than 15 minutes after the scheduled time shown in the carriers' Computerized Reservations Systems (CRS). In fulfilling DOT's data reporting requirements, the reporting airlines are required to use automated and/or manual systems for collecting flight data. The data of quarterly rate of on-time arrivals were available and collected.

Mishandled baggage

This statistic refers to the rate of mishandled baggage (i.e., lost, damaged, delayed or pilfered baggage) per 1,000 passengers. Quarterly data were not available for this dimension. The quarterly average rate was calculated based on monthly mishandled baggage data.

Bowen and Headley (1999) noted that these four dimensions are a valid proxy measure of the latent customer service quality construct, but differ in their relationships to customer service quality. Put differently, the number of customer complaints per 100,000 passengers, the number of denied boardings per 10,000 passengers, and the rate of mishandled baggage per 1,000 passengers are negatively related to service quality, while on-time arrival rate is positively related to service quality.

Independent and moderating variables

The data pertaining to alliance variables were collected from Securities Data Company (SDC) database, a database widely used in alliance research (e.g., Oxley & Sampson, 2004; Reuer & Ragozzino, 2006; Sampson, 2007) and is one of the most comprehensive sources of information on alliances (Anand & Khanna, 2000). SDC collects the alliance formation announcements and updates the alliance status daily based on popular media publications such as SEC filings, trade publications, and newswire sources. SDC provides comprehensive alliance details, such as contract type, nationality of the partner, SIC code of the alliance partners, name of each partners, description of the industry of the partners, synopsis of the alliance activities, and alliance status (i.e., terminated, renegotiated, extended, expired, completed). Also,

Anand and Khanna (2000) noted that the SDC alliance information is highly reliable and consistent with other sources. For example, they found that SDC's alliance SIC codes accurate and consistent with LexisNexis database. Although there have been some concerns about SDC's accuracy of announcement dates, Anand and Khanna (2000) found that in most cases, the discrepancy of SDC reported dates is within a few days, or at most one or two months, after they verified SDC announcement dates with various news sources, (e.g., news and wire reports, newspapers, magazines and trade journals). Since this study examines the quarterly alliance portfolio effects instead of monthly, the date discrepancy is not a serious issue for this dissertation.

Alliance portfolio size

The alliance portfolio size variable was operationalized as the logarithm of the cumulative number of alliances each airline has each quarter. When an alliance formation announcement is made and its alliance status is "completed and signed," the alliance was added to the alliance portfolio. When the alliance status indicates subsequently "expired or terminated," that alliance was counted off the airline's alliance portfolio size accordingly. For example, when British Airways and American Airlines terminated their alliance in November 1998, that alliance was subtracted from American Airlines' alliance portfolio size in the fourth quarter of 1998.

Multilateral alliance

Following Gulati and Singh (1998), an alliance was coded as a multilateral alliance if the alliance involves more than two partners. An alliance was coded as a bilateral alliance if it involves only two partners. Multilateral alliance ratio was calculated as the number of existing multilateral alliances divided by alliance

portfolio size.

<u>Partner country diversity</u>

Following Goerzen and Beamish (2005), I first measured alliance partner country diversity as the number of partners from unique countries in an alliance portfolio. For example, if several alliance partners in an airline's alliance portfolio are from the same foreign country, they were counted as one unique foreign country. Each foreign country was counted only once as a unique country in the measure of partner country diversity. Partner country diversity ratio was calculated as the number of unique countries in which partners are based divided by alliance portfolio size.

<u>Alliance type: Channel-dominated alliance ratio vs. backward competitor-dominated alliance ratio</u>

Following Rindfleish and Moorman (2003), when an alliance involves partners from other industries (e.g., credit card companies, car rental services, and hotels), it was coded as a channel-dominated alliance. For example, in December, 1991, Busch Entertainment and American Airlines signed a marketing agreement in which American Airlines was named as the official domestic airlines for seven of the nine Busch Entertainment theme parks. Competitor-dominated alliances are alliances formed primarily between airlines (Rindfleish & Moorman, 2003). When a competitor-dominated alliance formation focuses on the input supply and does not have direct impact on customers (e.g., joint purchase of fuel, joint fleet maintenance), the alliance was coded as a backward competitor-dominated alliance. The ratio of each alliance type was calculated against alliance portfolio size.

<u>Alliance experience</u>

Some researchers have used the number count of prior alliance relationships to measure alliance experience (e.g., Hoang & Rothaermel, 2005; Zollo et al., 2002). Yet, that approach overlooks the learning effects of alliance duration of each alliance. Therefore, I followed Rothaermel and Deeds (2006) to measure general alliance experience as an airline's cumulative durations of each alliance and calculated the alliance experience variable on an annual basis. For example, if an airline has four alliances up to the year of analysis, among which two alliances have lasted 2 years, one 10 years, and another 12 years, then the alliance experience score is calculated as 2*2+1*10+1*12=26.

<u>Moderating variables</u>

Alliance portfolio size*alliance experience and multilateral alliance ratio* alliance experience are the interaction terms to examine the hypothesized moderation effects of alliance experience. Following recommendations by Cohen, Cohen, West and Aiken (2003), each independent variable was mean centered before they were entered into the models. To check multicollinearity, I conducted post regression analyses and found that all VIFs were below 10, suggesting that multicollinearity was not a severe problem for these interaction terms (Hair, Anderson, Tatham, & Hair 1998).

Control variables

To control for the alternative explanations of the variances in the dependent variables, this study includes four control variables that are firm size, airline type,

temporal control for September 11th, 2001, and repeat alliances.

Firm size

Since larger airlines may have higher management complexity (Lapre & Tsikriktsis, 2006) and form more alliances, I used the logarithm of quarterly average number of employees as the proxy for firm size. Quarterly employee data from 1990 to 2007 were obtained directly from the DOT office. Because only annual employee data between 1988 and 1989 were available from DOT's Airline Employment Data reports, quarterly data were interpolated for these two years.

Airline type

Airlines can be classified into either focused or full-service airlines. Lapre and Tsikriktsis (2006) argued that focused airlines may learn faster than full-service airlines to achieve higher level of customer satisfaction, because focused airlines have a simplified operation, thus facilitating their coordination. Following Lapre and Tsikriktsis (2006), Alaska, America West, and Southwest were coded focused airlines because they focus on operations in North America only. American Airlines, Continental, Delta, Northwest, United Airlines and US Airways were coded full-service airlines because they operate both continental and intercontinental routes.

Terrorist attack on September 11th, 2001

The third control is a dummy variable that controls for the effects of the terrorist attack on September 11th, 2001. Rhoades and Waguespack (2004) compared the U.S. airline service quality between 1987 and 2002, and found that airline service quality improved in terms of on-time arrival, and reduced both involuntary denied boarding and customer complaints after the terrorist attack in 2001. They explained this improvement due to decreased passenger volume and consumers' lower propensity to complain as a result of their heightened concern over safety issues.

Repeat alliance

Fourth, I control for repeat alliances, because alliance with the same partner may suggest lower alliance management risks due to higher interfirm trust and more effective relation-specific routines of coordinating resources (Sampson, 2005). This variable was measured as the number of existing alliances in an alliance portfolio that involves at least one previous partner.

A total of 351 alliance announcements were obtained from SDC databases. To match the service quality data with the alliance data, I applied the three-month data lag as described earlier. Six hundred one observations (firm-quarter data entries) were coded for the nine airlines over the 20-year period. Table 5 provides the summary statistics and variable correlations. I conducted the Variance Inflation Factor (VIF) analyses of all the independent and moderating variables and found all the VIF values were below 10. This suggests that multicollinearity is not a severe issue in this study (Hair et al., 1998).

<center>**Hypotheses Testing**</center>

To test the hypotheses, I used random effects panel data regression (also known as random effects cross-sectional time series regressions) in Stata 10 (xtreg procedure). Random effects regressions relax the assumption that firm specific effects are correlated with the predictors in the model (Greene, 2003). I chose this analysis procedure because the Hausman's test results of the models did not suggest that fixed effects regressions are more efficient (Greene, 2003; Wooldridge, 2002).

Tables 5-16 provide the test results of the hypotheses. Each hypothesis was separately tested on each of the four dimensions of customer service quality (i.e., customer complaints, involuntary denied boarding, mishandled baggage, and on-time arrival) in a hierarchical fashion. First, models 1, 3, 5, and 7 are the baseline models with the control variables only. In models 2, 4, 6 and 8, the independent variables or interaction terms were entered to test the hypotheses. The odd number Tables (i.e., Tables 5, 7, 9, 1, 13, and 15) report the results that use customer complaints and mishandled baggage as dependent variables in the models, while even number Tables (i.e., Tables 6, 8, 10, 12, 14, and 16) report the results that include on-time arrival and involuntary denied boarding as dependent variables.

Hypothesis 1: Alliance portfolio size

Hypothesis 1 predicted a negative relationship between alliance portfolio size and customer service quality such that as alliance portfolio size increases, customer

<div align="right">85</div>

service quality decreases. Tables 5 and 6 present the analyses results pertaining to hypothesis 1.

Customer complaint

The results of model 2 indicate that both the overall model ($R^2 = 0.135$, Chi square = 87.4, $p < 0.01$), and the incremental change in R square (F = 49.887, $p < 0.01$) were significant after alliance portfolio size was entered in addition to the control variables in model 1. Alliance portfolio size (beta = 0.322, $p < 0.01$) was significantly positively related to customer complaints, lending support to H1.

Mishandled baggage

The results of model 4 indicate that both the overall model ($R^2 = 0.081$, Chi square = 80.12, $p < 0.01$), and the incremental change in R square (F=18.654, $p < 0.01$) were significant after alliance portfolio size was entered in addition to the control variables in model 3. Yet, alliance portfolio size (beta = -0.312, $p < 0.01$) was negatively related to mishandled baggage. This result suggests that as alliance portfolio size increases, mishandled baggage rate decreases, thus inconsistent with H1.

On-time arrival

The results of model 6 indicate that both the overall model ($R^2 = 0.135$, Chi square = 87.40, $p < 0.01$), and the incremental change in R square (F = 21.673, $p <$

0.01) were significant after alliance portfolio size was entered in addition to the control variables in model 5. Alliance portfolio size (beta = -0.022, $p < 0.01$) was found negatively related to on-time arrival. This result suggests that as alliance portfolio size increases, on-time arrival rate deteriorates, thus lending support to H1.

Involuntary denied boarding

The results of model 8 indicate that both the overall model ($R^2 = 0.195$, Chi square = 88.43, $p < 0.01$), and the incremental change in R square (F = 15.594, $p < 0.01$) were significant after the alliance portfolio size was entered in addition to the control variables in model 7. Alliance portfolio size (beta = -0.170, $p < 0.01$) was found negatively related to involuntary denied boarding. This suggests that as alliance portfolio size increases, involuntary denied boarding rate decreases, thus inconsistent with H1.

In sum, H1 results indicate that alliance portfolio size has significantly negative effects on customer service quality with respect to customer complaints and on-time arrival but not on mishandled baggage and involuntary denied boarding.

Table 4: Variable Means, Standard Deviations, and Intercorrelations

		Mean	**SD**	1	2	3	4	5	6	7
1	Customer complaint $_{it1}$	1.272	1.087							
2	Mishandled baggage$_{it1}$	5.156	1.465	0.123***						
3	On-time arrival$_{it1}$	0.78	0.055	-0.386***	-0.342***					
4	Involuntary denied boarding $_{it1}$	1.004	0.874	-0.002	0.045	-0.114***				
5	Alliance portfolio size $_{it0}$ (log)	2.469	1.183	0.115***	-0.153***	-0.155*	-0.196***			
6	Multilateral alliance ratio $_{it0}$	0.175	0.163	-0.084**	0.163***	-0.008	-0.186***	0.035		
7	Partner country diversity ratio $_{it0}$	0.421	0.24	0.162***	0.096**	-0.023	-0.203***	0.284***	0.020	
8	Channel-dominated alliance ratio $_{it0}$	5.058	5.759	0.021	-0.050	-0.054	-0.131***	0.737***	0.051	0.056
9	Backward competitor-dominated alliance ratio $_{it0}$	1.891	2.229	0.069*	0.023	-0.091*	-0.146***	0.734***	0.074*	0.135***
10	Alliance experience $_{it0}$	111.085	142.572	0.018	-0.019	-0.146	-0.04?	0.768*	0.079	0.095
11	Alliance portfolio size $_{it0}$ (log)* Alliance experience $_{it0}$	96.358	135.065	-0.111***	0.321***	0.0282	-0.051	-0.063	0.279*	0.002
12	Multilateral alliance ratio $_{it0}$* Alliance experience $_{it0}$	-0.915	17.636	0.044	-0.115***	-0.0657	0.091**	0.132***	-0.678***	0.165***

No. of observations = 601; *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

		Mean	SD	1	2	3	4	5	6	7
13	Country diversity $_{it0}$ *Alliance experience $_{it0}$	-2.769	20.229	0.110***	-0.046	0.039	-0.138***	-0.287***	0.126***	-0.489***
14	Firm size$_{it1}$ (log)	10.578	0.716	0.049	0.176***	0.108*	-0.377***	0.364*	0.117***	0.487***
15	Airline type	0.739	0.44	0.094**	0.247***	0.041	-0.327***	0.378***	0.226***	0.705***
16	Repeat alliance$_{it0}$	4.656	6.498	0.023	-0.045	-0.097*	-0.026	0.731***	0.133***	0.062
17	September 11th, 2001	0.338	0.474	-0.220***	-0.189***	0.023	-0.043	0.509***	0.004	-0.170***

No. of observations = 601; *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

		Mean	SD	8	9	10	11	12	13	14	15	16
9	Backward competitor-dominated alliance ratio	1.891	2.229	0.736***								
10	Alliance experience $_{it0}$	111.085	142.572	0.802***	0.784***							
11	Alliance portfolio size $_{it0}$ (log)* Alliance experience $_{it0}$	96.358	135.065	0.288***	0.227***	0.431***						
12	Multilateral alliance ratio $_{it0}$* Alliance experience $_{it0}$	-0.915	17.636	0.111***	0.047	-.000	-0.301***					
13	Country diversity $_{it0}$*Alliance experience $_{it0}$	-2.769	20.229	-0.146***	-0.182***	-0.283***	-0.062	-0.211***				
14	Firm size$_{it1}$ (log)	10.578	0.716	0.395***	0.572***	0.277***	0.284***	-0.004	-0.054			
15	Airline type	0.739	0.44	0.268***	0.423***	0.335***	0.339***	-0.036	-0.119***	0.820***		
16	Repeat alliance$_{it0}$	4.656	6.498	0.633***	0.822***	0.866***	0.286***	-0.031	-0.264***	0.342***	0.341***	
17	September 11th, 2001	0.338	0.474	0.580***	0.383***	0.644***	0.236***	0.020	-0.158***	-0.123***	-0.081*	0.438***

No. of observations = 601; *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Table 5: Hypotheses 1, DVs-Customer Complaint and Mishandled Baggage

	Model 1 Customer complaint$_{it1}$	Model 2 Customer complaint$_{it1}$	Model 3 Mishandled baggage $_{it1}$	Model 4 Mishandled baggage $_{it1}$
Control variables				
Airline type	0.090	0.135	2.759***	2.685***
	(0.239)	(0.224)	(0.475)	(0.509)
Firm size $_{it1}$ (log)	-0.096	-0.288**	-1.405***	-1.231***
	(0.145)	(0.140)	(0.264)	(0.288)
September 11th, 2001	-0.734***	-0.992***	-0.479***	-0.253
	(0.106)	(0.113)	(0.148)	(0.161)
No. of repeat alliance $_{it1}$	0.045***	0.011	-0.029**	0.006
	(0.009)	(0.011)	(0.013)	(0.016)
Independent variable				
Portfolio size $_{it0}$ (log)		0.322***		-0.312***
		(0.057)		(0.0813)
Constant	2.253	3.705***	18.27***	17.00***
	(1.407)	(1.345)	(2.560)	(2.771)
Overall R^2	0.062	0.135	0.053	0.081
Chi square	52.80***	87.40***	63.43***	80.12***
F-value for change in R^2		49.887***		18.654***

*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$
Standard errors in parentheses
No. of observations = 601

Table 6: Hypothesis 1, DVs- On-time Arrival and Involuntary Denied Boarding

	Model 5 On-time arrival$_{it1}$	Model 6 On-time arrival$_{it1}$	Model 7 Involuntary denied boarding$_{it1}$	Model 8 Involuntary denied boarding$_{it1}$
Control variables				
Airline type	-0.028	-0.059**	0.256	0.083
	(0.022)	(0.025)	(0.327)	(0.354)
Firm size $_{it1}$ (log)	0.038***	0.073***	-0.911***	-0.706***
	(0.011)	(0.012)	(0.164)	(0.181)
September 11th, 2001	0.025***	0.045***	-0.518***	-0.382***
	(0.006)	(0.006)	(0.083)	(0.091)
No. of repeat alliance $_{it1}$	-0.003***	-0.001	0.048***	0.068***
	(0.001)	(0.001)	(0.008)	(0.009)
Independent variable				
Portfolio size $_{it0}$ (log)		-0.022***		-0.170***
		(0.003)		(0.046)
Constant	0.407***	0.092	10.40***	8.631***
	(0.110)	(0.120)	(1.597)	(1.739)
Overall R^2	.062	0.135	0.174	0.195
Chi square	52.80**	87.40**	75.21***	88.43***
F-value for change in R^2		21.673***		15.594***

*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$
Standard errors in parentheses
No. of observations = 601

Hypothesis 2: Multilateral alliance ratio

Hypothesis 2 predicted that the multilateral alliance ratio of an alliance portfolio is negatively related to customer service quality. Since SDC alliance database did not report any multilateral alliance formation by America West and Southwest over the 20-year period, in testing H2 to better detect the effects of multilateral alliance formation on service quality, America West and Southwest were removed from the sample. The resultant number of observations is 495 for testing H2. Tables 7 and 8 present the analyses results of H2.

Customer complaint

The results of model 2 indicate that the overall model ($R^2 = 0.112$, Chi square $= 61.35$, $p < 0.01$) was significant, but the incremental change in R square ($F = 3.571$, $p < 0.10$) was only marginally significant after the multilateral alliance ratio was entered in addition to the control variables in model 1. The multilateral alliance ratio ($F = -0.510$, $p < 0.10$) was only marginally negatively related to customer complaint, inconsistent with H2.

Mishandled baggage

Although the results of model 4 indicate that both the overall model ($R^2 = 0.118$, Chi square $= 65.18$, $p < 0.01$), and the incremental change in R square ($F = 35.015$, $p < 0.01$) were significant after the multilateral alliance ratio was entered, the multilateral alliance ratio ($F = 0.412$, $p > 0.10$) was not significantly related to mishandled baggage, lending no support to H2.

<u>On-time arrival</u>

The results of model 6 indicate that the overall model ($R^2 = 0.114$, Chi square = 63.06, $p < 0.01$), and the incremental change in R square (F = 18.239, $p < 0.01$) were significant after the multilateral alliance ratio was entered. Multilateral alliance ratio (beta = 0.041, $p < 0.01$) was positively related to on-time arrival. This result suggests that as an airline increasingly participates in multilateral alliances, its on-time arrival rate is higher, thus inconsistent with H2.

<u>Involuntary denied boarding</u>

The results of model 8 suggest that the overall model ($R^2 = 0.211$, Chi square =130.72, $p < 0.01$), and the incremental change in R square (F = 16.273, $p < 0.01$) were significant after multilateral alliance ratio was entered. Multilateral alliance ratio (beta = -0.812, $p < 0.01$) was negatively related to involuntary denied boarding. This result suggests that as airlines increasingly participate in multilateral alliances, their involuntary denied boarding is lower, thus inconsistent with H2.

Taken together, the test results suggest that multilateral alliance ratio is not negatively related to any of the four service quality dimensions. Thus, H2 is not supported.

Table 7: Hypothesis 2, DVs-Customer Complaint and Mishandled Baggage

	Model 1 Customer complaint$_{it1}$	Model 2 Customer complaint$_{it1}$	Model 3 Mishandled baggage $_{it1}$	Model 4 Mishandled baggage $_{it1}$
Control variables				
Airline type	0.086	-0.031	3.509***	0.904**
	(0.235)	(0.242)	(0.739)	(0.395)
Firm size $_{it1}$ (log)	0.022	0.049	-1.645***	-0.010
	(0.120)	(0.120)	(0.346)	(0.196)
September 11th, 2001	-0.624***	-0.611***	-0.498**	-0.082
	(0.115)	(0.115)	(0.203)	(0.188)
No. of repeat alliance $_{it1}$	-0.011	-0.009	0.045**	0.038**
	(0.009)	(0.009)	(0.019)	(0.015)
Independent variables				
Portfolio size $_{it0}$ (log)	0.255***	0.240***	-0.477***	-0.555***
	(0.054)	(0.055)	(0.092)	(0.090)
Multilateral alliance ratio$_{it0}$		-0.510*		0.412
		(0.270)		(0.441)
Constant	0.562	0.519	21.00***	5.794***
	(1.115)	(1.112)	(3.219)	(1.815)
Observations	495	495	495	495
Overall R^2	0.105	0.112	0.055	0.118
Chi square	57.49***	61.35***	89.29***	65.18***
F-value for change in R^2		3.571*		35.015***

*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$
Standard errors in parentheses
No. of observations $= 495$

Table 8: Hypothesis 2, DVs- On-Time Arrival and Involuntary Denied Boarding

	Model 5 On-time arrival$_{it1}$	Model 6 On-time arrival$_{it1}$	Model 7 Involuntary denied boarding$_{it1}$	Model 8 Involuntary denied boarding$_{it1}$
Control variables				
Airline type	-0.002	0.054***	0.446**	0.261
	(0.022)	(0.014)	(0.177)	(0.181)
Firm size $_{it1}$ (log)	0.039***	0.006	-0.630***	-0.588***
	(0.011)	(0.007)	(0.090)	(0.090)
September 11th, 2001	0.032***	0.018***	-0.152*	-0.131
	(0.007)	(0.007)	(0.087)	(0.086)
No. of repeat alliance $_{it1}$	-0.001	-0.000	0.042***	0.0445***
	(0.001)	(0.001)	(0.007)	(0.007)
Independent variables				
Portfolio size $_{it0}$ (log)	-0.015***	-0.012***	-0.126***	-0.150***
	(0.003)	(0.003)	(0.041)	(0.041)
Multilateral alliance ratio $_{it0}$		0.041***		-0.812***
		(0.016)		(0.201)
Constant	0.396***	0.680***	7.400***	7.332***
	(0.103)	(0.065)	(0.841)	(0.829)
Overall R^2	0.081	0.114	0.185	0.211
Chi square	53.61***	63.06***	111.01***	130.72***
F-value for change in R^2		18.239***		16.273***

*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$
Standard errors in parentheses
No. of observations = 495

Hypothesis 3: Partner country diversity ratio

Hypothesis 3 predicted a negative relationship between partner country diversity ratio and customer service quality. Since SDC did not report that Southwest had formed alliances with any foreign partners between 1988 and 2007, in testing H3, Southwest was removed from the sample. The resultant number of observations was 552. Tables 9 and 10 present the test results of hypothesis 3.

Customer complaint

The results of model 2 indicate that the overall model ($R^2 = 0.116$, Chi square = 71.83, $p < 0.01$) was significant, but the incremental change in R square (F = 0.006, $p > 0.10$) was not significant after partner country diversity ratio was entered. Also, partner country diversity ratio (F = 0.287, $p > 0.10$) was not significantly related to customer complaint, providing no support to H3.

Mishandled baggage

The results of model 4 indicate the overall model ($R^2 = 0.077$, Chi square = 71.83, $p < 0.01$), but the incremental change in R square (F = -9.401, $p > 0.10$) was not significant after partner country diversity ratio was entered. Also, partner country diversity ratio (F = -0.304, $p < 0.1$) was not significantly related to mishandled baggage, providing no support to H3.

On-time arrival

Although the results of model 6 indicate that both the overall model ($R^2 = 0.090$, Chi square = 54.05, $p < 0.01$) and the incremental change in R square (F =

9.362, p < 0.01) were significant after partner country diversity ratio was entered, partner country diversity ratio (F = 0.009, p > 0.1) was not significantly related to on-time arrival, providing no support to H3.

Involuntary denied boarding

The results of model 8 show that both the overall model (R^2 = 0.199, Chi square = 64.34, p > 0.01) and the incremental change in R square (F = 7.501, p < 0.01) were significant after partner country diversity ratio was entered. Further, country diversity ratio (F = 7.501, p < 0.1) was found significantly positively related to involuntary denied boarding. This significant positive relationship suggests that as partner country diversity ratio increases, involuntary denied boarding rate becomes higher, thus lending support to H3.

In sum, despite the three insignificant results, the results provide partial support to H3 in that as partner country diversity ratio increases, the involuntary denied boarding rate becomes higher.

Table 9: Hypothesis 3, DVs-Customer Complaint and Mishandled Baggage

	Model 1 Customer complaint$_{it1}$	Model 2 Customer complaint$_{it1}$	Model 3 Mishandled baggage $_{it1}$	Model 4 Mishandled baggage $_{it1}$
Control variables				
Airline type	-0.622***	-0.591**	3.067***	3.824***
	(0.237)	(0.261)	(0.564)	(0.659)
Firm size $_{it1}$ (log)	0.087	0.083	-1.298***	-1.711***
	(0.137)	(0.137)	(0.305)	(0.343)
September 11th, 2001	-0.824***	-0.829***	-0.412**	-0.510***
	(0.125)	(0.126)	(0.177)	(0.179)
No. of repeat alliance$_{it1}$	-0.017	-0.018	0.040**	0.0317*
	(0.010)	(0.011)	(0.017)	(0.018)
Independent variables				
Portfolio size $_{it0}$ (log)	0.351***	0.358***	-0.460***	-0.398***
	(0.062)	(0.066)	(0.086)	(0.092)
Partner country diversity ratio $_{it0}$		-0.082		-0.346
		(0.287)		(0.402)
Constant	0.403	0.443	17.61***	21.45***
	(1.279)	(1.287)	(2.841)	(3.193)
Overall R^2	0.116	0.116	0.092	0.077
Chi square	71.87***	71.83***	92.40***	101.15***
F-value for change in R^2		.006		-9.401

*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$
Standard errors in parentheses
No. of observations = 552

Table 10: Hypothesis 3, DVs- On-Time Arrival and Involuntary Denied Boarding

	Model 5 On-time arrival$_{it1}$	Model 6 On-time arrival$_{it1}$	Model 7 Involuntary denied boarding$_{it1}$	Model 8 Involuntary denied boarding$_{it1}$
Control variables				
Airline type	-0.029	0.012	0.451	0.470
	(0.020)	(0.014)	(0.452)	(0.479)
Firm size $_{it1}$ (log)	0.047***	0.015**	-0.777***	-0.876***
	(0.012)	(0.007)	(0.209)	(0.219)
September 11th, 2001	0.039***	0.026***	-0.392***	-0.382***
	(0.007)	(0.007)	(0.103)	(0.103)
No. of repeat alliance $_{it1}$	-0.001	0.000	0.066***	0.072***
	(0.001)	(0.001)	(0.010)	(0.011)
Independent variables				
Portfolio size $_{it0}$ (log)	-0.019***	-0.017***	-0.153***	-0.187***
	(0.003)	(0.003)	(0.050)	(0.052)
Partner country diversity ratio $_{it0}$		0.009		0.445*
		(0.015)		(0.231)
Constant	0.343***	0.635***	9.004***	9.883***
	(0.104)	(0.068)	(1.958)	(2.046)
Overall R^2	0.075	0.090	0.188	0.199
Chi square	69.70***	54.05***	61.20***	64.34***
F-value for change in R^2		9.362***		7.501***

*** $p<0.01$, ** $p<0.05$, * $p<0.1$
Standard errors in parentheses
No. of observations=552

Hypothesis 4: Alliance type

Hypothesis 4 predicted that channel-dominated alliance ratio is more negatively related to customer service quality than backward competitor-dominated alliance ratio. Since SDC did not report any backward competitor-dominated alliances by Alaska and America West over the 20-year period, in testing hypothesis 4, these two airlines were removed from the analysis in order to better detect the effects of alliance type on service quality. The resultant number of observations was 495. Tables 11 and 12 present the analyses to test hypothesis 4.

Customer complaint

The results of model 2 indicate that the overall model ($R^2 = 0.201$, Chi square = 122.62, $p < 0.01$) was significant and channel-dominated alliance ratio (beta = 0.683, $p < 0.01$) and backward competitor-dominated alliance ratio (beta = -0.965, $p < 0.01$) were found positively related to customer complaint. Yet, the incremental change in R square (F = 14.569, $p > 0.10$) was insignificant after the channel-dominated alliance ratio and backward competitor-dominated alliance ratio were entered. Further, a post regression test suggests that the coefficient difference (Chi square = 1.17, $p > 0.10$) between channel-dominated alliance ratio and backward competitor-dominated alliance ratio was not significant, lending no support to H4.

Mishandled baggage

The results of model 4 indicate that the overall model ($R^2 = 0.126$, Chi square = 70.19, $p < 0.01$), but the incremental change in R square (F = 37.612, $p > 0.01$) was not significant after the channel-dominated alliance ratio and backward

101

competitor-dominated alliance ratio were entered. Further, channel-dominated alliance ratio (beta = 0.946, p < 0.01) was positively related to mishandled baggage, but backward competitor-dominated alliance ratio (beta = 0.946, p > 0.10) was not significantly related to mishandled baggage. Furthermore, a post regression test suggests that the coefficient difference (Chi square = 2.05, p > 0.10) between channel-dominated alliance ratio and backward competitor-dominated alliance ratio was not significant, thus lending no support to H4.

On-time arrival

The results of model 6 suggest that both the overall model (R^2 = 0.105, Chi square = 57.22, p < 0.01) and the incremental change in R square (F = 28.570, p < 0.01) were significant after the channel-dominated alliance ratio and backward competitor-dominated alliance ratio were entered. Channel-dominated alliance ratio (beta = -.009, p > 0.10) was not significantly related to on-time arrival, but backward competitor-dominated alliance ratio (beta = -0.06, p < 0.01) was negatively related to on-time arrival. A post regression test suggests that the coefficient difference (Chi square = 12.03, p < 0.01) between channel-dominated alliance ratio and backward competitor-dominated alliance ratio was significant. This result suggests that backward competitor-dominated alliances are associated with lower on-time arrival than channel-dominated alliances, inconsistent with H4.

Involuntary denied boarding

The results of model 8 indicate that both the overall model (R^2 = 0.241, Chi square =154.85, p < 0.01) and the incremental change in R square (F = 14.314, p < 0.01) were significant after channel-dominated alliance ratio and backward

competitor-dominated alliance ratio were entered. Channel-dominated alliance ratio (beta = -0.675, p < 0.01) was negatively related to involuntary denied boarding but backward competitor-dominated alliance (beta = -0.225, p > 0.10) was not significantly related. A post regression test suggests that the coefficient difference (Chi square = 5.37, p < 0.05) between channel-dominated alliance ratio and backward competitor- dominated alliance ratio was more negatively related to involuntary denied boarding than backward competitor-dominated alliance ratio, thus lending support to H4.

In sum, the results suggest that H4 is supported only when the service quality dimension is involuntary denied boarding rate such that increases in channel-dominated alliances are associated with deteriorating involuntary denied boarding rate.

Table 11: Hypothesis 4, DVs-Customer Complaint and Mishandled Baggage

	Model 1 Customer complaint$_{it1}$	Model 2 Customer complaint$_{it1}$	Model 3 Mishandled baggage $_{it1}$	Model 4 Mishandled baggage $_{it1}$
Control variables				
Airline type	0.728***	1.339***	1.983***	1.855***
	(0.153)	(0.227)	(0.509)	(0.360)
Firm size $_{it1}$ (log)	0.027	-0.225	-0.991***	-0.040
	(0.117)	(0.138)	(0.330)	(0.219)
September 11th, 2001	-0.586***	-0.709***	-0.107	-0.031
	(0.115)	(0.122)	(0.194)	(0.193)
No. of repeat alliance$_{it1}$	-0.009	-0.008	-0.001	0.021
	(0.008)	(0.009)	(0.017)	(0.014)
Independent variables				
Portfolio size $_{it0}$ (log)	0.225***	0.279***	-0.292***	-0.421***
	(0.052)	(0.055)	(0.086)	(0.088)
Channel-dominated alliance ratio $_{it0}$		0.683***		0.946**
		(0.244)		(0.386)
Backward competitor-dominated alliance ratio $_{it0}$		0.965***		0.356
		(0.266)		(0.421)
Constant	-0.069	1.704	15.02***	4.721**
	(1.217)	(1.341)	(3.421)	(2.121)
Overall R^2	0.177	0.201	0.059	0.126
Chi square	105.31***	122.62***	55.35***	70.19***
F-value for change in R^2		14.569***		37.612***

*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$
Standard errors in parentheses
No. of observations = 495

Table 12: Hypothesis 4, DVs- On-Time Arrival and Involuntary Denied Boarding

	Model 5 On-time arrival$_{it1}$	Model 6 On-time arrival$_{it1}$	Model 7 Involuntary denied boarding$_{it1}$	Model 8 Involuntary denied boarding$_{it1}$
Control variables				
Airline type	-0.028*	-0.039***	-0.343***	-0.737***
	(0.015)	(0.013)	(0.114)	(0.170)
Firm size $_{it1}$ (log)	0.039***	0.016*	-0.654***	-0.457***
	(0.011)	(0.008)	(0.087)	(0.103)
September 11th, 2001	0.030***	0.019***	-0.180**	-0.052
	(0.007)	(0.007)	(0.086)	(0.091)
No. of repeat alliance$_{it1}$	-0.001	0.000	0.045***	0.037***
	(0.001)	(0.001)	(0.006)	(0.007)
Independent variables				
Portfolio size $_{it0}$ (log)	-0.014***	-0.017***	-0.134***	-0.122***
	(0.003)	(0.003)	(0.039)	(0.041)
Channel-dominated alliance ratio $_{it0}$		-0.009		-0.675***
		(0.014)		(0.182)
Backward competitor-dominated alliance ratio $_{it0}$		-0.060***		-0.225
		(0.015)		(0.199)
Constant	0.415***	0.698***	8.469***	6.855***
	(0.111)	(0.078)	(0.908)	(1.001)
Overall R^2	0.053	0.105	0.219	0.241
Chi square	45.90***	57.22***	137.16***	154.85***
F-value for change in R^2		28.570***		14.314***

*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$
Standard errors in parentheses
No. of observations = 495

Hypothesis 5a: Interaction between alliance portfolio size and alliance experience

H5a predicted that alliance experience moderates the effects of alliance portfolio size on service quality such that as alliance experience increases, the relationship between alliance portfolio size and service quality becomes less negative or more positive. Table 13 and 14 presents the analyses to test hypothesis 5a.

Customer complaint

The results of model 2 indicate that both the overall model ($R^2 = 0.145$, Chi square = 88.80, p > 0.01) and the incremental change in R square (F = 14.569, p < 0.01) were significant after the alliance portfolio size*alliance experience was entered. Yet, the interaction term, alliance portfolio size* alliance experience (beta = -0.001, p > 0.10), was not significantly related to customer complaint, lending no support to H5a.
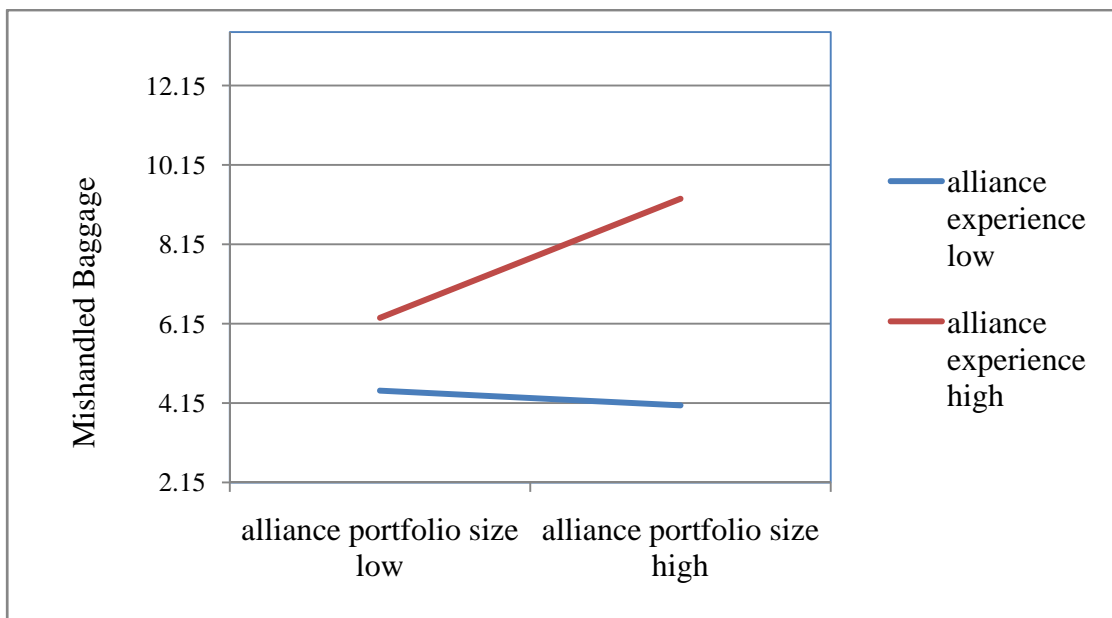

Figure 2: Interaction Effect of Alliance Portfolio Size and Alliance Experience on Mishandled Baggage

Mishandled baggage

The results of model 4 indicate the overall model ($R^2 = 0.117$, Chi square = 134.20, $p < 0.01$), and the incremental change in R square (F = 8.864, $p < 0.01$) after the interaction term, alliance portfolio size* alliance experience, was entered. The interaction term, alliance portfolio size* alliance experience (beta = 0.005, $p < 0.01$), was positively related to mishandled baggage. I followed the recommendation of Cohen et al. (2003) to plot the interaction in Figure 2. The plot suggests that when alliance experience is high, increases in alliance portfolio size lead to higher mishandled baggage rate, inconsistent with H5a.

On-time arrival

The results of model 6 indicate the overall model ($R^2 = 0.134$, Chi square = 135.84, $p < 0.01$) and the incremental change in R square (F = 5.682, $p < 0.05$) were significant after alliance portfolio size *alliance experience was entered. The interaction term, alliance portfolio size *alliance experience (beta = -0.000, $p < 0.01$) was significantly negatively related to on-time arrival. Figure 3 plots the interaction and suggests that when alliance experience is low, the larger an airline's alliance portfolio size, the higher on-time arrival. But when alliance experience is high, increases in alliance portfolio size are associated with lower on-time arrival rate. This is inconsistent with H5a prediction.

Table 13: Hypothesis 5a, DVs-Customer Complaint and Mishandled Baggage

	Model 1 Customer complaint$_{it1}$	Model 2 Customer complaint$_{it1}$	Model 3 Mishandled baggage $_{it1}$	Model 4 Mishandled baggage $_{it1}$
Control variables				
Airline type	0.135	-0.212	2.685***	2.193***
	(0.224)	(0.285)	(0.509)	(0.761)
Firm size $_{it1}$ (log)	-0.288**	-0.190	-1.231***	-1.625***
	(0.140)	(0.172)	(0.288)	(0.360)
September 11th, 2001	-0.992***	-1.189***	-0.253	-1.115***
	(0.113)	(0.142)	(0.161)	(0.200)
No. of repeat alliance$_{it1}$	0.011	0.008	0.006	-0.002
	(0.011)	(0.019)	(0.016)	(0.032)
Independent variables				
Alliance portfolio size $_{it0}$ (log)	0.322***	0.415***	-0.312***	0.321**
	(0.0571)	(0.104)	(0.081)	(0.159)
Alliance experience $_{it0}$		0.000		-0.002
		(0.001)		(0.002)
Alliance portfolio size $_{it0}$ (log)* Alliance experience $_{it0}$		0.001		0.005***
		(0.001)		(0.001)
Constant	3.705***	2.661	17.000***	20.050***
	(1.345)	(1.629)	(2.771)	(3.432)
Overall R^2	0.145	0.1309	0.104	0.117
Chi square	88.80***	90.88***	105.24***	134.20***
F-value for change in R^2		-9.279		8.864***

*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$
Standard errors in parentheses
No. of observations = 601

Table 14: Hypothesis 5a, DVs- On-time Arrival and Involuntary Denied Boarding

	Model 5 On-time arrival$_{it1}$	Model 6 On-time arrival$_{it1}$	Model 7 Involuntary denied boarding $_{it1}$	Model 8 Involuntary denied boarding $_{it1}$
Control variables				
Airline type	-0.059**	-0.019	0.0828	0.129
	(0.025)	(0.029)	(0.35)	(0.44)
Firm size $_{it1}$ (log)	0.073***	0.064***	-0.706***	-0.655***
	(0.012)	(0.014)	(0.18)	(0.21)
September 11th, 2001	0.045***	0.073***	-0.382***	-0.371***
	(0.006)	(0.008)	(0.091)	(0.12)
No. of repeat alliance$_{it1}$	-0.001	0.001	0.068***	0.046**
	(0.001)	(0.001)	(0.009)	(0.018)
Independent variables	-0.022***	-0.037***	-0.170***	-0.267***
Alliance portfolio size $_{it0}$ (log)	(0.003)	(0.006)	(0.046)	(0.091)
Alliance experience $_{it0}$		-0.000		0.002
		(0.000)		(0.001)
Alliance portfolio size $_{it0}$ (log)* Alliance experience $_{it0}$		-0.000***		-0.001
		(0.000)		(0.001)
Constant	0.092	0.198	8.631***	8.289***
	(0.12)	(0.13)	(1.74)	(1.99)
Overall R^2	0.126	0.134	0.203	0.212
Chi square	122.31***	135.84***	89.97***	89.56***
F-value for change in R^2		5.682**		6.547**

*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$
Standard errors in parentheses
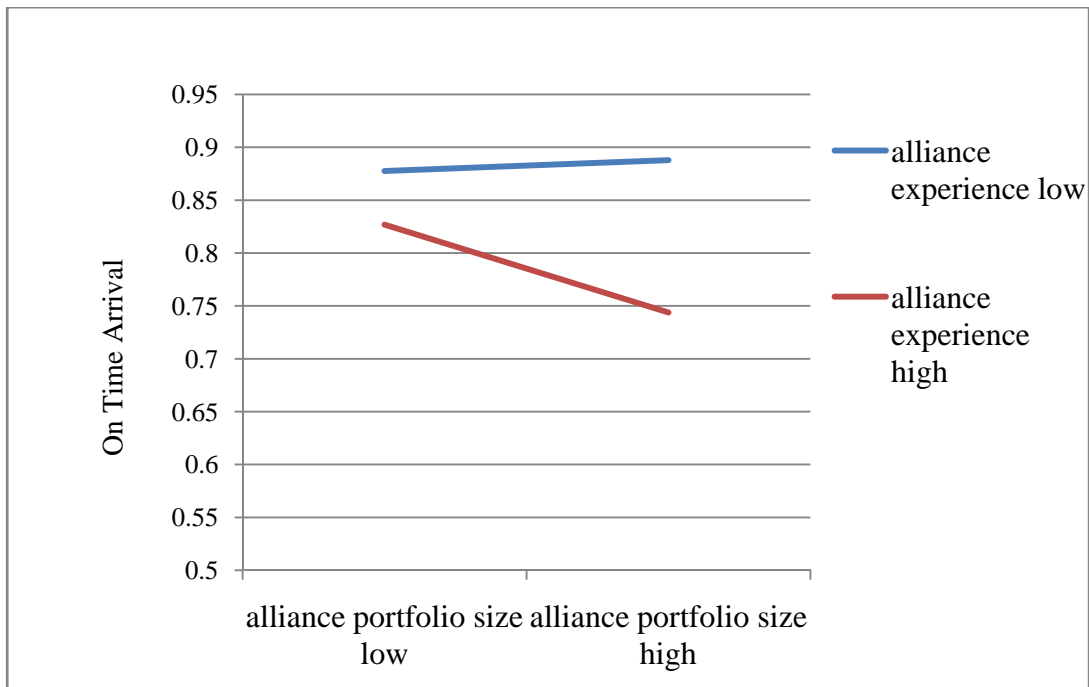No. of observations = 601

Figure 3: Interaction Effect of Alliance Portfolio Size and Alliance Experience on On-Time Arrival

<u>Involuntary denied boarding</u>

The results of model 8 indicate the overall model ($R^2 = 0.212$, Chi square = 89.56, $p < 0.01$) and the incremental change in R square (F = 6.547, $p < 0.05$) were significant after the interaction term, alliance portfolio size *alliance experience was entered. The interaction term (beta = -0.001, $p > 0.10$) was not significantly related to involuntary denied boarding, lending no support to H5a.

In sum, the test results suggest that as alliance experience does not positively moderate the relationship between alliance portfolio size and customer service quality with respect to any of the four service dimensions. Thus, H5a was not supported.

Hypothesis 5b: Interaction between multilateral alliance ratio and alliance experience

H5b predicted that alliance experience enhances the relationship between multilateral alliance ratio and customer service quality. As with testing hypothesis 2, similarly in testing H5b, America West and Southwest were removed from the sample because these two airlines were not reported to have any multilateral alliances. The resultant number of observations is 495. Tables 15 and 16 present the analyses to test hypothesis 5b.

Customer complaint

The results of model 2 show that both the overall model ($R^2 = 0.138$, Chi square = 78.03, $p > 0.01$), and the incremental change in R square (F = 5.245 $p < 0.05$) were significant after multilateral alliance ratio*alliance experience was entered. Multilateral alliance ratio*alliance experience (beta = -0.009, $p < 0.05$) was negatively related to customer complaint. The interaction plot is presented in Figure 4 and suggests that when alliance experience is high, as multilateral alliance ratio increases, customer complaint ratio decreases, thus lending support to H5b.
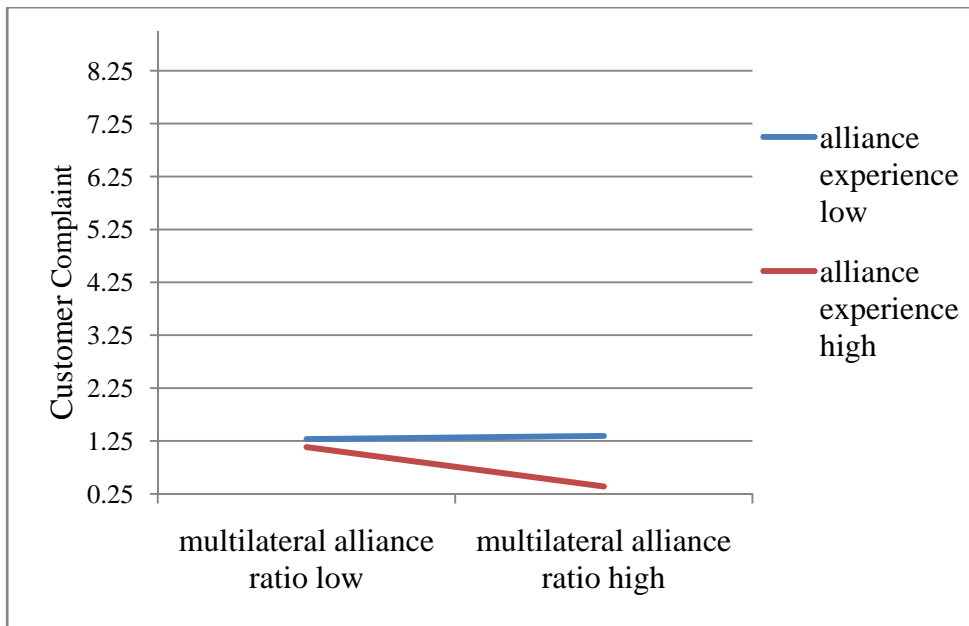
Figure 4: Interaction Effect of Multilateral Alliance Ratio and Alliance Experience on Customer Complaint

Mishandled baggage

The results of model 4 indicate the overall model ($R^2 = 0.166$, Chi square = 96.70, p < 0.01) was significant but the incremental change in R square (F = 0.058, p > 0.10) was not significant after interaction term, multilateral alliance ratio* alliance experience, was entered. Further, multilateral alliance ratio * alliance experience (beta = -0.002, p > 0.10) was not significantly related to mishandled baggage, lending no support to H5b.

Table 15: Hypothesis 5b, DVs-Customer Complaint and Mishandled Baggage

	Model 1 Customer complaint$_{it1}$	Model 2 Customer complaint$_{it1}$	Model 3 Mishandled baggage $_{it1}$	Model 4 Mishandled baggage $_{it1}$
Control variables				
Airline type	-0.233	-0.535*	0.353	0.288
	(0.249)	(0.280)	(0.399)	(0.45)
Firm size $_{it1}$ (log)	0.083	0.155	0.0825	0.098
	(0.120)	(0.123)	(0.192)	(0.20)
September 11th, 2001	-0.868***	-0.857***	-0.784***	-0.781***
	(0.141)	(0.140)	(0.226)	(0.23)
No. of repeat alliance$_{it1}$	-0.036***	-0.041***	-0.034*	-0.035*
	(0.012)	(0.013)	(0.020)	(0.020)
Independent variables				
Alliance portfolio size $_{it0}$ (log)	0.197***	0.229***	-0.673***	-0.666***
	(0.056)	(0.058)	(0.090)	(0.093)
Alliance experience $_{it0}$	0.002***	0.002***	0.006***	0.006***
	(0.001)	(0.001)	(0.001)	(0.001)
Multilateral alliance ratio $_{it0}$	-0.524*	-1.441***	0.375	0.177
	(0.268)	(0.481)	(0.429)	(0.77)
Multilateral alliance ratio $_{it0}$* Alliance experience $_{it0}$		-0.009**		-0.002
		(0.003)		(0.006)
Constant	0.402	0.019	5.475***	5.393***
	(1.103)	(1.111)	(1.768)	(1.790)
Overall R^2	0.129	0.138	0.166	0.166
Chi square	72.13***	78.03***	96.78 ***	96.70***
F-value for change in R^2		5.245**		0.058

*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$
Standard errors in parentheses
No. of observations = 495

Table 16: Hypothesis 5b, DVs- On-Time Arrival and Involuntary Denied Boarding

	Model 5 On-time arrival$_{it1}$	Model 6 On-time arrival$_{it1}$	Model 7 Involuntary denied boarding $_{it1}$	Model 8 Involuntary denied boarding $_{it1}$
Control variables				
Airline type	0.077***	0.097***	0.172	0.339
	(0.014)	(0.016)	(0.187)	(0.211)
Firm size $_{it1}$ (log)	0.002	-0.002	-0.573***	-0.613***
	(0.007)	(0.007)	(0.090)	(0.093)
September 11th, 2001	0.048***	0.047***	-0.245**	-0.251**
	(0.008)	(0.008)	(0.106)	(0.106)
No. of repeat alliance$_{it1}$	0.003***	0.003***	0.033***	0.036***
	(0.001)	(0.001)	(0.009)	(0.009)
Independent variables				
Alliance portfolio size $_{it0}$ (log)	-0.007**	-0.010***	-0.170***	-0.188***
	(0.003)	(0.003)	(0.042)	(0.043)
Alliance experience $_{it0}$	-0.000***	-0.000***	0.001*	0.001*
	(0.000)	(0.000)	(0.001)	(0.001)
Multilateral alliance ratio $_{it0}$	0.043***	0.104***	-0.818***	-0.308
	(0.015)	(0.027)	(0.201)	(0.361)
Multilateral alliance ratio $_{it0}$* Alliance experience $_{it0}$		0.001***		0.005*
		(0.000)		(0.003)
Constant	0.693***	0.719***	7.280***	7.493***
	(0.063)	(0.063)	(0.827)	(0.835)
Overall R^2	0.183	0.195	0.217	0.221
Chi square	108.92***	117.52***	134.70***	138.10***
F-value for change in R^2		7.182***		2.871*

*** p < 0.01, ** p < 0.05, * p < 0.1
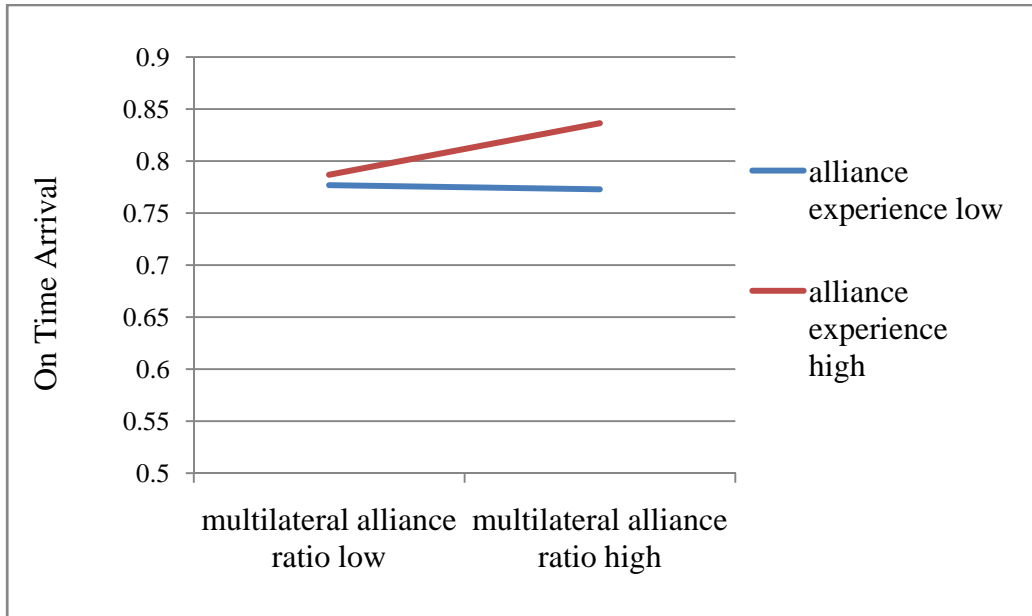Standard errors in parentheses
No. of observations = 495

Figure 5: Interaction Effect of Multilateral Alliance Ratio and Alliance Experience on On-Time Arrival

On-time arrival

The results of model 6 indicate that both the overall model ($R^2 = 0.195$, Chi square $= 117.52$, $p < 0.01$) and the incremental change in R square ($F = 7.182$, $p < 0.01$) were significant after multilateral alliance ratio* alliance experience was entered. Alliance portfolio size * alliance experience (beta $= 0.001$, $p < 0.01$) was significantly positively related to on-time arrival. The interaction plot presented in Figure 5 suggests that alliance experience positively moderates the relationship between multilateral alliance ratio and on-time arrival such that as multilateral alliance ratio increases, the higher alliance experience, the higher on-time arrival rate. On the other hand, under the low alliance experience condition, as a multilateral alliance ratio increases, on-time arrival is associated with a slight decrease. This finding is consistent with H5b.
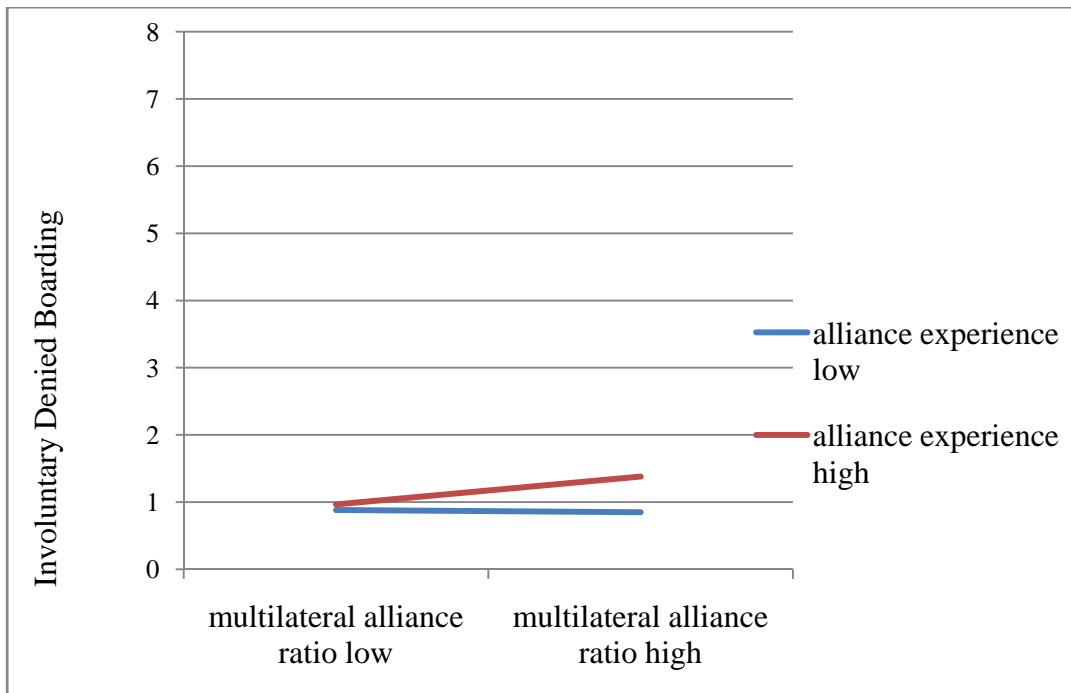
Figure 6: Interaction Effect of Multilateral Alliance Ratio and Alliance Experience on Involuntary Denied Boarding

Involuntary denied boarding

The results of model 8 indicate that the overall model ($R^2 = 0.221$, Chi square = 138.10, $p < 0.01$) was significant and the incremental change in R square ($F = 2.871$, $p < 0.10$) was marginally significant after the interaction term of multilateral alliance ratio* alliance experience was entered. Alliance portfolio size*alliance experience (beta = 0.005, $p > 0.10$) was marginally positively related to involuntary denied boarding. Figure 6 plots the interaction and suggests that when alliance experience is high, increase in multilateral alliances is associated with higher involuntary denied boarding, thus inconsistent with H5b.

In sum, H5 results indicate that as alliance experience increases, the effects of multilateral alliance ratio on consumer complaint and on-time arrival were improved, although involuntary denied boarding worsened.

Chapter 4 presented the research methodology to collect the data and test the proposed hypotheses. A discussion of the results, managerial implications, and limitations and future research appears in the next chapter.

CHAPTER FIVE: DISCUSSION

This chapter consists of four sections. The first section summarizes and discusses the results reported in chapter 4. The second section discusses managerial implications. In the third section, the limitations of this dissertation and implications for future research are discussed. Lastly, a conclusion is presented.

Discussion of Results

This dissertation seeks to investigate the paradoxical effects of alliance participation, specifically, on customer service quality. In the context of the U.S. airline industry, managers are constantly pressured to enhance revenues and contain costs. Participating in alliance becomes an attractive strategy because alliances allow airlines to obtain benefits that are hard to obtain on their own. Yet, alliances are a complex organizational form that involves managing independent partners to accomplish interdependent alliance tasks, demanding substantial time and effort of the boundedly rational managers. Increased alliance participation may overtax managers' capability in managing all aspects of customer service quality.

Customer service quality is an important organizational outcome especially in the U.S. airline industry. As noted earlier, Luo (2007) reported that Southwest Airlines' one percent increase in its customer complaints could lead to a $262 million loss in its stock returns, and American Airlines' one percent decrease in customer complaints would result in a substantial gain of $138 million from the stock market. Given the importance of customer service quality, if negative alliance effects on customer service quality exist, then an alliance paradox emerges.

Using longitudinal archival data of nine major U.S. airlines over a 20-year period, the effects of four alliance portfolio attributes (i.e., alliance portfolio size, multilateral alliance ratio, alliance partner country diversity, and alliance type) on customer service quality were first examined. Then, the moderating effects of alliance experience were tested. Table 17 provides a summary of the findings.

Altogether, as shown in Table 17, out of the 24 predicted relationships between alliance portfolio attributes and the four dimensions of service quality, only 6 were consistent with the hypotheses. Surprisingly, the results show that none of the hypothesized relationships were supported on all the four service quality dimensions. That is, although a hypothesis was supported on some service quality dimensions, inconsistent (opposite) or insignificant effects were reported on other dimensions. For example, as with H1, the effects of alliance portfolio size were confirmed on customer complaint and on-time arrival as predicted. However, the effects of alliance portfolio size on mishandled baggage and involuntary denied boarding were opposite to the H1 prediction.

This suggests that the relationships between alliance portfolio attributes and customer service quality are more complicated than initially proposed, thus creating a challenge in interpreting the results. In interpreting the results of H1-4, if there is at least one confirmed relationship, I interpret it as supported. This result interpretation strategy is consistent with the view of service as a total experience (Bowen & Ford, 2002), which posits that service is a holistic experience in that a drop in any key aspect of a customer's service experience leads to lower service quality experienced and perceived by customers. This is a valid argument. Suppose a passenger's flight arrived on time and she was not denied boarding, she would still perceive low service quality if her baggage were lost.

Similarly, in interpreting the results of H5a and H5b, if there is a result that suggests alliance experience negatively moderates the relationship between alliance portfolio size, multilateral alliance ratio and customer service quality, I interpret that hypothesis as not supported. This result interpretation strategy of H5 is also consistent with the view of service as a total experience because customers may have negative evaluations of their service experience if service deteriorates in some dimensions despite improvements in other dimensions.

H1 predicted a negative relationship between alliance portfolio size and customer service quality. Even though alliance portfolio size was associated with service improvements in mishandled baggage and involuntary denied boarding, the results suggest that alliance portfolio size was associated with higher customer complaints and lower on-time arrival rate. Thus, H1 was supported. As opposed to other studies that found positive relationships between alliance portfolio size and firm performance (e.g., Baum et al., 2000; Shan et al., 1994), this finding suggests that increasingly participating in a large number of alliances does constrain boundedly rational managers' capabilities of dealing with the inherent alliance complexities and thus may end up with lower customer service quality.

H2 predicted a negative relationship between multilateral alliance ratio and customer service quality. Surprisingly, this prediction was not supported on any of the four dimensions. This finding is inconsistent with the arguments that multilateral alliances are more complex to manage (Hwang & Burgers, 1997; Zeng & Chen, 2003). A possible explanation is that despite the inherent higher alliance complexities, airlines pay more attention to cooperating in multilateral alliance than in bilateral alliances due to higher level of alliance identification. Zeng and Chen proposed that "Alliance partners [in a multilateral alliance] will be less likely to cooperate with each

other when they have a low rather than a high level of identification with the alliance"

(p. 596). It is possible that airlines in multilateral alliances (e.g., SkyTeam, Star

Alliance and Oneworld) have higher level identification with the alliance, and are

more committed to alliance cooperation.

H3 predicted that alliance partner country diversity is negatively related to

customer service quality. The results show that even though alliance partner country

diversity was not significantly related to customer service quality with respect to

customer complaint, mishandled baggage, and on-time arrival, increasing partner

country diversity was positively related to involuntary denied boarding. In line with

the result interpretation strategy (i.e., service as a total experience), H3 was supported.

This finding is consistent with the idea that increasing geographic scope creates

higher management complexity and thus is associated with lower performance

(Goerzen & Beamish, 2005).

H4 predicted that channel-dominated alliance ratio is more negatively related

to service quality than backward competitor-dominated alliance ratio. The results

show that channel-dominated alliance ratio was more positively related to involuntary

boarding, thus, confirming H4. This finding suggests that different types of alliances

demand different levels of alliance management capabilities (Rothaermel & Deeds,

2006), and thus are associated with different effects on customer service quality.

H5a predicted that alliance experience positively moderates the relationship

between alliance portfolio size and customer service quality. The results did not

support H5a on any of the four dimensions. Moreover, the results suggest that as

alliance experience increases, the negative effects of alliance experience on

mishandled baggage became more severe. H5b predicted that alliance experience

positively moderates the relationship between multilateral alliance ratio and customer

service quality. Even though the results show that alliance experience improved the effects of multilateral alliance ratio on customer complaints and on-time arrival, the effect of multilateral alliance ratio on involuntary boarding worsened. In line with the "service as a total experience" approach, I interpret H5 as not supported. As opposed to other research that found positive effects of alliance experience (e.g., Hoang & Rothaermel, 2005; Rothaermel & Deeds, 2006), this finding indicates that customer service quality of airlines does not improve as their alliance experience accumulates over the years.

Overall, three out of five hypotheses received support (i.e., H1, H3, and H4). This finding unveils the alliance paradox and suggests that alliance participation does cause harm to customer service quality. Specifically, increases in alliance portfolio size, partner country diversity and channel-dominated alliances (compared with backward competitor-dominated alliances) are associated with lower customer service quality.

The next section discusses the limitations of this dissertation and continues with suggestions for future research.

Table 17: Summary of Results

	Customer Service Quality			
	Customer complaints	Mishandled baggage	On-time arrival	Involuntary denied boarding
H1: Alliance portfolio size	**consistent** [a]	inconsistent [b]	**consistent**	inconsistent
H2: Multilateral alliance ratio	inconsistent	insignificant [c]	inconsistent	inconsistent
H3: Partner country diversity ratio	insignificant	insignificant	insignificant	**consistent**
H4:Channel-dominated alliance ratio versus Backward competitor-dominated alliance ratio	insignificant	insignificant	inconsistent	**consistent**
H5a: Alliance portfolio size *Alliance experience	insignificant	inconsistent	inconsistent	insignificant
H5b:Multilateral alliance ratio * Alliance experience	**consistent**	insignificant	**consistent**	inconsistent

a: "consistent" denotes that the result is consistent with the hypothesized prediction, and lends support to the corresponding hypothesis.
b: "inconsistent" denotes that the result is opposite to the hypothesized prediction.
c: "insignificant" denotes that the relationship is not significant.

Limitations and Future research

There are several limitations of this dissertation. First, given the data limitation, some potential interaction effects between the independent variables were not studied. For example, the multilateral competitor-dominated alliances may have different effects on service quality from multilateral channel-dominated alliances. Future research may study the interaction effects of the independent variables in this dissertation. Using the companies that are both available in American Customer Service Index (ACSI) database and SDC database may result in sufficient sample size and thus facilitate such inquiries.

Second, the alliance experience moderating effects on partner country diversity and alliance type were not studied in this dissertation. Future study may investigate these two interactions. Also, the positive moderating effect of alliance experience on multilateral alliances was not confirmed. Probably, this happened because I did not specifically measure an airline's experience with multilateral alliance. It may be possible that an airline's alliance experience was only gained from dealing with bilateral alliances, thus was not effective in managing multilateral alliances.

Third, given the data unavailability, I did not control for the effects of dedicated alliance functions. Kale, Dyer and Singh (2002) argued that alliance experience is a crude proxy for alliance management capability. They found that firms with a dedicated alliance function had better performance. Future studies may investigate the effects of a dedicated alliance function on service quality.

Fourth, this dissertation has encountered a challenge in interpreting the hypotheses due to the lack of a good weighting system of the four airline service

dimensions. Even though Bowen and Headley (1991) developed a weighting system in their Airline Quality Ratings (AQR), their weighting system was based on a survey of airline managers' perceptions of the importance of these dimensions. Thus, AQR does not accurately capture the service quality evaluation from the customers' perspectives. As a result, future studies may first survey airline passengers to generate a weighting system that reflects customers' evaluations of the importance of these four dimensions and then create a composite score of service quality.

Fifth, despite the notable strengths of the SDC database, its alliance data may have compromised the analyses results. The alliance termination rate recorded in SDC database is relatively low in that only 5 out of 351 alliance announcements are alliance terminations. It is possible that airlines did not publicly announce their alliance terminations to avoid negative publicity. This lack of alliance termination data may have created severe threats to the alliance variables in this dissertation because some alliances are probably only short-term arms-length market transactions. Future research may involve interviews with the airline managers in the related functions to verify the durations of each alliance investigated in this dissertation.

Sixth, researchers may conduct qualitative studies to help understand the findings of this dissertation. This dissertation is built on the theoretical premise of managers' bounded rationality (March & Simon, 1958). The bounded rationality argument presupposes that the alliance participation dampens the various alliance benefits. Surprisingly, several analyses results are in the opposite direction to the hypothesized relationships (see Table 17). These inconsistent results suggest that bounded rationality is at work but insufficient to explain all the results reported in this dissertation. Future research may include qualitative studies such as interviews with airline managers to understand, for example, why multilateral alliances were

associated with improvements in customer complaints, on-time arrival and involuntary denied boarding in testing H2, and why backward competitor-dominated alliances were more negatively related to on-time arrival than channel-dominated alliances in testing H4.

Seventh, future research may use different regression procedures and time lags to validate the results reported in this dissertation. This dissertation used random panel regressions to test the hypotheses. Future research may use difference in difference regressions to detect the differential effects of alliances on service quality to corroborate the results reported in this dissertation. Also, future research may use different time lags such as 6 months or 12 months to compare the results because it is possible that under certain circumstances, the time lag of 3 months may not be long enough for the alliance effects to show on service quality.

Lastly, since this dissertation relied on data from a single, unique industry, future research should cross-validate the results of this dissertation in other industries. As mentioned earlier, using data from ACSI and SDC databases is a viable approach.

Managerial Implications

Participating in alliances provides potential financial benefits such as revenue enhancements from greater market access and cost reductions. Yet, managers are constrained by their limited time and effort to manage the inherently complex alliance relationships. I hope to demonstrate that alliance participation may have unintended consequences, particularly as it relates to customer service quality, that managers should be aware of. As a result, managers should look at the full consequences of alliance participation, not just revenue enhancements or cost reductions, when contemplating alliance arrangements.

The results of this dissertation indicated that although alliance participation provides critical benefits to the airlines, when the total number of existing alliances is high, the drop in customer service with respect to customer complaints and on-time arrival was observed. Therefore, managers should also pay more attention to mishandled baggage and involuntary denied boarding. Also, as airlines pursue international alliances, they should be more attentive to the issues related to involuntary denied boarding.

Another implication for the airline managers is that channel-dominated alliance ratio has more detrimental effects on involuntary denied boarding than backward competitor-dominated alliance ratio. This suggests that managers should increase their interfirm coordination efforts with, for example, its ticket sales agents and ticket reservation websites to ensure accurate flight information.

Also, since the moderating effects of alliance experience were not significant, airline managers should seek other more active means to manage alliances, such as setting up a dedicated function to coordinate alliance activities in order enhance alliance performance (Kale et al., 2002).

Given the currently heightened pressure to lower costs and enhance revenues, participating in airline alliances is an attractive strategy even to ensure airline survival. Interestingly, this dissertation reported that participating in multilateral alliances does not hurt service quality. Thus, managers should consider participating more in multilateral alliances such as SkyTeam, Star Alliance and Oneworld than in bilateral alliances.

Conclusion

This dissertation makes three important contributions. First, this dissertation contributes to alliance research by exploring the potential dark side of alliance participation. The results unveiled an alliance paradox. Despite the potential alliance benefits, managing interdependent alliance activities performed by independent firms to produce and deliver products/services creates substantial alliance management complexity. Since managers are limited in their available time and effort, despite their best effort, as airlines increasingly participate in a large number of alliances, or form alliances with partners from diverse countries, boundedly rational managers fail to effectively manage alliances and end up with disappointing customer service quality.

Second, this dissertation also contributes to services marketing research by studying alliance portfolio attributes as potential antecedents to service quality. As shown in the literature review, no empirical research to date has investigated the alliance portfolio effects on service quality. This dissertation suggests that the attributes of the multiple alliances that a firm currently manages have substantial effects on its service quality.

Third, this dissertation provides the first examination of the moderating effects of alliance experience on the relationships between alliance portfolio attributes and customer service quality. Contrary to the findings reported in studies that use financial performance measures or production innovations as proxies for firm performance (Rothaermel & Deeds, 2006), this dissertation shows that when customer service quality is brought into the mix of alliance research as a dependent variable, alliance experience does not have positive moderating effects.

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