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ROLES OF MOTIVATIONS, PAST EXPERIENCE,  
PERCEPTIONS OF SERVICE QUALITY, VALUE AND  
SATISFACTION IN MUSEUM VISITORS' LOYALTY

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ROLES OF MOTIVATIONS, PAST EXPERIENCE,  
PERCEPTIONS OF SERVICE QUALITY, VALUE AND SATISFACTION  
IN MUSEUM VISITORS' LOYALTY

By

Chi-Ming Hsieh

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## **ABSTRACT**

### **ROLES OF MOTIVATIONS, PAST EXPERIENCE, PERCEPTIONS OF SERVICE QUALITY, VALUE AND SATISFACTION IN MUSEUM VISITORS' LOYALTY**

By

Chi-Ming Hsieh

Cultural tourism is an important and fast developing type of tourism, in terms of its cultural, social and economic impacts. The museum market, including over 40,000 museums worldwide, represents one of the largest segments of the cultural tourism market. Approximately 450 museums in Taiwan have attracted an annual visitor number equivalent to half of the entire population of Taiwan. Museums face growing challenges, and are competing for visitors, resources, volunteers, and funding to maintain facilities and continue operating. Additionally, the educational and cultural interests of museum visitors, the exhibits they visit, the activities in which they participate, and their interactions with museum collections and interpreters play important roles in museums' long-term sustainability because, without visitors, museums would struggle to survive.

The first purpose of the study, which was to develop and test an integrated, dynamic model of museum visitor behavior ( $n = 512$ ), was fulfilled by successfully integrating two theories (push and pull motivation theory, destination loyalty theory) and two models (recreational behavior model, service quality model) into a comprehensive structural model across three temporal stages. Results also favorably identified significant interrelationships—among pull motivation, perception of service quality, perception of value and overall satisfaction—that played concurrent positive roles in determining visitors' loyalty. The second purpose of this study, which was to assess the moderating effects of socio-demographic and travel behavior variables on the

hypothesized relationships in the structural model, was partially fulfilled by recognizing the significant moderating effects of membership status, ticket type (one indicator of visitor type), and length of stay on three paths (perception of service quality–satisfaction, perception of value–loyalty, satisfaction–loyalty). Thus, to the primary research question—did the National Museum of Natural Science in Taiwan deliver the appropriate quality of service to match its visitors’ needs—the answer was “yes” and as the research also showed that these visitors were loyal.

The implication of this research is that museum managers should examine both push and pull motivations simultaneously to accommodate their visitors’ expectations (personal needs and growth, professional purposes, and an enjoyable gathering with family and friends) through providing sufficient levels of the recognized service (professional training and development programs attended by museum staff members, physical facilities and equipment, provision of understandable and sufficient information, and caring and individualized attention) to increase visitors’ revisit intentions and assure the museum’s continued operation and success. Managers should pay attention to the needs of nonmembers, and provide incentives for short-stay visitors to extend their stays, in an effort to enhance their perceptions of value (reasonable price, valuable exhibits, helpful activities, and useful services). Suggested directions for future research include: 1) an examination of a wider respondent base across other museums or cultural tourism services (e.g., historical sites); 2) the selection and development of a well-established measurement scale of service quality and other factors, using a qualitative approach; and 3) the selection of other potential moderating variables and affected paths.

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Dedicated to my father, Jui-Chen Hsieh, and my mother, Pi-Ching Chien,  
for their endless love, support  
and encouragement throughout my life.

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# **CHAPTER 1**

## **INTRODUCTION**

### **Background**

Cultural tourism is one of the fastest developing types of tourism in the world, and it has potential for greater promotion in the international tourism market (Alaeddinoğlu & Can, 2009) in terms of its cultural, social and economic influences. Stebbins (1996, p. 948) defined cultural tourism as “a genre of special interest tourism based on the search for and participation in new and deep cultural experiences, whether aesthetic, intellectual, emotional, or psychological.” Kennedy (2001) claimed that “cultural tourism incorporates a variety of cultural forms, including museums, galleries, festivals, architecture, historic sites, artistic performances, and heritage sites, as well as any experience that brings one culture in contact with another for the specific purpose of that contact, in a touring situation.”

Cultural attractions constitute a crucial component of most attractive tourism destinations (Prentice, 2001; Richards, 2002) and have had an impact on host communities. In 1996, the World Tourism Organization (WTO) reported that cultural tourism accounted for 37 percent of all tourism trips, and predicted that demand would continue to grow by 15 percent per annum, generating an estimated 240 million international trips to cultural destinations each year (Richards, 1996). The U.S. Travel Association (2003) supported the prediction of the WTO by reporting an annual increase of 13 percent in domestic cultural tourism in the United States from 192.4 million person-trips in 1996 to 216.8 million person-trips in 2002. This trend resulted in 217

million person-trips in 2002, and these tourists spent more and stayed longer at the destination than other visitors.

Cultural tourism is still spreading to many corners of the world and is being embraced by local, national, and transnational bodies (Richards, 2007). For instance, The United Nations Educational, Scientific and Cultural Organization (UNESCO) promotes cultural tourism as a means of preserving world heritage, the European Commission supports cultural tourism as a major industry, and the newly emerging nation-states of Africa and Central Europe see it as an important facilitator for maintaining national identity (Richards, 2007). In regions such as Latin America, cultural tourism plays a crucial role in the development of international tourism; for instance, Peru classifies 93 percent of its visitors as cultural tourists (Richards, 2007). In many parts of the world, cultural tourism attracts the majority of tourists, and supports the local economy, traditional activities, and cultural preservation. Tourism is recognized as an agent of change (Carter & Beeton, 2004), and cultural tourism has high potential for positively impacting communities.

Several studies have noted that 65 million people, or nearly half of all American domestic travelers, visited or participated in museums, historic sites or musical arts performances (Kerstetter, Confer, & Bricker, 1998; Miller, 1997). After assessing the typology of cultural tourism, the Association for Tourism and Leisure Education (ATLAS) reported that museums and art galleries are the most important attractions for cultural tourism, and account for over 50 percent of all cultural tourist visits (Richards, 2007). In other words, museums represent one of the largest segments in the cultural tourism market. For instance, in the United States, visiting museums ranks among the



top three tourist activities and the estimated revenue from museums, historical sites and similar institutions has been the fastest growing segment among the primary market of arts, entertainment and recreation annually from 2004 to 2007 (U.S. Census Bureau, 2009) (see Table 1). In Europe museums attract more than 370 million visitors a year (Creigh-Tyte & Selwood, 1998), many of whom are tourists (Johnson, 2003).

**Table 1**  
**Arts, Entertainment, and Recreation Services in the U.S. Estimated Revenue, 2004 through 2007**

<b>Arts, entertainment, and recreation</b>	<b>Estimated Revenue (\$1,000)</b>				<b>Estimated Year-to-Year Percent Change</b>		
	<b>2004</b>	<b>2005</b>	<b>2006</b>	<b>2007</b>	<b>2004/2005</b>	<b>2005/2006</b>	<b>2006/2007</b>
Performing arts companies	11,554	11,978	11,987	11,734	3.7%	0.1%	-2.1%
Spectator sports	23,659	24,402	26,531	28,757	3.1%	8.7%	8.4%
Museums, historical sites, and similar institutes	9,688	10,256	11,967	12,978	5.9%	16.7%	8.4%
Amusement and theme parks	9,344	9,882	9,963	10,746	5.8%	0.8%	7.9%
Casinos (except casino hotels)	16,664	18,010	19,746	20,485	8.1%	9.6%	3.7%
Golf courses and country clubs	17,880	18,533	19,082	19,279	3.7%	3.0%	1.0%
Fitness and recreational sports centers	16,839	17,620	18,519	19,507	4.6%	5.1%	5.3%

Source: U.S. Census Bureau (2009); adapted from "2007 Service Annual Survey, Arts, Entertainment, and Recreation Services"

There has been an increasing interest in the overall relationship between the arts and tourism because culture becomes a significant factor affecting visitors' choice of a city as a tourist destination (Hughes, 1998). Museums are thus an important, popular component of the attraction-base and tourism resources of a tourism destination (Beeho & Prentice, 1995; Jansen-Verbeke & Rekom, 1996). In many cities, museums have served as one of

the main attractions for tourists. Moreover, tourism and cultural development can play a key role in urban regeneration, and a museum can be the core element of a redevelopment program (Plaza, 2000), as well as having a significant effect on tourism promotion strategies for the destination (Prideaux & Kininmont, 1999).

Within such an important and competitive cultural tourism market, understanding cultural tourist behavior has become necessary for practitioners, marketers and policy-makers. Furthermore, as in other travel and tourism industry segments, contributions of cultural tourism attractions largely rely on the level of satisfaction derived by tourists; such satisfaction is determined primarily by visitors' assessment of their experiences. Thus, the tourist experience becomes a key concept in cultural tourism (De Rojas & Camarero, 2007).

### **Need for the Study**

#### ***Traditional Museum Roles***

More than 40,000 museums exist worldwide (Zils, 2000). The museum mix in many countries includes small, local, volunteer-operated private museums, large independent visitor attractions, national public museums fully or partly supported by governments, local authority cultural service; and university museums. These various museums, which present a wide range of topics and are supported largely by corporate and/or public monies, serve a diverse public (Falk, 1998). Because museums are the largest segment of the cultural tourism market, they face external competition from similar attractions, such as historic and cultural sites, and from other attractions, such as movie theaters or sport events, and even home recreation and electronic pastimes. Museums also must address internal issues, including lack of management commitment, failing budgets, lack of clear

goals, confusion over museum roles, lack of specialist operational managers, lack of staff commitment, lack of other incentives, a constant turnover in front-of-house staff owing to low wages and seasonality, and lack of visitor praise (Black, 2005).

Many museums find themselves in an increasingly competitive environment, competing for visitors, resources, volunteers and funding (Black, 2005). Private/independent museums are heavily reliant on visitor income (admissions, catering, and retailing). Museums find they must develop new and innovative services to retain existing users and attract new ones, and must work to improve standards across the board to ensure their futures. Black (2005) emphasized that the twenty-first-century museum should focus on audience needs and the role of museums in society, indicating that a museum should be:

- an object treasure-house significant to the local community;
- an agent for physical, economic, cultural and social regeneration;
- accessible to all – intellectually, physically, socially, culturally, economically;
- relevant to the whole of society, with the community involved in product development and delivery, and with a core purpose of improving people's lives;
- a celebrant of cultural diversity;
- a promoter of social cohesion and inclusion;
- proactive in supporting neighborhood and community renewal;
- proactive in developing new audiences;
- proactive in developing, working with and managing pan-agency projects;
- a resource for structured educational use;
- integral to the learning community;
- a community meeting place;
- a tourist attraction;
- an income generator; and
- an exemplar of quality service provision and value for money.

Both supply and demand sides are incorporated in the above roles. On the supply side, museum functions and services should be provided for visitors. On the demand side, visitors expect and desire educational and fun experiences to benefit themselves and host communities. Successful and sustainable development of museums necessitates a long-term commitment, balancing between museum supply of museums and visitor demands, and general consensus among key stakeholders for museums' roles.

Understanding visitor motivation, perception of service quality, perception of value and satisfaction can be important in helping managers identify weaknesses and deficiencies and develop strategies for improvements.

The following case provides a good example of the trends in roles and functions of contemporary museums:

The Museum of Modern Art in New York has redefined its role as a Heritage Visitor Attraction (HVA). The museum wants people to visit more often and stay longer. To achieve that objective, it now offers its facilities as an alternative meeting place and it has become an entertainment venue; it has seized the opportunity to become a participant in community learning and support. This expanding audience has led the museum to operate in a different economic environment and, by focusing greater attention on visitors' needs; the management has created a more welcome environment (Drummond & Yeoman, 2001, p. 21).

There is a need to expand innovative exhibit programs or provide additional services (e.g., mail order services, dining facilities) to satisfy new markets. Simultaneously, museum staffs are required to be more skilled and to have better understanding of the visitor, according to Enterprise (1999).

### ***Museums as Businesses***

Sargeant (1999) classified museums as one of several types of nonprofit organizations. Because they are “nonprofit,” these organizations have not been treated as businesses in most countries. However, traditional funding sources seem to be declining; thus, nonprofit organizations must become more market-oriented to survive (Clarke & Mount, 2001; Shelley & Polonsky, 2002; Sullivan, 2001). One common element between nonprofit and profit organizations is that the customer service that they provide is important in generating income. As a result, current nonprofit organizations are being recognized as industries driven by economic influences (Sullivan, 2001). Sokolowski and Salamon (1999) estimated that the nonprofit industry in 22 countries contributes over \$1 trillion to local economies and employs 19 million full-time workers. Educational and cultural organizations such as universities, libraries, museums and galleries provide good examples of nonprofit organizations that play key roles in many aspects of our society. In short, these nonprofit organizations provide services to customers, as do for-profit organizations.

Kotler and Kotler (1998) defined marketing as the social and managerial process by which individuals and groups obtain what they need and want through creating and exchanging products and services with others. Marketing focuses primarily on customers' satisfaction by matching products and services with their needs and wants. There has been debate whether marketing concepts can be applied to nonprofit organizations such as museum. If, as this study posits, for-profit organizations employ marketing strategies to benefit themselves and their customers, marketing can also be applied to nonprofit organizations that are now regarded as business entities. As Gil and

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Ritchie (2008) mentioned, “museums function not only as economic development engines but also as one distinctive form of attraction within tourist destinations.” As such, they contribute to job and income growth (Kotler & Kotler, 2000). Thus, museums must be studied from a marketing perspective.

### ***Need for Museum Tourist Studies***

Several researchers have noted insufficiencies in museum visitor studies. Bicknell and Farmelo (1993) pointed out that, despite museums’ importance to both the tourism industry and local culture, only a few studies focus on the museum product. There is little understanding of what visitors expect a museum to offer, although museums have given much more serious consideration to attracting tourists in recent years (Harrison, 1997). Richards (2001) noticed that surveys of tourists rarely assess cultural tourism beyond establishing the number of tourists visiting cultural attractions. Meehan (2002) found that little research relates data to factors such as satisfaction and behavioral intentions in the cultural tourism context. Previous studies of museums focus on museum visitor profiling, including demographics such as age, education, place of residence and nationality, to help museum managers determine who visits their museums (Harrison & Shaw, 2004). Gil and Ritchie (2008) noted that little attention has been accorded to understanding what makes visitors satisfied with their museum experiences, or what differences there might be between tourists and residents, although both are major target markets for museums located in tourism destinations.

Thyne (2001) summarized numerous museum studies and found that most studies focused on visitor experiences over the past two decades, and listed the aspects investigated: 1) visitor expectations (Beeho & Prentice, 1997; Harrison, 1997); 2) visitor

satisfaction (Moscardo, 1996; Moscardo & Pearce, 1986); 3) visitors' perceptions of authenticity (McIntosh & Prentice, 1999; Moscardo & Pearce, 1986); 4) information sources used by visitors about museums (Prideaux & Kininmont, 1999); 5) the impact of interpretation on learning and education (Prentice, Guerin, & McGugan, 1998); and 6) the motivation and behavior patterns of museum visitors (Jansen-Verbeke & Van Redom, 1996). Additionally, Frochot (2000), Allen (2001) and Lynch (2006) focused on the assessment of museum service quality.

In addition, several researchers have considered multiple dimensions to explain museum tourist behavior. For instance, Burton and Scott (2003) claimed that satisfaction with a museum's components (e.g., facilities, staff, services, exhibitions) influences overall satisfaction, intention to return and intention to recommend. Harrison and Shaw (2004) investigated the relationship among service elements (e.g., facilities, services, and experiences), satisfaction and future revisit intentions using SERVQUAL.

Although several studies on museum visitors exist, most are based on one to three dimensions of tourist behavior. A few researchers have jointly examined the structural and causal relationships among key factors of nonprofit museum organizations. However, there is still need for a holistic and systematic approach that considers temporal aspects (pre-visit, on-site, post-visit and future intention). Such studies must be built on a solid theoretical foundation.

In summary, a substantial number of people visit more than 40,000 museums worldwide; this justifies building a comprehensive model to understand museum tourist behavior. Museums are becoming more visitor-oriented and are "paying greater attention to the wishes and needs of their visitors" (Gil & Ritchie, 2009; Johnson, 2003;



Kawashima, 1999; Kotler & Kotler, 2000; Ruyter et al., 1997). In this era of accountability, museums must listen more attentively to the various segments that comprise their markets as means of improving service quality, enhancing the satisfaction of visitors and other stakeholders (Caldwell, 2002), and encouraging repeat visits. Museums are seeking ways to reach a broader public, strengthen community ties, and compete effectively with other tourism and leisure activities (Kotler & Kotler, 2000). This study was proposed to better understand and integrate the multiple factors that affect museum visitor behavior by investigating visitors to one nonprofit museum in Taiwan. The following section is a discussion of the public museums of Taiwan.

### ***National Museums in Taiwan***

From 2004 to 2007, cultural tourism has accounted for approximately 30% of the entire tourism and recreation market in Taiwan (National Statistics of Taiwan, 2008). Museums have made up 23% of cultural tourism attractions and are primary destinations. According to the Chinese Association of Museums (2009), Taiwan has approximately 456 museums, including 21 public and 435 private. The number of museums in Taiwan has quadrupled since 1990, when there were only 99 museums. As in most countries, Taiwanese museums vary in scale, operations and governance, and include national, county, city, local and independent or private museums. The average annual number of visitors to national museums between 2001 and 2008 was 12.43 million, the equivalent of 54% of the entire population (Taiwan Tourism Bureau Ministry, 2009). Thus, visiting national museums has played an important role as a leisure time activity.

Nevertheless, similarly to other museums throughout the world, most Taiwanese museums have struggled to maintain their audience share in an increasingly competitive

leisure market. Declining visitation reduces revenue and this influences organizations' routine operations. For instance, in 2007, the National Palace Museum in Taipei decided to raise its entrance fee from NT\$100 to NT\$160<sup>1</sup>, an increase of 60%, to cover operating costs for maintenance, utilities and employee salaries.

### **Study Purpose and Objectives**

The purpose of this study is to develop and test an integrated, dynamic museum tourist behavior model based on theories concerning a range of interrelationships among seven variables of tourists' decisions and behavior patterns, which appeared in three temporal phases, including: 1) pre-visit determinants of destination choice (push motivations, pull motivations, past experience); 2) post-visit evaluation of on-site experience (perception of service quality, perception of value, perception of value, overall satisfaction); and 3) future behavioral intentions (museum loyalty). Specifically, the proposed model aims to explain the complex process encompassing museum tourists' behavior before, during and after their visits by identifying: the determinants of visitors' intentions to revisit a specific nonprofit museum; the antecedents and consequences of museum service quality (MUSEQUAL); assessing concurrently the structural and causal relationships among these seven variables; and the moderating effect of visitor type and length of stay on the causal relationship between perception of service quality and overall satisfaction, and overall satisfaction and museum loyalty.

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<sup>1</sup> US \$1 ≈ NT \$32

Taiwan museums undoubtedly have had positive socio-cultural, economic and educational impacts on the host communities. However, they cannot avoid increasing competition and are losing visitors. Challenged to find ways to retain current visitors and attract new ones, museum managers and planners must understand museum visitor/tourist behavior and decision-making. According to Ryan (2002) and Williams and Buswell (2003), tourist behavior can be divided into four stages, including pre-visit, on-site, post-visit, and future decision-making. In this study, museum tourist behavior can be regarded as an aggregate construct, comprising pre-visit determinants for destination choice (e.g., motivation, past experience); on-site experience (e.g., activities, events participation); post-visit evaluation (perception of service quality, perception of value, overall satisfaction); and future behavioral intentions (destination loyalty). Combined, these factors help to understand comprehensive museum visitor behavior. Identifying motivations of visitors and increasing the service quality of museums are viable ways for museums to remain competitive. In turn, these could lead to better understanding of the needs of different museum consumer segments; more careful shaping and launching of new services; pruning of weak services; more effective methods of delivering services; more flexible pricing approaches; and higher levels of client satisfaction (Kotler, 1979).

An extensive literature review indicates that seven important variables can be critical determinants of overall museum visitor/tourist behavior. The seven variables include push motivations, pull motivations, past experience, perception of service quality, perception of value, overall satisfaction, and museum loyalty. Most studies have focused on an examination of no more than three constructs at the post-visit stage. The seven

variables have not been integrated into a single model to examine all interrelationships simultaneously. The research objectives, within the framework of the overall purpose, are to identify the following (presented in terms of three stages of visits to a specific museum):

***Pre-visit stage***

- 1) visitors' push and pull motivations prior to the initial visit among museum visitors;
- 2) visitors' frequency of and satisfaction with prior museum visits;

***On-site stage***

- 3) visitors' participation in activities or events, service experiences and interaction with museum staff during their museum visit;

***Post-visit stage***

- 4) visitors' perceptions of museum service quality;
- 5) visitors' perceptions of value of their museum experiences;
- 6) visitors' overall satisfaction with quality of museum service; and

***Future intention/ decision-making***

- 7) visitors' to return, to recommend visiting to others, and to renew or gain membership within one year.

The on-site stage was included in the post-visit stage in this study because visitors' perceptions of on-site service quality needed to be evaluated after their visit. Future intention was also evaluated after their visits. A holistic and systematic approach utilizing the three temporal stages and corresponding seven important factors, which concur in museum tourist behavior process, has been applied to the entire study. An examination of relevant literature is provided for a theoretical foundation for this study.

## **Theoretical Framework**

The study explores museum visitors' behaviors by empirically examining both the consumer side (motivations, perception of value, past experience and satisfaction) and the provider side (museum services and products) as antecedents that influence a museum visitor's intention to revisit, recommend and become a member. This study proposes and tests a theoretical foundation on the basis of seven major sources: Push and Pull Motivation Theory (Dann, 1977), Service Quality Model (Parasuraman, et al., 1988), Destination Loyalty Theory (Baker & Crompton, 2000; Bitner, 1990; Dick & Basu, 1994) and Recreational Behavior Model (Clawson & Knetsch, 1966). A theoretical framework (see Figure 1) was developed to integrate these theories and their associated variables into a single model and graphically represent the structural and causal relationships among seven constructs, including push motivations, pull motivations, past experience, perception of service quality, perception of value, overall satisfaction, and museum loyalty.

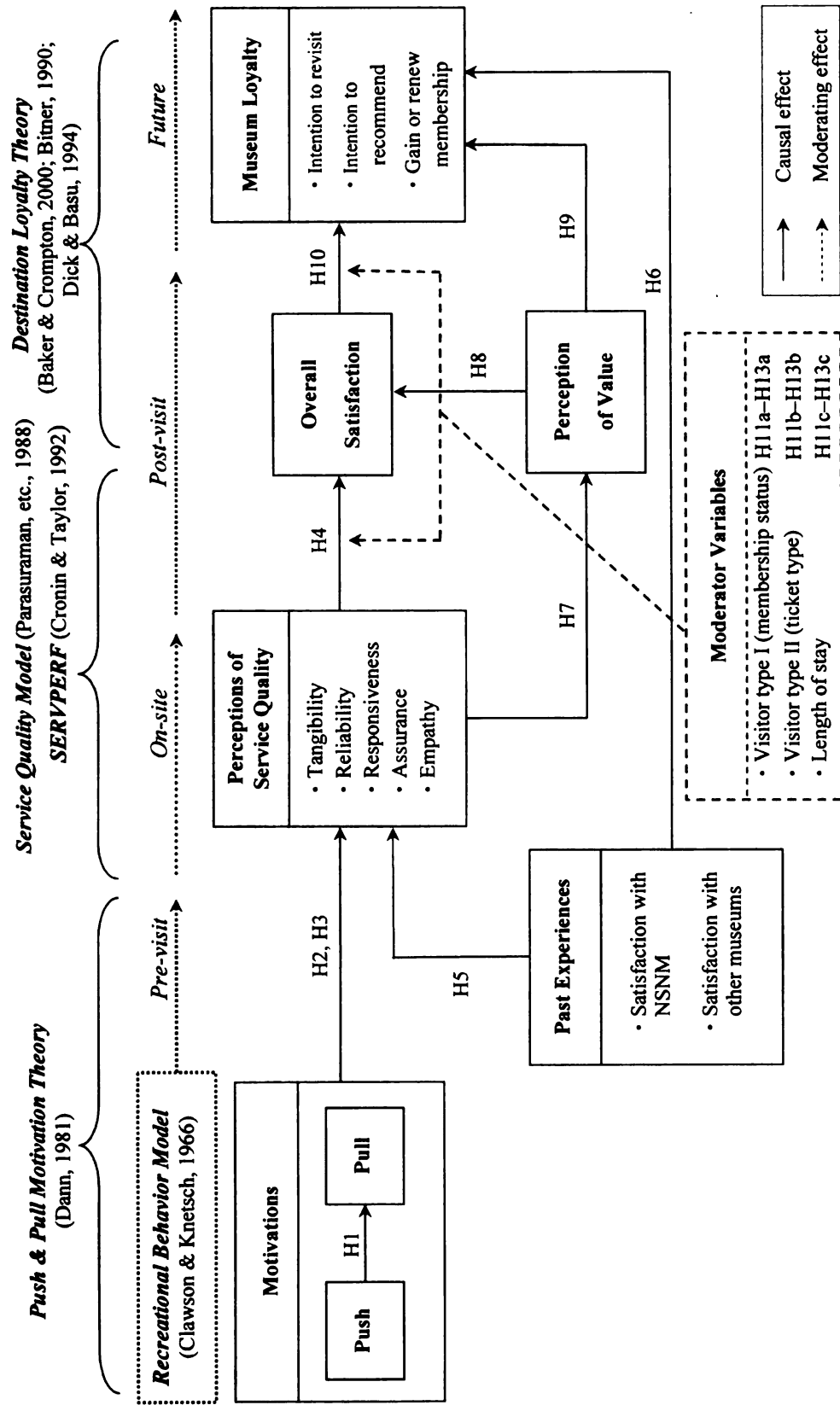


Figure 1. Theoretical framework

## Research Hypotheses

Based on the theoretical framework illustrated in the proposed model, the influence of and interactions among variables in multiple theories will be tested using the following sixteen hypotheses. Specific reviews of literature related to these theories and constructs are discussed in the literature review section.

- H1:** Museum visitors' push motivations positively affect their pull motivations at the pre-visit stage;
- H2:** Museum visitors' push motivations positively affect their perceptions of service quality in the museum at the post-visit stage;
- H2alt<sup>2</sup>:** Museum visitors' push motivations negatively affect their perceptions of service quality in the museum at the post-visit stage;
- H3:** Museum visitors' pull motivations positively affect their perceptions of service quality in the museum at the post-visit stage;
- H3alt:** Museum visitors' pull motivations negatively affect their perceptions of service quality in the museum at the post-visit stage;
- H4:** Museum visitors' perceptions of service quality at the post-visit stage positively affect their overall satisfaction with quality of museum service;
- H5:** Museum visitors' past experiences at the pre-visit stage positively affect their perceptions of service quality at the post-visit stage;
- H6:** Museum visitors' past experiences at the pre-visit stage positively affect their intentions to return, to recommend visiting to others, and to renew or gain membership in the future;

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<sup>2</sup> "alt" indicates the alternate of the hypothesis H2 and H3, described more fully on p. 61 in this study

- H7:** Museum visitors' perceptions of service quality at the post-visit stage positively affect their perceptions of value of their museum experiences at the post-visit stage;
- H8:** Museum visitors' perceptions of value of their museum experiences at the post-visit stage positively affect their overall satisfaction with quality of museum service;
- H9:** Museum visitors' perceptions of value of their museum experiences at the post-visit stage positively affect their intentions to return, to recommend visiting to others, and to renew or gain membership in the future;
- H10:** Museum visitors' overall satisfaction with quality of museum service at the post-visit stage positively affects their intentions to return, to recommend visiting to others, and to renew or gain membership in the future;
- H11a:** Visitor type by membership status (member and nonmember) moderates the effect of museum visitors' perceptions of service quality on the overall satisfaction with quality of museum service at the post-visit stage;
- H11b:** Visitor type (adult and discount ticket) moderates the effect of museum visitors' perceptions of service quality on the overall satisfaction with quality of museum service at the post-visit stage;
- H12a:** Visitor type by membership status (member and nonmember) moderates the effect of museum visitors' overall satisfaction with quality of museum service on their intentions to return, to recommend visiting to others, and to renew or gain membership in the future;
- H12b:** Visitor type (adult and discount ticket) moderates the effect of museum visitors' overall satisfaction with quality of museum service on their intentions to return, to recommend visiting to others, and to renew or gain membership in the future;



- H13a:** Visitor type by membership status (member and nonmember) moderates the effect of museum visitors' perceptions of value of their museum experiences on their intentions to return, to recommend visiting to others, and to renew or gain membership in the future;
- H13b:** Visitor type (adult and discount ticket) moderates the effect of museum visitors' perceptions of value of their museum experiences on their intentions to return, to recommend visiting to others, and to renew or gain membership in the future;
- H14:** The length of visitors' stay in museums moderates the effect of museum visitors' perceptions of service quality on the overall satisfaction with quality of museum service at the post-visit stage in which the relationship is likely to be positively stronger for visitors' lengthy stays in the museum than for shorter stays; and
- H15:** The length of visitors' stay in museums moderates the effect of museum visitors' overall satisfaction with quality of museum service on their intentions to return, to recommend visiting to others, and to renew or gain membership in the future in which the relationship is likely to be positively stronger for visitors' lengthy stays in the museum than for shorter stays; and
- H16:** The length of visitors' stay in museums moderates the effect of museum visitors' perceptions of value of their museum experiences on their intentions to return, to recommend visiting to others, and to renew or gain membership in the future in which the relationship is likely to be positively stronger for visitors' lengthy stays in the museum than for shorter stays.

### **Potential Contributions of the Study**

This study represents one of the first attempts to integrate theories, models and constructs within a museum tourist behavior context to explain the complex process of museum visit decisions, experience quality and loyalty. It attempts to synthesize seven constructs, including push motivations, pull motivations, service quality, perception of value, past experience, overall satisfaction and museum loyalty. Specifically, this study proposes a theoretical framework integrating two models (recreational behavioral model, service quality model) and two theories (push and pull motivation theory and destination loyalty theory) into a conceptual model based on a literature review within the tourism and marketing fields. The interrelationships among seven constructs were examined using structural equation modeling (SEM). Results should extend the body of knowledge in the museum tourist behavior field by integrating these critical factors.

This study was conducted within a major cultural market in Taiwan, its largest national museum, the National Museum of Natural Science. Annual visitor numbers are comparable to those of the most popular museums in the world (e.g., the Metropolitan Museum of Art, New York, USA; Le Louvre, Paris, France; and the British Museum, London, UK). Additionally, the total annual visits to this museum, along with other two largest national museums (i.e., National Palace Museum, National Science & Technology Museum), is comparable in size to half of the Taiwan population. This museum has become an important cultural attraction for people with diverse educational and cultural motivations. It is beneficial to study one of these places that have impacted certain types of regional and national influence in many aspects, such as social, cultural and economic impacts. This study proposes a generalized model of determinants of

museum tourists' intentions to revisit, and hopefully can be used by museum staff to tailor services to visitor expectations, reinforce visitor experiences and build visitor loyalty. By improving services and visitor experiences, and by increasing visits, museums can play a significant role in the host community and overall cultural tourism market.

### **Definitions of Terms**

Following are definitions of the terms as they were used in this study.

Push motivation: Internal (social-psychological) personal needs and desires within travelers that generate the demand for travel (Dann, 1977).

Pull motivation: External characteristics of the destination, or destination attributes, that generate the demand for travel (Dann, 1977).

Service quality: Customers' perception of the service component of a product or destination, including:

Tangibility. This component refers to the physical facilities, equipment and appearance of personnel (Parasuraman, Zeithaml, & Berry, 1988).

Responsiveness. This component refers to the willingness, knowledge and courtesy of employees to provide prompt service to customers (Parasuraman, et al., 1988).

Empathy. This component refers to the caring, individualized attention the museum staff provides its customers (Parasuraman, et al., 1988).

Communication. This component refers to the ability of the staff to convey accurate, understandable and sufficient information to customers for their desired services (Frochot & Hughes, 2000).

Consumables. This component refers to the quality and variety of merchandise, restaurants and souvenir stores the museum provides its customers (Frochot & Hughes, 2000).

Satisfaction: Cognitive assessment of quality or characteristics of a product or destination resulting from the customers' comparison of the rewards and costs of the purchase in relation to the anticipated consequences (Churchill & Surprenant, 1982). Alternatively, dissatisfaction is the assessment when this confirmation does not take place (Engel, Blakwell, & Miniard, 1986).

Perception of value: Consumer's overall assessment of the utility of a product/service based on perceptions of what is received and what is given. The meaning of value is what consumers get for what they give (Zeithaml, 1988).

Destination loyalty: Committed behavior that is reflected in the propensity to participate in a particular recreation service/activity (Bachman & Crompton, 1991).

Visitor/Tourist: Any person traveling to a place other than that of his/her usual environment, for less than 12 months and whose main purpose of visit is other than the exercise of an activity remunerated from within the place visited (World Tourism Organization, 2001). This study categorizes museum visitors as: 1) the domestic tourists (visitors), who are not local residents and travel for at least one night for the museum visit; 2) the same-day domestic visitors, who are local residents or non-residents and travel to the museum for a same-day trip.

### **Delimitations**

The study is constrained to only Chinese-speaking citizens in Taiwan, who are between 20-64 years of age, have residences in Taiwan, and visited NMNS between June 16, 2009–July 12, 2009. The data in the study were collected in the National Museum of Natural Science in Taichung City during a four-week period from June 16 (Tuesday) thorough June 28 (Sunday) 2009 for the pilot study, and from June 30 (Tuesday) thorough July 12 (Sunday) for the formal study. The participants were screened and selected in terms of ticket type, including adult tickets, discount tickets (students aged 20 years or more, government employees) and members, who indicated that they had spent one day or more visiting the NMNS.

### **Structure of Dissertation**

This dissertation includes five chapters. Chapter one provides the background, rationale and research purpose. Research hypotheses and a theoretical framework are proposed, followed by the research hypotheses that guide this study. Lastly, potential contributions are discussed, along with the statement of definition of terms and delimitations. Chapter two discusses relevant theories and models, and the associations among key constructs and variables that frame this study. Chapter three presents the methods employed in this study. Sample selection and sampling approach, instrument development and pilot testing, survey procedures, and data analyses are described. Chapter four presents the results of data analysis and hypothesis testing. Chapter five discusses conclusions derived from the results. Managerial implications and recommendations for further study in the museum field are addressed in this chapter.

## **CHAPTER 2**

### **LITERATURE REVIEW**

#### **Overview**

This chapter provides a review of previous studies to identify relevant theories, models and variables related to visitor decision-making, experience quality and loyalty. The review discusses seven constructs of tourist behavior (push motivations, pull motivations, perception of service quality, past experience, perception of value, satisfaction and loyalty), two theories (push and pull motivations and tourism destination loyalty) describing the relationships among several constructs, and two models (recreational behavior model and service quality model) describing tourist behavior in terms of temporal stages and service quality measurement. These constructs, theories and models have been integrated to propose a theoretical framework for this study. The relevant literature is organized in nine sections: 1) tourist behavior; 2) tourist motivations; 3) service quality; 4) satisfaction (including approaches to its assessment); 5) past experience; 6) perception of value; and 7) tourism destination loyalty. The chapter concludes with a conceptual synthesis and discussion of hypothesized relationships among all constructs that provide the basis for the study's research hypotheses.

#### **Tourist Behavior**

How people consume travel and tourism products has become a focus of much tourism research. Understanding travel behavior is imperative in today's highly competitive business environment (Pizam & Mansfeld, 1999). Tourists, or visitors, are

classified by the World Tourism Organization as follows: 1) the domestic tourist (visitor), who travels to a domestic destination for at least one night for purposes such as leisure and holiday, or business and professional; 2) the international tourist (visitor), who travels to a country other than his/her home country for at least one night for purposes such as leisure and holiday, or business and professional; 3) same-day international tourist (visitor); and 4) same-day domestic tourist (visitor).

Tourist behavior is subjective, dynamic and multi-faceted; it involves and is influenced by many factors over time. Pizam and Mansfeld (1999) pointed out that research on consumer behavior in travel and tourism primarily involves the relationships between travel motivation, choice of destination choice and consequent travel behavior over time. Tourist behavior is studied to determine why tourists purchase tourism products/services (Hudson, 2000), how they make decisions (where to go, how long to stay), and what determines their subsequent behavior, such as post-purchase evaluation and future decision-making (Moutinho, 1987). Lee, Lee, and Lee (2005) pointed out that tourist behavior is an umbrella term that labels a set of temporal stages mainly comprising decision-making, on-site experience, experience evaluation, and post-trip behavior.

Several theories and models have been developed and proposed to explain tourists' destination choice processes and their travel behavior. These include: the recreational behavior model (Clawson & Knestch, 1966); the travel decision model (Schmoll, 1977) based on buyer behavior theory (Howard & Sheth, 1969); the tourist decision-making process model (Mathieson & Wall, 1982); the vacation tourist behavior model (Moutinho, 1987); the stimulus-response model of buyer behavior (Middleton, 1988); the

general model of traveler leisure destination and awareness choice (Woodside & Lysonski, 1989); the model of the pleasure travel destination choice process (Um & Crompton, 1990); the general system framework of customer choice decisions of tourism services (Woodside & MacDonald, 1994); and a set of propositions model (Teare, 1994). All of the above models include successive stages or phases, as well as sets of distinct variables. With the exception of Woodside and MacDonald's framework (1994) and Teare's (1994) propositions, most of the above are not predictive or complete because they do not consider the complexity of real life (e.g., the problem of attitude/behavior discrepancy) and issues of the role of emotion and feelings (Decrop, 2000).

One of the most widely accepted is Clawson and Knetsch's (1966) recreational behavior model, which identifies the main drivers affecting the choice and later evaluation of a tourism destination by tourists over time, including pre-visit, on-site, post-visit and/or future intention stages. An explanation of this model follows.

#### ***Clawson and Knetsch's Model of Recreational Behavior***

Clawson and Knetsch (1966) first proposed a five-phase process, including anticipation, travel to the site, on-site behavior, return travel, and recollection. Specifically, the stage of anticipation (i.e., planning and thinking about the trip) incorporates the activities undertaken prior to travel, including recognition of need and a search for information. The stage of travel to the site (i.e., getting to the destination) involves a wide range of experiences and service encounters, depending on the mode of transport. In some situations, traveling to and from the destination may be a principal travel experience such as an overseas trip or a luxury train journey. The stage of on-site behavior (i.e., behavior at the site or destination region) incorporates the travel



experience and is affected by a variety of service providers, such as the accommodation facility, recreation outlets, retail services, and interaction with other travelers. The stage of recollection (i.e., recall, reflection and memory of the trip) determines the post-purchase evaluation phase that will greatly affect the next purchase decision.

John and Clark (1993) applied this recreation behavior model to the museum context. They supported that museum tourists view the experience of visiting museum as a “journey” that includes six stages: 1) pre-visit; 2) arrival; 3) entry; 4) visitor experience; 5) exit; and 6) follow-up. A systematic appraisal of service quality through use of customer perception audits offers an effective means of assessing service quality from visitors’ perspectives over time in museums and galleries.

Clawson and Knestch’s (1966) model was selected to provide the general temporal framework for museum visitor behavior, and have integrated other relevant theories and variables to develop a museum tourist behavior model in this study. This study omits the second stage (travel to the site) and the fourth stage (return travel) to fit Taiwanese visitors who do not have to travel long distances. A three-phase process of museum tourist behavior was used: 1) pre-visit stage, determinants of destination choice (push and pull motivation, past experience); 2) on-site and post-visit stage: recollection of the visit and evaluation of on-site experience (perception of service quality, perception of value, overall satisfaction); and 3) future intention stage: next visit decision (museum loyalty).

Reviews of the reasons for using key constructs at each travel stage are presented in the following sections. Studies that identify key determinants of tourist behavior at each

stage, as supported by relevant models, theories and empirical studies, are discussed in the following sections.

### **Tourist Motivations**

Most tourism studies agree that at the pre-visit stage, motivation plays a major role in determining tourists' decisions regarding when, where and what type of tourism to pursue (Pizam & Mansfeld, 1999). Several motivation theories have been proposed to describe how tourists' motivation affects their tourism behavior and actions, including Maslow's hierarchy of needs (Maslow, 1970), Plog's (1973) tourism motivation model, Dann's (1977) push and pull motivation theory, and Crompton's (1979) nine motives.

Every tourist can choose from a number of destinations (Crompton, 1992), and the prime reasons encouraging tourists to travel or participate in a tourist activity can be regarded as motivations. Andreu, Kozak, Avci, and Cifter (2005) claimed that motivations may differ from one tourist to another because of their diverse needs and desires and from one destination to another because of the various products and services. They supported that understanding tourists' motivations enables tourism destination planners to better satisfy consumer needs. A number of studies highlight the importance of understanding tourist motivations to better understand visitors' choices, preferences and needs (Bansal & Eiselt, 2004). Other empirical examinations of tourist motivation have been carried out to identify markets in which tourist motivations and destination features and resources match (Kozak, 2002).

Besides Andreu et al.'s (2005) definition of motivation, a review of the literature shows that motivations are: 1) the fundamental reasons for behavior (Mayo & Jarvis,

1981; Pearce, 1991); 2) critical to understanding the vacation decision-making process (Dann, 1977; Sirakaya & Woodside, 2005); 3) essential in assessing satisfaction with the experience (Ross, Elizabeth, & Iso-Ahola, 1991; Ryan, 2002; Yoon & Uysal, 2005); and 4) critical for marketing tourism experiences, for designing and planning tourism attractions, and for evaluating service delivery of a vacation (Snepenger, King, Marshall, & Uysal, 2006).

### ***Push and Pull Motivation Theory***

A majority of studies that emphasize the importance of tourists' motivation based on the concept of push and pull motivations in choosing vacation destination choices have been generally accepted (Alghamdi, 2007; Baloglu & Uysal, 1996; Bogari, Crowther, & Marr, 2003; Crompton, 1979; Dann, 1977; Jang & Cai, 2002; Kim & Lee, 2002; Kim, Lee, & Klenosky, 2003; Pyo, Mihalik, & Uysal, 1989; Sung, 2004; Uysal & Hagan, 1993; Uysal & Jurowski, 1994; You, O'Leary, Morrison, & Hong, 2000). Dann (1977) first proposed the push and pull motivation theory and classified travel motivations: 1) push motivations are travelers' internal (social-psychological) needs and desires, which generate the demand for travel; and 2) pull motivations are external forces of destinations, or destination attribute factors. Crompton (1979) proposed that push motives explain the desire to travel while pull motives explain the selection of destination. These external and internal stimulations trigger a tourist's desire to travel (Kotler, 1982).

Uysal and Hagan (1993) explained that "push" motivations refer to the intangible or intrinsic desires of the individual tourist, e.g., the desire for escape, rest and relaxation, adventure, health or prestige; "pull" motivations relate to the attractiveness of a given

destination and its tangible characteristics, such as natural features, accommodation and recreation facilities, and cultural and historical resources. Jang and Cai (2002) found that British travelers to Asia were likely to be influenced by the push motivation of “novel experience,” while British travelers who selected the U.S as a holiday destination were affected by the pull motivation of “enjoyable and exciting outdoors activities.” Sung (2004) agreed that examining push and pull motivations of tourists should be beneficial to destination marketers and researchers because individuals' various needs, attitudes, and lifestyles can be identified, understood and incorporated into programming and marketing activities. Based on above discussions, Dann's (1977) push and pull motivation theory was used to explain the motivations for visiting museums in this study.

### ***Motivation Studies in Museum Tourism***

Kuo (2005) claimed that museums view visitors' motivations to visit, needs, and expectations as top priorities. Csikszentmihalyi and Hermanson (1995) found that novelty and curiosity are intrinsic motivations to visit museums. They claimed that the desire to learn for its own sake appears to be a common motive for many museum visitors. Packer (2004) claimed that “motivation is an important aspect of learning in educational leisure settings because it affects the choices visitors make regarding what to attend, the amount of effort they devote to learning, and the extent to which they enjoy the experience.” In addition, Packer and Ballantyne (2002) identified five motivational factors for visiting an educational leisure setting, based on 40 items derived from previous research in leisure motivation (Beard & Ragheb 1983; Crandall, 1980; Crompton, 1979) and goal taxonomies (Ford & Nichols, 1987). These five motivational

factors are: 1) *Learning and discovery* (the desire to discover new things, expand knowledge, be better informed and experience something new or unusual); 2) *Passive enjoyment* (the desire to enjoy oneself, to be pleasantly occupied and to feel happy and satisfied); 3) *Restoration* (the desire to relax mentally and physically, to have a change from routine and recover from stress and tension); 4) *Social interaction* (the desire to spend time with friends or family, interact with others and build relationships); and 5) *Self-fulfillment* (the desire to make things more meaningful, challenge abilities, feel a sense of achievement and develop self-knowledge and self-worth). These five motivational factors can be categorized as push (internal) motivations.

Davies and Prentice (1995) claimed that positive motivation results from the belief that expected valued consequences (experiences and benefits) will satisfy needs. Conversely, negative motivation occurs when visitors believe that visiting a heritage attraction will produce consequences to be avoided, such as intellectual anxiety, boredom or a diminished self-concept. They indicated that fundamental motivations for visiting heritage sites (e.g., museums) include: intrinsic-terminal needs, hedonic needs, perceived benefits, and satisfactions. Other reasons for visiting museums have been identified in several studies. For instance, Leichter, Hensei, and Larsen (1989) found that family visits to museums can initiate family discussions. Brunt (1990) found that people visited a museum for: seeing the particular site; education; being with family and taking children; being of a group travel package; going for a walk; visiting friends and relatives; and just wanting to go somewhere. Kelly's (1993) study pointed out that some visitors go to museums only for status-seeking experiences, and some only spent time in the souvenir shop or the café.

Jansen-Verbeke and Van Redom (1996) applied a laddering technique to interview visitors in a museum in Rotterdam, and identified their motivations for visiting the museum as: to see something new; to have a day out; to escape from daily routine; and to learn something. Prentice, Davies, and Beeho (1997) listed motivations for visiting a museum as: to gain general knowledge; out of curiosity; as part of a general day out; to gain a feeling of self-fulfillment, to contribute to preserving the attraction for future generations; and to escape routine by relaxing with family and friends. The author suggested that motivation needs to be reflected in product and promotional design to meet visitors' needs.

Richard's (2001) study found that half of the interviewed participants indicated that they always visited a museum on a holiday. Motivations that were rated most highly by these respondents were: experiencing new things; learning new things; and relaxation. He concluded that cultural tourists are largely motivated by a desire to learn about and experience other cultures. However, he emphasized that cultural tourism, including museum visits, is no longer regarded as purely cultural but a form of leisure as well. Furthermore, there were far more significant differences in motivations between residents and tourists. Tourists were more likely to search for new experiences and learn new things than local residents.

Kerstetter, Confer and Graefe (2001) identified several heritage tourism motivators, including: interest in culture; talking with new people; observing other people; interest in heritage; supplemental to visit other sites in the region; historic character of the place; learning something new; experiencing authentic elements; and encountering history. Packer and Ballantyne (2002) emphasized that museum visitors are likely to value the

learning aspects. They determined that visitors seldom see the museum environment as entertaining, fun or emotionally engaging. They claimed that an understanding of the motivational factors involved in leisure or free-choice learning settings such as museums will help to meet a significant challenge for museums– the need to stimulate visitors' motivation to learn. The studies related to motivations for visiting museums are summarized in Table 2, in which most motivational factors are categorized as the push motivation.

**Table 2**  
**Prior Studies about Motivations for Visiting Museums**

<b>Researchers</b>	<b>Contexts</b>	<b>Motivations</b>
Alt (1980); Falk and Dierking (1992); Hood (1983); Litwak (1993); McManus (1987); Merriman (1991)	General museums	General dimensions of experiences sought, including: to seek social or recreational experiences; to satisfy their general interest and curiosity; and to receive informal education and social interaction
Beard and Ragheb (1983); Crandall (1980); Crompton (1979); Ford and Nichols (1987); Packer (2002);	Museums in Queensland, Australia	Learning and restoration; discovery; passive enjoyment; social interaction; and self-fulfillment
Brunt (1990)	Heritage sites, including museums	To see the particular site; an educational interest; to be with family and taking children out; to go for a walk; good weather; to visit friends and relatives; and to just go out somewhere
Caldwell (2002)	11 London museums	Interest in history; general interest; to explore myself; educational interest; enjoyable; and place to take school children
Csikszentmihalyi and Hermanson (1995)	General museums	Novelty; curiosity; and learning
Davis and Prentice (1995)	Heritage sites, including museums	Intrinsic terminal needs; hedonic needs; and perceived benefits
Jansen-Verbeke and Van Redom (1996)	Rotterdam museums	To see something new; to have a day out; to escape from daily routine; and to learn something
Johnson (1990); Wales Tourist Board (1984)	Industrial museums	Specific interest in industrial history or archaeology
Kelly (1993)	Major museums throughout the world	To seek experience; to consolidate one's actual and desired social position
Kerstetter, Confer and Graefe (2001)	Heritage Tour Route, including museums, located in southwestern Pennsylvania, US	Interest in culture; interest in heritage; visiting other sites in the region; historic character of the place; learning something new; experiencing authentic elements; and encountering history
Koran, Koran, and Longino (1986)	General museums	To "kill time;" to be entertained; to satisfy curiosity; and to "people watch"
Laws (2001)	General heritage sites	Formal learning; curiosity; informal learning; entertainment; and enjoyment
Leichter et al. (1989)	General museums	To learn; to be with family and take children out; and to just go out somewhere
McManus (1991)	Science Museum in London	Enjoyment with family; recreation; and learning



Table 2 (cont'd)

Researchers	Contexts	Motivations
Prentice et al. (1997)	General museums	To gain general knowledge; to satisfy curiosity; as part of a general day out; to gain a feeling of self-fulfillment, to contribute to preserving the attraction for future generations, and to escape routine by relaxing with family and friends
Richards (2001)	Museums in nine European countries	To experience new things; to learn new things; and to relax

### ***Correlation and Causation between Push and Pull***

Numerous studies have shown that push and pull motivations were integrated and had a significant positive and reciprocal relationship (Alghamdi, 2007; Baloglu & Uysal, 1996; Bogari et al., 2003; Jang & Cai, 2002; Martin Armario, 2008; Kim, 2008; Kim & Lee, 2002; Klenosky, 2002; Uysal & Jurowski, 1994; You, O'Leary, Morrison, & Hong, 2000). Push and pull motivations should not be viewed as independent variables, but as related to each other (Klenosky, 2002). Most tourist motivation studies have focused on an integration model using push and pull motivation theory, which can be matched to psychographic profiles of tourists (Alghamdi, 2007). For example, the “escape and relaxation” factor leads to the choice of destinations where outdoor activities reduce tensions, whereas the “cultural experience” factor motivates tourists to go to historical and cultural attractions to expand knowledge or enjoy different experiences, and the “family togetherness” factor may result in family members choosing to improve their relationship by participating in interactive or educational activities in a friendly and convenient environment. It is important to identify correlations between push and pull and to explore the causal relationship between the two motives. Prior studies relevant to the causal relationship between push and pull motives are provided below.

Uysal and Jurowski's (1994) study was one of the first to examine the causal relationships between push and pull motivations. They found several significant causal relationships between push motivations (re-experiencing family togetherness, sports, cultural experiences, escape) and pull motivations (entertainment/resort, outdoor/nature, heritage/culture, rural/inexpensive). The test results based on multiple regression showed that the "escape" push motivational factor had the strongest effect on the "rural/inexpensive" pull motivational factor, whereas the "escape" factor had the weakest influence on the "entertainment/resort" pull motivational factor. The "cultural experiences" push motivational factor had positive effects on all four pull motivational factors. All push motivational factors had positive effects on "heritage/culture" factor except "sports" factor having a negative impact on "heritage/culture factor." On the other hand, a simultaneous examination of the reversed model was checked and found that all four pull motivational factors (as independent variables) negatively influenced the "sports" push motivational factor (as an independent variable).

Consistent with Uysal and Jurowski's (1994) findings, Kim and Lee's (2002) study supported that three push motivational factors (family togetherness and study, appreciating natural resources and health, escaping from everyday routine) positively affected the pull motivational factor (various tourist resources). Inconsistent with Uysal and Jurowski's (1994) findings, however, they found that a regression model to predict the push motivational factor (adventure and building friendship) using the three pull motivational factors was not statistically significant. They identified only one positive direction between push and pull motivations—push motivations positively affected the pull motivations.

Another study conducted by Bogari et al. (2003) extensively examined causal relationships between Saudi domestic tourists' nine push motivational factors (cultural value, knowledge, family togetherness, relaxation, convenience of facilities, utilitarian, social, economical, and interest factors) and nine pull motivational factors (i.e., safety, activity, beach sports/activities, nature/outdoors, budget, leisure, historical/cultural, religious, and upscale factors). The causal link between the total push motivation and the total pull motivation, and between each pull motivational factor and each push motivational factor, were examined in detail using a multiple regression analysis. The major findings were that the push motivational factors positively and strongly affected the pull motivational factors at  $R^2 \geq 0.25$ . These included: 1) the total push motivation positively influenced pull motivation at  $R^2 = 0.27$ ; 2) "cultural value" positively affected five pull motivational factors (safety, nature/outdoor, historical/cultural, religious, leisure); 3) "knowledge" positively influenced two pull motivational factors (nature/outdoors, historical/cultural); and 4) "interest" positively influenced five pull motivational factors (activity, beach sports/activities, historical/cultural, religious factor, upscale).

Finally, in the study of domestic and international travel, Kim (2008) investigated whether U.S. college students' push motivations had positive impacts on their pull motivations. The results supported that push motivations ("adventure and excitement," "discovery and learning") were a good predictor of pull motivations ("lodging and transportation," "convenience and value," "sun and beaches," "family friendly") in a positive causal direction.

In summary, tourist motivation has been regarded as the starting point and driving force of tourist behavior by most tourism researchers (Crompton, 1979; Mannell & Iso-Ahola, 1987; Mansfeld, 1992; Kim, 2006) because most stakeholders have been interested in investigating why people travel (Alghamdi, 2007). Tourists travel because they are “pushed” into making travel decisions by internal, psychological forces, and “pulled” by external forces of the destination attributes. The push and pull approach to travel decision making provides the best way of explaining and predicting tourists’ travel decisions (Kim & Chalip, 2004; Kim, Jogaratnam, & Noh, 2006). Moreover, prior studies have shown that push motivations were positively associated with pull motivations. Based on the above discussion, the first hypothesis describes the relationship of the exogenous variable, push motivations, and the endogenous variable, pull motivations:

***H1: Museum visitors’ push motivations positively affect their pull motivations at the pre-visit stage.***

### **Service Quality**

Shonk (2006, p. 41) claimed that “we live in a society whereby our very functioning depends upon the services of others.” Over two-thirds of the workforce in the United States is employed in the service sector (Orwig, Pearson, & Cochran, 1997). Service quality is the customers’ perception of the service component of a product (Goeldner & Ritchie, 2006), and evaluating it helps understand how to satisfy customers so that they hold positive attitudes toward products and services (Ostrowski, O’ Brien, & Gordon, 1993). Parasuraman, Zeithaml, and Berry (1985; 1988) first defined service quality as

the difference between customer perceptions of the current service being provided by a given organization and customer expectations of excellent service within that given industry. Namely, service quality is the relationship between what customers desire from a service and what they perceive that they received (Mackay & Crompton, 1988). It is commonly believed that high quality service will produce satisfied visitors who are more likely to spread their views by word-of-mouth, and to be repeat tourists (Cole & Illum, 2006).

Vogt and Fesenmaier (1995) indicated that service delivery had become important to businesses and governmental units, particularly in the public recreation, tourism, and hospitality areas. The reason is that service quality can be adopted as an indicator of profitability and the success of organizational objectives in the fields of recreation and tourism (Lee, Graefe, & Burns, 2004). Service quality can be used to help deliver a competitive advantage in tourism by leading to tourist satisfaction and loyalty, both of which lead to repeat business and long term profitability (Goeldner & Ritchie, 2006).

### ***Museum Functions and Services***

The International Council of Museums (ICOM, 2001) defines a museum as “a nonprofit, permanent institution in the service of society and its development, open to the public, which acquires, conserves, researches, communicates and exhibits, for purposes of study, education and enjoyment, material evidence of people and their environment.” In addition to the above functions, museums also provide extended and diverse services for visitors, including engagement of leisure activity, artistic and aesthetic development, cultural appreciation and development of moral and ethical sentiment.

There has been agreement that museums are built not only to educate visitors but also for collecting and preserving valuable objects and artifacts (Bryant, 1988). Several researchers cited in that study agreed that museums have to recognize visitors' needs and provide services that they want (Beeho & Prentice, 1995; Combs, 1999; Falk, 1998). Moreover, Rubenstein and Loten (1996) suggested that visitor services could be the most distinguishing factor of why a visitor goes to one museum more often than another.

Reynolds (1999) claimed that tourism experiences have four basic characteristics that are equally applicable to museums: 1) the experience is intangible; 2) the experience consists of activities rather than things; 3) the experience is produced and consumed simultaneously; and 4) the customer has to be present and participate in the production process. Black (2005) suggested that these attributes reflect the role of the museum as part of the service economy. He supported Bryant's (1988) contention that, although museums are about real things—real sites, real objects, exhibitions, programs, etc.—it is visitor engagement with these that creates the individual user experience.

Drummond (2001) suggested that service is viewed as a major factor associated with the competitiveness and development of tourism as we move into the twenty-first century. The ability to enhance service quality is fundamentally important to an attraction's future sustainability (Lynch, 2006). Although tourism has the general characteristics of services, including intangibility, heterogeneity, inseparability, perishability (Cowell, 1984) and intangibility (Frochot & Hughes, 2000), tourism faces challenges of delivering satisfying experiences to tourists visiting heritage sites (including museums) because each site may have its individual or unique characteristics.

Customer-oriented service quality is necessary for a tourism organization that desires to better understand its targeted tourists and effectively manage a customer service. Furthermore, managers should seek “a balance between human input and technology, between costs and income, and finally between quality and productivity” (Gummesson, 1993). Drummond (2001) emphasized that service quality should be in everyone’s best interest, from the large heritage attraction (e.g., museums) to small independent operators, to deliver the customers’ required standard of service by: 1) talking to the customer (consumer and market research); 2) developing what they want ( product and service development); 3) setting standards to suit the customer (quality planning); 4) developing operating procedures to achieve the standards (re-organization of the processes); 5) providing expected products and service (quality of resources – human and material); and 6) control, evaluation and review (to be used for quality improvement and development).

### ***Measurement of Service Quality***

Expectancy-disconfirmation theory (EDT) (Oliver, 1980) was used to develop the measurement of service quality. EDT has been widely used as a framework for customer satisfaction research within the marketing field and has received strong empirical support. EDT (see Figure 2) suggests a comparison between expectation and performance (Oliver, 1980; Oliver, 1997; Wirtz, Mattila, & Tan, 2000; Yi, 1990).

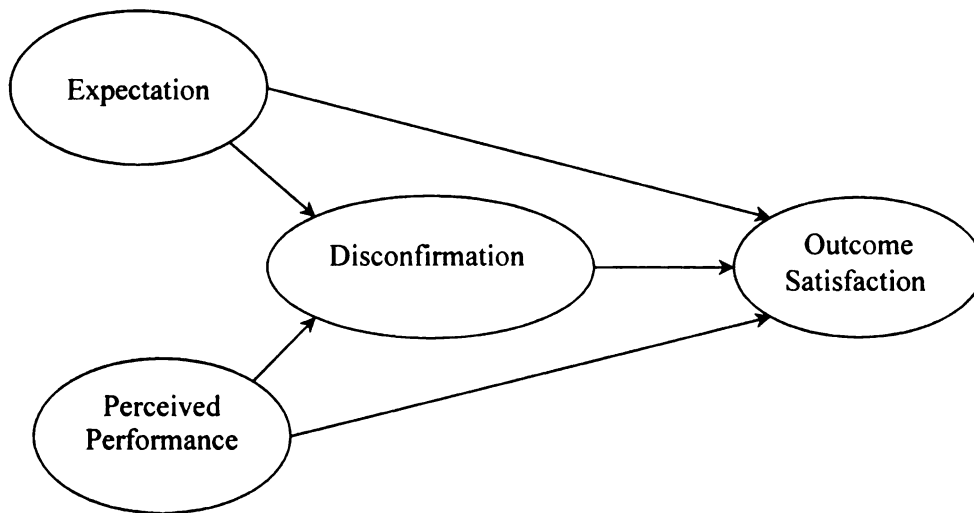


Figure 2. Expectancy-disconfirmation theory (Oliver, 1980)

The EDT model claims that consumers first form their expectations of product or service prior to purchase or use. Subsequently, purchase and use contribute to consumer beliefs about the actual or perceived performance of the product or service. The consumer then compares the perceived performance with prior expectations. Thus, consumer satisfaction is seen as the outcome of this comparison of expectation with performance (Clemons & Woodruff, 1992). Specifically, a consumer's expectation is: 1) confirmed when the product or service performance matches prior expectations; 2) negatively disconfirmed when product or service performance fails to meet the minimum level of expectation; and 3) positively disconfirmed when the perceived performance of product or service exceeds expectation. Dissatisfaction occurs when a consumer's expectation is negatively disconfirmed; that is, the product performance is less than expected (Churchill & Surprenant, 1982; Oliver & Beardon, 1985; Patterson, 1993).



Parasuraman et al. (1985) first developed a service quality gap model in the management field to explain the concept of service quality by synthesizing: 1) the expectation-disconfirmation theory concerning consumer satisfaction (Churchill & Surprenant, 1982; Gronroos, 1982; Lewis & Booms, 1983; Oliver, 1980); and 2) previous explorations of the dimensions of service quality (Gronroos, 1982; Lehtinen & Lehtinen, 1982; Sasser, Olsen, & Wyckoff, 1978). As seen in Figure 3, the service quality gap model identifies seven key potential discrepancies, or gaps, related to managerial perceptions of service quality, and tasks associated with customer service (Shahin, 2004). Of seven gaps, six gaps (Gap 1, Gap 2, Gap 3, Gap 4, Gap 6 and Gap 7) are identified as functions of the way in which service is delivered, whereas Gap 5 pertains to the customer and as such is considered to be the true overall measure of service quality as perceived by the customer. The other six gaps contribute to the overall Gap 5 assessment. Therefore, Gap 5 is used as a practical factor to assess customers' perceptions of expectation and performance levels. This model is applied in many fields.

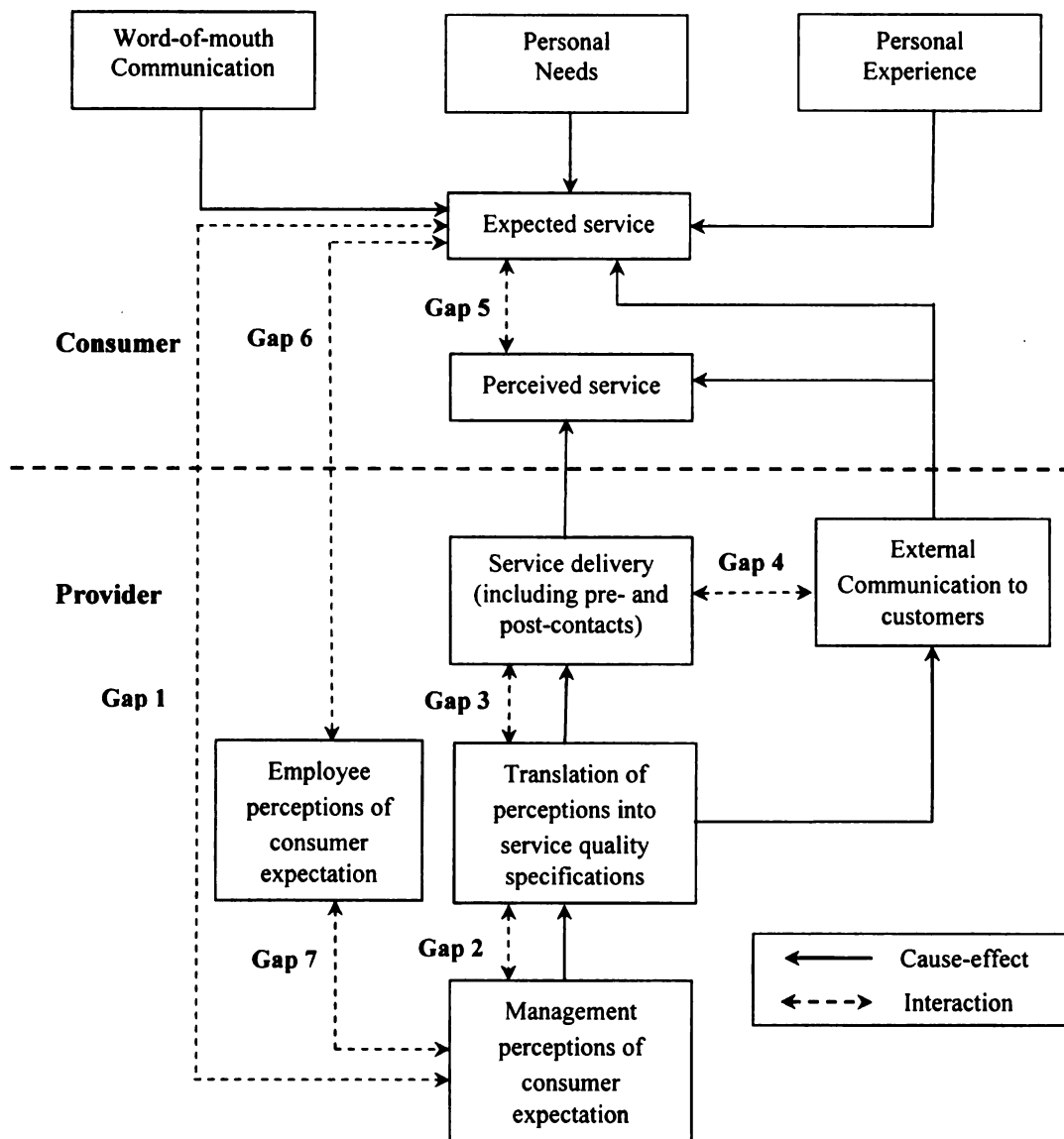


Figure 3. Model of service quality gaps (Parasuraman, Zeithaml, & Berry, 1985)

Based on the above discussion, Parasuraman et al. (1985) subsequently developed a multiple-item scale, PZB SERVQUAL model, and revised it in 1991, to conceptualize and measure elements of service that are evaluated by customers. The SERVQUAL scale

covers 22 items within five generic dimensions described as follows (Parasuraman, Bahri, & Molloy, 1991; Van Iwaarden, Van der Wiele, Ball, & Millen, 2003):

- (1) *Tangibles* refer to the appearance of physical facilities, equipment, personnel and communication materials.
- (2) *Reliability* relates to the organization's ability to perform the promised service dependably and accurately.
- (3) *Responsiveness* is the willingness to help customers and provide prompt service.
- (4) *Assurance* is the knowledge and courtesy of employees and their ability to inspire trust and confidence (including competence, courtesy, credibility, and security).
- (5) *Empathy* refers to the caring and individualized attention that the firm provides to its customers (including access, communication, and understanding of the customer).

After using the instrument in several service sectors, the authors came to the conclusion that the above five criteria used by consumers in evaluating service quality were similar regardless of the type of services industries provide. The SERVQUAL instrument seems to have the greatest potential for applicability across different industries and sectors although there are many different approaches or methods for measuring service quality. Lewis and Booms (1983, p. 10), pioneers in this area, proposed that service quality is “measure of how well the service level delivered matches the customer's expectations.” Prior research indicates that SERVQUAL had become the most common method in the late 1980's for measuring service quality by marketing researchers.

### ***Applications of Service Quality in Tourism***

Various studies have been published as to how tourists evaluate the quality of services they receive while on trips (Atilgan, Akinci, & Aksoy, 2003; Baker & Crompton, 2000; Chadee & Mattsson, 1996; Frochot, 2004; Hudson, Hudson, & Miller, 2004; Shonk, 2006; Suh, Lee, Park, & Shin, 1997; Vogt & Fesenmaier, 1995; Weirmair & Fuchs, 1999) and service quality of travel agencies (Ryan & Cliff, 1997). Tonge and Moore (2007) claimed that effective tourism and recreation management relies on being able to evaluate visitors' perception of service quality. Tourism research has demonstrated that consumer satisfaction is a function of both expectations related to certain performance attributes and judgments of attribute performance. However, each service industry in the tourism field has its own unique dimensions that may or may not be applicable to other industries. It was suggested by Carman (1990) that researchers should be cautious when using SERVQUAL because each service industry should have its own dimensions.

Mackay and Crompton (1988) first proposed a conceptual model (see Figure 4), adapted from Parasuraman et al. (1985), to explain the process by which a consumer evaluates perception of service quality in the tourism and recreation fields. This was the first time the SERVQUAL model was used to measure tourists' satisfaction in both public and private sectors, so it opened the door to a new type of satisfaction research in the tourism field (Hwang, Lee, & Chen, 2005). Crompton, Mackay, and Fesenmaier (1991) further proposed a revised version of the SERVQUAL model, named RECQUAL, to measure the degree of tourist satisfaction in the context of public sector recreation. RECQUAL presents a framework for the methodical investigation of perceived

recreation service quality in the public sector, and emphasizes the managers' need to understand customers' experiences.

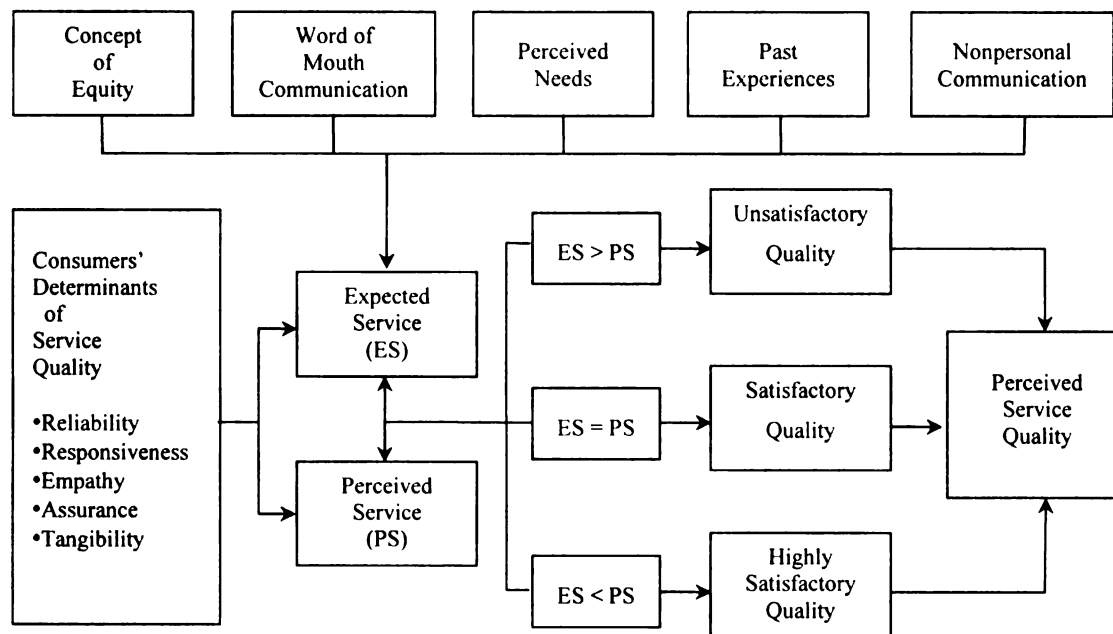


Figure 4. A Conceptual Model of Perceived Recreation Service Quality (Mackay & Crompton, 1988)

In addition to RECQUAL, several alternative service quality dimensions and measurement scales have been proposed and applied in the leisure, tourism, recreation and hospitality context. For example, LODGSERV is proposed to measure service quality in hotels (Knutson, Wullaert, Patton, & Yokoyama, 1990). Three different instruments have been adapted to the lodging industry, including: 1) LOGQUAL (Lodging SERVQUAL; Getty & Thompson, 1994); 2) DINESERV (Dinning SERVQUAL; Stevens, Knutson, & Patton, 1995); and 3) HOTELQUAL (Hotel SERVQUAL; Falces et al., 1999). Moreover, HOLSAT was used to evaluate the

destination satisfaction of Varadero, Cuba (Tibe & Snaith, 1998); HISTOQUAL is for historic houses (Frochot & Hughes, 2000); ECOSERV was designed for measuring service quality in ecotourism (Khan, 2003); and ATTRACTQUAL has been applied in cultural tourism contexts, including museums (Lynch, 2006).

### ***Service Quality Studies in Museums***

Many established service quality dimensions or similar measures have been designed for specific industries. The museum industry is no exception. Museums, whether operated by the public sector or private foundations, are now being scrutinized to see what sort of services they are delivering (Caldwell, 2002). The purpose of evaluating service quality is to help professionals provide reliable services for the visiting public (Nowacki, 2005). The measurement of museum service quality can help to identify positive and negative attributes to improve quality management. Realizing how various dimensions affect overall service quality would enable museums to efficiently design their service delivery elements and processes. Knowing how visitors perceive museum service quality and being able to measure it can benefit museum industry professionals (Shahin, 2004). Moreover, identifying strengths and weaknesses pertaining to the dimensions of service quality can help museums better allocate resources to provide better service to visitors.

Caldwell (2002) indicated that no systematic study of how museums measure service quality has been conducted since the development of the SERVQUAL model in the 1980s. Black (2005) emphasized the importance of service quality in museums, but also highlighted the weakness of the service quality evaluations currently being carried out. He found that most user satisfaction surveys about service in museums are developed in

an ad hoc fashion by individual institutions. Some prior studies have investigated service quality of museums using non-SERVQUAL approaches; for example, Caldwell (2002) examined the issue of how service quality is measured in museums, and used a repertory grid analysis of factors by visitors to 11 key London museums. Yucelt (2000) used factor analysis to investigate museum visitors in 24 historical and museum sites in Pennsylvania to discover service quality, needs, wants, interest, and satisfaction levels of visitors to improve museums' service level.

According to the extant literature review in tourism contexts, SERVQUAL has been valued as a practical tool to assess tourists' perceptions about service quality and satisfaction. Among the SERVQUAL models employed in tourism and hospitality industries, HISTOQUAL (Frochot & Hughes, 2000) and ATTRACTQUAL (Lynch, 2006) are applied in cultural tourism, both indirectly and directly applied to museums. Although MUSEQUAL was first developed and named by Allen (2001), access to the complete MUSEQUAL instrument is unavailable for subsequent researchers. To date, research that emphasizes primarily cultural tourist service experience and satisfaction has increased. The use of SERVQUAL in the museum context appears to be generally compatible with the procedures and methods obtained in previous tourism studies. Following are several supporting studies relevant to visitors' service experiences using the concept of SERVQUAL in the museum context.

As mentioned in chapter one, John and Clark (1993) first used the quality audit approach adapted from the SERVQUAL concept to assess service quality at six stages of museum and gallery visits from the visitor's point of view. Based on Parasuraman et al.'s (1985) model, John and Clark attempted to help museums close five gaps, including:

1) *positioning gap*: the gap between customers' requirements and management's concept of the museum product; 2) *specification gap*: the gap between management's vision of the museum product and the specifications or policies that are written for employees and others to follow; 3) *delivery gap*: the gap between what is specified and what is actually delivered; 4) *communication gap*: the gap between the museum's external image and the service being delivered; and 5) *perception gap*: the gap between what is perceived and expected by the visitor.

Harrison and Shaw (2004) adapted the generic service quality model rather than SERVQUAL to measure perceptions of visitors at 10 Australian museums and galleries. Three service elements (i.e., exogenous constructs) were devolved based on a review of the literature, including: 1) exhibition experience (education, stimulation, relevance, contemplation, emotion); 2) staff services (accessibility, information, friendliness); and 3) venue attributes (accessibility, ease of movement, functionality, cleanliness, comfort, safety, aesthetics). That study clarified the relationship between specific museum service elements, evaluation of the museum experience and subsequent intentions. The study results showed that the exhibition experience is the major contributing factor to satisfaction among the three service elements. In addition, demographics (e.g., gender, age, education) moderated the effect of satisfaction on subsequent behavior.

Since the late 1990s, researchers have applied the SERVQUAL instrument in museum settings. Williams (1998) first investigated whether or not the SERVQUAL model is an appropriate management tool for measuring service delivery quality in nonprofit sectors of the service industry rather than commercial organizations. He adapted the SERVQUAL model to one art gallery and one museum. That study assessed



the original five dimensions for service delivery quality with consideration of the perspectives of both consumers (consumption) and employees (provision).

Frochot (2001, 2004) investigated the strengths and limitations of the SERVQUAL scale and developed a new scale identifying service quality dimensions for historic attractions, including museums. Using SERVQUAL as a starting point, the new scale's results, HISTOQUAL, provided detailed insight into service quality assessment across three properties belonging to the same organization. The author indicated that if attractions are part of a common organization or trust, the various sites are more likely to implement similar marketing strategies and service quality. Partly different from the five SERVQUAL dimensions, the HISTOQUAL instrument includes the five original SERVQUAL dimensions, 1) responsiveness; 2) tangibles; 3) communication; 4) consumables; and 5) empathy, plus additional different dimensions (communication and consumables). HISTOQUAL has been shown to be a reliable tool to help identify the dimensionality of service quality and to assess satisfaction of service quality in the context of heritage attractions; it provides a direct contribution to assessment of museum service quality.

The original five dimensions of SERVQUAL investigated five profit sectors (appliances, repair and maintenance, telephone company, banking, credit cards). Several studies (Maher, Clark, & Motley, 2004; McFadyen, Harrison, Kelly, & Scott, 2001) contributed to an agreement that the dimensions of service quality are similar in both nonprofit and profit organizations. Nevertheless, a comparative study (Maher & Clark, 2005) found differences in customers' rankings of these five dimensions between a typical service industry (banking) and a nonprofit organization (museum). More

specifically, they indicated that customers perceive slight differences in their expectations of service by different types of service providers. The bank's highest priority was customers' expectation of reliable service, followed by the assurance that services would be provided as promised. On the other hand, museum patrons perceive assurance of service to be most important, followed by the tangible aspects of the service. Their study indicated that service marketers must recognize the differences in expectations of customers in different industries. Consequently, modifications of instruments to measure service quality must be considered.

Nowacki (2005) regarded museums as tourism products and used the concept of SERVQUAL to assess service quality of the Rogalin Museum. He used 36 items, revised and expanded from the original 22 items as proposed by Parasuraman et al. (1988), to assess visitors' expectations, perceptions, and level of satisfaction. The results of factor analysis did not fit the original five service quality dimensions, but were helpful in assessing service quality of heritage and cultural tourism products. He suggested that future researchers should be flexible and adjust methods and instruments to particular tourists and their particular characteristics. Also, elements of the measurement scales should be modified according to site-specific features.

Lynch (2006) suggested that enhancement of service quality could be an effective way to assure an attraction's future sustainability. He first developed and piloted a diagnostic tool, ATTRACTQUAL, to measure perceptions of service quality within visitor attractions, including museums. Using Churchill's (1979) purification procedures, Lynch's instrument includes a 17-item scale based on the original SERVQUAL instrument. Two underlying dimensions (interactions and outcomes) were generated

through use of exploratory factor analysis (EFA). That study was unable to replicate the five SERVQUAL dimensions, possibly due to limitations in respondent sample size and various destination contexts. However, the author provided a foundation for future research, and suggested use of larger samples and different types of attractions to test the stability of the dimensions.

### ***Second-order Service Quality***

An important feature of measuring service quality is to consider overall service quality as a common second-order factor. It is an overall evaluation of a service, not an evaluation of simple service attributes. Recent research has supported a second-order five-construct structure for service quality (Bagozzi & Dholakia, 2002; Bagozzi & Dholakia, 2006; Bagozzi & Lee, 2002; Bauer, Falk, & Hammerschmidt, 2006; Dholakia, & Bagozzi, 2004; Kaul, 2007; Parasuraman, Zeithaml, & Malhotra, 2005; Park, & Baek, 2007; Raajpoot, 2004; Ramsden, 1991).

In short, most museums currently accept that they belong to part of the service world, and that they resemble other service providers with regard to the need to understand and respond to visitor demand, and to meet visitor expectations (Black, 2005). As already discussed, museum studies suggest that visitors' experiences when visiting museums are important to the operation of museums. Visitor satisfaction must be checked periodically and the marketing plans of museums should be revised according to the needs and wants of museum visitors. A generalized and effective museum SERVQUAL is needed to improve museums' service quality by researchers, practitioners, or marketers. Table 3 summarizes prior studies about application of SERVQUAL to museums. This study adapted five dimensions (i.e., tangibility,

responsiveness, empathy, communication, consumables) from the HISTOQUAL (Frochot, 2000) and MUSEQUAL (Allen, 2001) in the contexts of cultural, heritage, and historical attractions, to measure the visitor services element of the museum experience.

**Table 3**  
**Summary of Museum Service Quality Studies**

<b>Researchers</b>	<b>Contexts</b>	<b>Service Quality Dimensions</b>
Allen (2001)	Manchester Museum of Science and Industry; Derby Museum & Art Gallery in UK	Named MUSEQUAL, composing five exogenous constructs (using 24 items) built on HISTOQUAL: 1) Tangibles; 2) Responsiveness; 3) Awareness; 4) Communication; and 5) Consumables
Deng & Lee (2006)	Taipei Fine Arts Museum in Taiwan	Five exogenous constructs (using 26 items) adapted from SERVQUAL: 1) Tangibles; 2) Reliability; 3) Responsiveness; 4) Assurance; and 5) Empathy
Frochot (2000)	Three historic sites containing museums in England & Scotland.	Named HISTOQUAL, comprising five exogenous constructs (using 24 items) adapted from SERVQUAL: 1) Responsiveness; 2) Tangibles; 3) Communication; 4) Consumables; and 5) Empathy
Harrison & Shaw (2004)	10 museums and galleries in Australia	Three exogenous constructs: 1) Exhibition experience (educational, stimulating, relevant, contemplative, emotive); 2) Staff services (accessible, informative, friendly); and 3) Venue attributes (accessible, ease-of-movement, functional, clean, comfortable, safe, aesthetic)
Lee & Lin (2008)	Shihsanhang Museum in Taiwan	Interpretation service quality, composing three exogenous constructs: 1) Interpretation facilities; 2) Exhibition environment; and 3) Interpretation staff services
Lynch (2006)	A sport museum, a war memorial, and a heritage museum in Australia	Named ATTRACTQUAL, comprising two exogenous constructs (using 17 items) adapted from SERVQUAL: 1) Interactions and 2) Outcomes
Maher & Clark (2005)	A museum and a bank in PA, U.S.	Five exogenous constructs (using 26 items) adapted from SERVQUAL: 1) Tangibles; 2) Reliability; 3) Responsiveness; 4) Assurance; and 5) Empathy
Mylonakis & Kendristakis (2006)	Cambridge & County Folk Museum in UK	Ten dimensions (using 39 items ) adapted from original ten SERVQUAL dimensions: 1) Physical environment; 2) Security; 3) Access; 4) Communication; 5) Credibility; 6) Courtesy; 7) Reliability; 8) Responsiveness; 9) Competence; and 10) Empathy
Nowacki (2005)	Rogalin museum in Poland	Seven factors that are different from SERVQUAL, using 36 items revised from the original 22 items of Parasuraman et al. (1988). Seven factors are: 1) Orientation marking; 2) Safety information; 3) Personnel; 4) Exhibition and personnel standards; 5) Technical aspects of the exhibition; 6) Aesthetics; and 7) Exhibition theme and stimulation
Peng (2008)	Children's Museum in Taiwan	Five exogenous constructs (using 30 items) revised from SERVQUAL: 1) Tangibles & reliability; 2) Care & empathy; 3) Inspiration & education; 4) Operation & entertainment; and 5) Assurance & response
Williams (1998)	Art gallery and museum in UK	Five exogenous constructs (using 22 items) adapted from SERVQUAL: 1) Tangibles; 2) Reliability; 3) Responsiveness; 4) Assurance; and 5) Empathy

### ***SERVQUAL (Gap Score) VS. SERVPERF (Performance-Only)***

There is an unresolved debate as to whether the gap score (the difference between expectation and performance) or the performance-only item score can be an effective determinant of service quality when it comes to the measurement of service quality. Based on EDT's concepts, Importance-Performance Theory (or Importance-Performance Analysis, IPA), proposed by Fishbein (1967), is another frequently used customer satisfaction approach to reflect customer service information back to providers (Crompton & Duray, 1985; Guadagnolo, 1985; Hammitt, Bixler, & Noe, 1996; Hollenhorst, Olson, & Fortney, 1992; Martilla & James, 1977). IPA introduces a way of understanding consumers' needs so as to make good management decisions about how to respond to them. By finding out what people think about the importance and performance of the attributes of a product or service, managers can reach some reasonable conclusions about modifying performance to increase profit or customer satisfaction effectively. However, IPA deals with issues similar to those of EDT when using gap analysis with the disconfirmation concept. Therefore, SERVPERF was modified based on SERVQUAL and was proposed as a substitution approach. Lee and Beeler (2007) noted that SERVQUAL remains a leading instrument, and that SERVPERF, adapted from SERVQUAL, also is being used regularly.

Cronin and Taylor (1992) first proposed a "performance-based" service quality measurement scale named SERVPERF because SERVQUAL, using a gap score, was supported by little empirical evidence in the early 1990s. SERVPERF has been supported by subsequent studies (Babakus & Boiler, 1992; Babakus & Mangold, 1992; Oliver, 1993) after the initiation. To date, the SERVPERF instrument, built on

unweighted performance-based assessment, has been a better method of measuring service quality than SERVQUAL in terms of reliability and validity (Lee, 2007). Several reasons are discussed below.

First, prior studies had supported the hypothesis that the performance-only item scores could be a better or more effective predictor than the gap scores (the difference between importance and satisfaction) in terms of the significant causal relationship between service quality and overall satisfaction. For example, Churchill and Suprenant (1982) and Oliver and DeSarbo (1988) found that the performance-only score could directly affect overall satisfaction. Tse and Wilton (1988) pointed out that consumer dissatisfaction is a function of only the perceived performance, regardless of expectation. Babakus and Boller (1992) and Carman (1990) found that the expectation score was obviously dominated by the perception score rather than contributing to the difference scores.

In another study, Cronin and Taylor (1992) noted that there is not strong empirical evidence to support the idea that the gap is the basis for measuring service quality. Boulding et al. (1993) found that service quality is directly influenced only by post-experience perceptions. Burns et al. (2003) and Kim (2004) explored the possibility of employing both performance-only item scores and gap scores to develop a better predictor of overall satisfaction, and found that the performance-only measures provided significantly better explanations of the larger proportions of the variance in overall satisfaction than gap scores. Lee (2007) claimed that previous studies were in favor of the SERVPERF perspective, indicating that the performance-only approach yields more stable results than the gap score approach in measuring service quality.

Second, SERVPERF has been adapted for use in numerous studies of consumers, and in both profit and nonprofit industries (Lee, 2007), including banks (Angur, Natarajan, & Jahera, 1999; Bauman et al., 2007), retail stores (Mehta, Lalwani, & Han, 2000), a shopping center (Marshall & Smith, 2000), an airline (Cunningham, Young, & Lee, 2002), a dental office (Paul, 2003), higher education (Abdullah, 2006), air cargo (Hong & Jun, 2006), business-to-business repair (Peterson et al., 2005), and public transportation (Perez et al., 2007). The use of SERVPERF in several studies of tourism has revealed that the performance-only approach can significantly determine relationships among multiple dimensions, as well as overall satisfaction in tourism (Hudson, Hudson, & Miller, 2004; Johns, Avci, & Karatepe, 2004), hotels (Nadiri & Hussain, 2005), sporting events (Shonk, 2006), convention attending (Severt, Wang, Chen, & Breiter, 2007), festival tourism (Cole & Illum, 2006), and cultural tourism (Yoon & Uysal, 2005).

As to pros and cons of gap score (SERVQUAL) vs. performance-only (SERVPERF), Crompton and Love (1995) indicated that, although the performance-only measures have generally been better predictors of satisfaction, the gap scores are useful in tracking trend data over time regarding visitor expectations. Specifically, Kettinger and Lee (1997) summarized advantages and disadvantages of SERVQUAL and SERVPERF, respectively, as instruments to measure service quality (see Figure 5). They illustrated that SERVPERF had better performance concerning data collection efficiency and predictive power than SERVQUAL, although SERVQUAL had provided greater “diagnostic value” and “data richness” than SERVPERF.



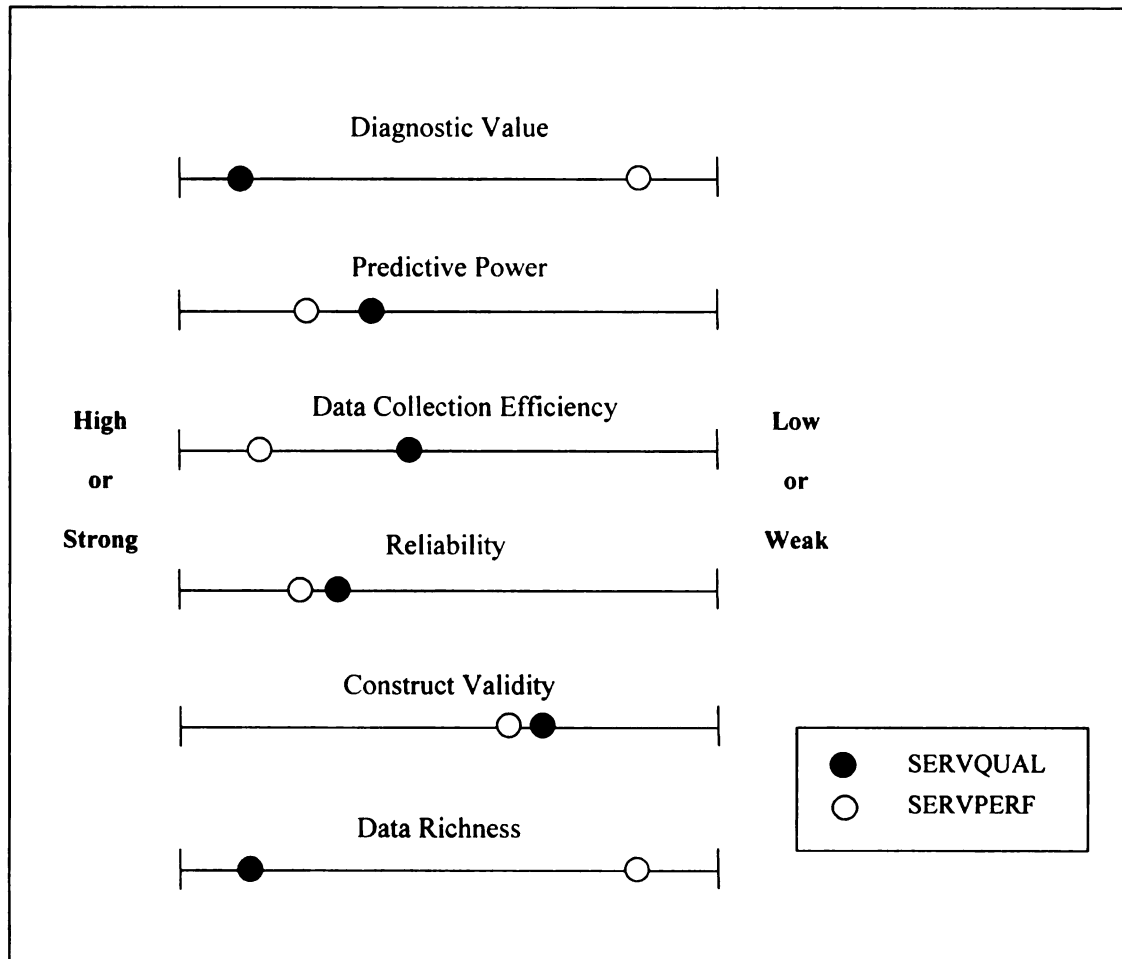


Figure 5. Relative advantages of SERVQUAL vs. SERVPERF (Ketinger & Lee, 1997)

Nevertheless, Yüksel and Yüksel (2001) claimed that there are unresolved issues or weaknesses remaining with EDT gap scores (see Table 4), although most previous EDT-based SERVQUAL studies suggest that expectations, performance, and disconfirmation play important roles in predicting consumer intention.

**Table 4**  
**Issues Related to Expectancy-Disconfirmation Theory (Yüksel & Yüksel, 2001)**

<b>Researchers Issue items</b>	<b>Questions or concerns addressed</b>
Pre-purchase expectations	Without expectations, disconfirmation cannot occur. How realistic would it be to expect customers to have firm expectations of all attributes prior to purchase in every consumption situation?
Meaning of expectations	Would an expectation question have the same meaning for everyone?
Single or multiple comparison	Does customer satisfaction come from disconfirmation of expectations alone?
Logical inconsistency	Would meeting low expectations generate satisfaction as the model predicts? Why do customers report overall satisfaction when their ratings indicate service performance falling short of their initial expectations?
Disconfirmation process	Would the disconfirmation process operate in every consumption situation?
Operational timing of the expectation measurement	Should expectations be measured before or after the service experience?
If customers have high expectation norm	If scores on expectations are consistently and constantly high, then it may never be possible to exceed them.
Possibility of misleading conclusions	Would meeting a high expectation with a high performance and meeting a low expectation with a low performance signify equal satisfaction in each case?
Dual administration and possibility of response-tendency-bias	Answering the same set of questions twice might bore respondents.
Uncertainty	The EDT predicts that customers will be satisfied (dissatisfied) when their initial expectations are met (unmet), but this may not necessarily apply to every consumption situation. Subjective satisfaction standards may differ before and after purchase, and differ across products/services.

Based on the above comparison of two measurement methods (SERVQUAL score = perception score - expectation score; SERVPERF score = perception score), SERVPERF was used in this study to assess visitors' perceptions of museum service quality. The adapted museum SERVPERF was conceptualized as a second-order five construct

structure comprising tangibility, responsiveness, empathy, communication, and consumables. The SERVPERF measurement is a better predictor of overall satisfaction, and is more efficient for data collection than is SERVQUAL. Specifically, the advantage of data collection efficiency is that respondents need only to rate the performance-only items rather than spending time to rate both expectation and performance items. Using this approach, the study hopefully will increase its response rate and item reliability because visitors are more likely to participate in a shorter, less time-consuming survey than a longer one. Theoretically, performance-only analysis for service quality in this study can help museum planners and staff understand the determinants of satisfaction among visitors, and determine if there is a significant relationship between service quality and satisfaction, as prior studies have found. Practically, performance-only analysis can help museum managers focus resources on influencing visitors' perceptions of service performance and help managers properly allocate resources.

#### ***Causation between Push (or Pull) and Perception of Service Quality***

Tourism studies have agreed that motivation has a positive, direct effect on satisfaction (Fielding, Pearce, & Hughes, 1992; Ross et al., 1991; Yoon & Uysal, 2005) or an indirect effect on satisfaction via the mediating variables (e.g., activity participation) (Hsieh, 1998; Ragheb, 1980; Ragheb & Griffith, 1982; Russell, 1987; Ragheb et al., 1993; Sneegas, 1986). A specific relationship between motivation and expectation or perception of service quality has been emphasized and explored in recent literature. A review of the tourism literature reveals that very few studies have analyzed the causal relationship between two variables— tourist motivation (push and pull) and level of perception of service quality (SERVPERF). Three studies reported that tourist

motivation, including push and pull motivational factors, directly affected tourists' expectation, perception of service quality, or the difference between expectation and perception, which then determined the level of tourists' overall satisfaction or revisit intention (Shen & Tseng, 2006; Wu, Huan, and Chiu, 2004; Yoon and Uysal (2005). For example, Wu, Huan, and Chiu (2004) found that both push and pull motivations had a direct positive effect on tourists' expectations of service quality and satisfaction (expectation score–perception score), which then influenced their intentions to revisit a national park. Yoon and Uysal (2005) examined the causal relationship between the tourists' push and pull motivations, and tourists' satisfaction (expectation –perception) in a cultural attraction. They found that pull motivational factors had a direct negative impact on tourists' satisfaction (expectation–perception), whereas push motivational factors had none. Shen and Tseng (2006) found that visitors who were strongly motivated to seek therapy via hot springs gave the spa a high expectation and perception rating. The test results supported that spa visitors' push and pull motivation had a positive impact on the visitors' expectations and perceptions of service quality, which then affected their level of satisfaction and revisit intention.

Based on the above discussion, tourism motivation (either overall motivation or individual push and pull motivation) has been shown to either positively or negatively affect perception of service quality. This study, using push and pull motivation as well as SERVPERF approach (only perception of service quality), addresses the following two sets of hypotheses to test the causal relationship between push motivations and visitors' perceptions of service quality in a positive direction or negative (for alternate), and the

causal relationship between pull motivations and visitors' perceptions of service quality in a positive direction or negative (for alternate).

***H2:*** *Museum visitors' push motivations positively affect their perceptions of service quality in the museum at the post-visit stage.*

***H2alt<sup>3</sup>:*** *Museum visitors' push motivations negatively affect their perceptions of service quality in the museum at the post-visit stage.*

***H3:*** *Museum visitors' pull motivations positively affect their perceptions of service quality in the museum at the post-visit stage.*

***H3alt:*** *Museum visitors' pull motivations negatively affect their perceptions of service quality in the museum at the post-visit stage.*

### **Satisfaction**

Consumer satisfaction plays a central role in marketing in many fields. It usually costs at least five times more to attract a new customer than it does to keep an existing one (Kandanpully & Duddy, 1999). In other words, it is more important to retain and satisfy present customers than attract/secure new ones because customer retention is less costly and, therefore, more profitable than customer attraction. Retention also contributes

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<sup>3</sup> H2alt and H3alt (for alternate) are alternative statements of the competing hypothesis H2 and H3. Test results would support one of the alternatives for both hypotheses 2 and 3.

to the creation of reputation, which in turn further lowers customer acquisition costs (Xu & John, 2005). Consumer satisfaction/dissatisfaction is determined by how well/bad a consumer perceives the service fulfills needs, wants or desires, and is measured as a sum of satisfaction with the different attributes of a service (Athiyaman & O'Donnell, 1995). Tourism research findings (Cronin & Taylor, 1992; Parasauraman, Zeithaml & Berry, 1994; Wang, Zhang, Gu, & Zhen, 2009) supported that satisfaction is a consequence of service quality (i.e., a causal direction), and has been considered one of the most significant predictors of behavioral intentions (e.g., purchase, repurchase, brand choice and switching behavior, etc) in many service industries (Attaway & Griffin, 1996; Baker & Crompton, 2000; Cronin, Brady, & Hult, 2000; Duman & Mattila, 2005; McQuitty, Finn, & Willey, 2000; Oh, 1999; Oliver, 1980; Petrick, Morais, & Norman, 2001; Tian-Cole, Crompton, & Wilson, 2002; Yoon & Uysal, 2005), including museums as described below.

### ***Satisfaction with Museum***

Harrison and Shaw (2004) pointed out that many museums consider visitor satisfaction to be a primary goal of their organizations. For example, in Australia the Museum Victoria sets a level of 95% audience satisfaction as the staff's number one goal; the National Museum of Australia also focuses on high levels of customer satisfaction and is engaged in continuing evaluation of the visitor experience.

Danaher and Mattson (1994) suggested that museum studies should evaluate visitors' satisfaction with key components of museum services, such as facilities, staff services and the exhibition, as well as overall satisfaction. Burton and Scott (2003), and Gabbott and Hogg (1998) agreed that satisfaction with museum services should be evaluated

continually throughout the service delivery or consumption process, rather than mainly post-visit. Prior research found that museum visitors' perceptions of service quality had a positive impact on the overall satisfaction, using SERVPERF (Deng & Lee, 2006) or SERVQUAL (Nowacki, 2005; Peng, 2008).

In this study, SERVPERF is the preferred instrument as discussed previously, and will be used to assess visitors' perceptions of museum service quality regarding five constructs as identified previously (i.e., tangibility, responsiveness, empathy, communication, consumables). This study will use overall satisfaction as the consequences of perceptions of museum service quality to determine the final level of visitors' satisfaction with the museum visit. A hypothesis is proposed to test the causal relationship between visitors' perceptions of service quality and overall satisfaction at the post-visit stage.

***H4: Museum visitors' perceptions of service quality at the post-visit stage positively affect their overall satisfaction with quality of museum service.***

### **Past Experience**

Tourism literature has indicated that the quantity and quality of tourists' past experiences, and their satisfaction with those experiences, play an important role in tourist behavior. It is generally accepted that past travel experience can influence tourist attitude toward destination decision-making, both positively and negatively (Anastasopoulos, 1992; Huang & Hsu, 2009). Tourist experiences include tourist

activities, intercultural interaction, service quality, tourism products, and other resources provided by tourism destinations (Gomez-Jacinto, Martin-Garcia, & Bertiche-Haud'Huyze, 1999; Oppermann, 2000).

### ***Effect of Past Experience on Perceptions of Service Quality***

As discussed previously, the SERVQUAL model (see Figure 3, p. 42) pointed out that personal experience, personal needs and word-of-mouth communication can directly affect expected service quality. This is also supported by the subsequent recreation SERVQUAL model (see also Figure 4, p. 45), in which tourists' past experiences have a direct impact on their expectation or perception of service quality. Research has indicated that tourists' satisfaction with their prior experiences significantly affects their perceptions of service quality and their overall satisfaction (Huh, 2002; Jodice et al., 2006).

### ***Effect of Past Experience on Attitude toward Revisit Intention***

Prior studies have reported that past experience or past behavior directly affects future purchase intentions or behavior (Bentler & Speckart, 1979; Petrick et al., 2001; Sonmez & Graefe, 1998), and in most cases past travel experiences positively influenced visitors' revisit intention (e.g., Gomez-Jacinto, Martin-Garcia, & Bertiche-Haud'Huyze, 1999; Sonmez & Graefe, 1998). Specifically, tourists' positive past experiences of service quality provided by tourism destinations could produce repeat visits as well as positive word-of-mouth influence on potential tourists such as friends and/or relatives (Bramwell, 1998; Oppermann, 2000; Postma & Jenkins, 1997).

Past travel experiences to specific destinations increases the intentions to travel there again (Mazursky, 1989; Perdue, 1985; Sonmez & Graefe, 1998). Specifically, tourists



are more likely to perceive a destination as less risky and feel safer in choosing it in the future once they have visited it (Sonmez & Graefe, 1998, p. 199). Because their past experience reduces the “risk that an unsatisfactory experience is forthcoming,” tourists repeat a vacation experience (Gitelson & Crompton, 1984). Moreover, tourists are more likely to revisit a destination once they have had satisfactory past travel experiences with it (Huang & Hsu, 2009).

Based on the above research, this study asked participants about their satisfaction with previous visit experiences (e.g., activities, facilities, exhibition, etc.), and proposed two hypotheses:

***H5:*** *Museum visitors’ past experiences at the pre-visit stage positively affect their perceptions of service quality at the post-visit stage.*

***H6:*** *Museum visitors’ past experiences at the pre-visit stage positively affect their intentions to return, to recommend visiting to others, and to renew or gain membership in the future.*

### **Perception of Value**

Perception of value has received increasing attention in the literature in many fields, including marketing and tourism. According to Zeithaml (1988), one of the most widely used definitions of perception of value is “the consumer’s overall assessment of the utility of a product/service based on perceptions of what is received and what is given.” In addition, the vast majority of prior studies has focused on the meaning of value as

“what consumers get for what they give” (Bojanic, 1996; Caruana, Money, & Berthon, 2000; Tam, 2000; Zeithaml, 1988). Put another way, perception of value is “a trade-off between perceived benefits and perceived cost” (Lovelock, 2002).

Prior studies indicate that perceptions of service quality positively affect perceptions of value (Chen, 2008; Chen & Chen, 2010; Chen & Tsai, 2007; Chen & Tsai, 2008; Choi & Chou, 2001; Cronin, Brady, & Hult, 2000; Lai, Hutchinson, Li, & Bai, 2007; Oh, 1999; Petrick, 2004; Petrick & Beckman, 2002; Tam, 2004; Zeithaml, 1988). Based on the above research, this study proposes the following hypothesis:

***H7: Museum visitors' perceptions of service quality at the post-visit stage positively affect their perceptions of value of their museum experiences at the post-visit stage.***

The positive impact of perception of value on overall satisfaction has been reported in prior studies (Baker & Crompton, 2000; Caruana, Money, & Berthon, 2000; Cronin, Brady, & Hult, 2000; Gronroos, 1997; Petrick & Beckman, 2002; Tam, 2000; Woodruff, 1997). Also, customer satisfaction is found to mediate the relationship between perception of value and behavioral intentions (Tam, 2000). Based on prior empirical studies, this study proposes the following hypothesis:

***H8: Museum visitors' perceptions of value of their museum experiences at the post-visit stage positively affect their overall satisfaction with quality of museum service.***

As for the relationship between perceptions of value and loyalty, perception of value recently has been recognized as one of the most salient determinants of purchase intentions and repeat visit (Bolton & Drew, 1991; Chang & Wildt, 1994; Jayanti & Ghosh, 1996). There is considerable support that perception of value is a better predictor of repurchase or revisit intentions and recommendation intentions than either satisfaction or perceptions of service quality in tourism studies (Chang & Wildt, 1994; Cronin, Brady, Brand, Hightower, & Shemwell, 1997; Dodds, McDougall & Levesque, 2000; Monroe, & Grewal, 1991; Oh, 2000; Parasuraman, 1997; Petrick & Beckman, 2002; Reicheld, 1996; Tam, 2000). This means that high levels of perception of value result in higher levels of future behavioral intentions. Moreover, Cronin et al. (1997) showed that perception of value can significantly explain larger variance in purchase intentions than perceived performance in a variety of service settings. Based on the literature cited above, the following hypothesis has been developed for this study:

***H9:*** *Museum visitors' perceptions of value of their museum experiences at the post-visit stage positively affect their intentions to return, to recommend visiting to others, and to renew or gain membership in the future.*

### **Tourism Destination Loyalty Theory**

In the marketing literature, customer loyalty usually refers to repeat purchases or recommendations to others (Yoon & Uysal, 2005). Antanassopoulos, Gournaris, and Stathakopoulos (2001) showed that satisfied customers are most likely to engage in

favorable word-of-mouth communication, and demonstrate product brand and company loyalties. Jang and Feng (2007) pointed out that intention to repurchase or revisit has been viewed as one of the most important subjects in contemporary marketing, and has the following benefits: 1) attracting previous customers is more cost-effective than gaining new ones; 2) a five percent increase in customer retention can increase profits by 25-85%; and 3) customer retention tends to yield positive word-of-mouth referral (Shoemaker, 1999).

In the context of tourism, destination loyalty theory refers to the causal relationships between satisfaction and destination loyalty, in which tourist satisfaction directly affects tourist loyalty (Baker & Crompton, 2000; Bitner, 1990; Dick & Basu, 1994; Kozak, 2001; Oliver, 1999; Yuksel, 2001). Davidow (2003) found that satisfaction generates favorable word-of-mouth, then generates return intentions. Customers with higher levels of satisfaction are more likely to translate their intentions into actual behaviors indicating destination loyalty than those who are merely satisfied (Harrison & Shaw, 2004). Several studies have supported this relationship and emphasized that satisfied customers are believed to affect the long-term viability of organizations through repeat purchase, brand loyalty and positive word-of-mouth communication (Churchill & Surprenant, 1982; Cina, 1989; Walker, 1995).

Loyalty traditionally is measured through behaviors such as repeat purchase, intention to repurchase or advocacy of the organization's products. To a destination's manager or marketer, it is vital to investigate the degree of tourists' loyalty that reflects their intentions to revisit the destination and in their recommendations to others (Oppermann, 2000). Three major public museums (including the study site) in Taiwan

receive a substantial portion of repeat visitors (see Table 5), according to previous studies (Huang, Cheng, Pu, Yen, & Huang, 1999; Chiang, 2002; Lu, 2003; Chen & Lu, 2006). Evidence shows that it is meaningful to assess museum loyalty of those visitors who have visited more than once for the multiple purposes of education, culture and/or entertainment. A resident group is more likely to revisit a museum than other non-resident groups.

**Table 5**  
**Prior Studies Indicating Repeat Resident Visitation to Three Major Taiwan Museums**

<b>Museum</b>	<b>Frequency of Visits</b>	<b>Residents/ Locals</b>
<b>National Palace Museum (NPM)</b>	3 times (40%) and 10 times or above (30%) visiting NPM with N=100; 1 time (50%) and 2 times or above (30%) visiting other museums per year (Lu, 2003)	44.3% were resident visitors
	70% were repeat visitors with N=716 (NPM, 2007)	An average of 45.3% were resident visitors in the years of 2006 and 2007
<b>National Museum of Natural Science (NMNS)</b>	3.2 times with N=386 (Chen & Lu, 2006)	61.1% were resident visitors
<b>National Science &amp; Technology Museum (NSTM)</b>	2.6 times with N=583 (Chiang, 2002)	55.7% were resident visitors
	40% were repeat visitors with N=236 (Huang et al., 1999)	44.9% were resident visitors

In summary, this study used destination loyalty theory as the main outcome variable for measuring satisfaction and behavioral intentions and for examining the relationship between satisfaction and intentions to revisit and to recommend to others. In light of the

above, this study proposes the following hypothesis to test the relationship between visitors' overall satisfaction and their museum loyalty.

***H10: Museum visitors' overall satisfaction with quality of museum service at the post-visit stage positively affects their intentions to return, to recommend visiting to others, and to renew or gain membership in the future.***

### **Socio-Demographic and Travel Behavior Variables**

Social demographics have been widely explored in the tourism literature. Cultural tourists are likely to be female, older, well educated and high-income (Bourdieu, 1991; Burton & Scott, 2003; Colbert, 2002), as well as having adequate leisure time or having occupations related to the cultural industries and education (Richards, 1996; WTO, 2001).

Museum research reveals that socio-economic class and education strongly correlate with the habit of museum visiting (Falk, 1998; Harrison & Shaw, 2004; Kawashima, 1999; Yucelt, 2000). To illustrate the characteristics above, Falk (1998) found that several variables are associated with museum-goers, including education, income, occupation, race, and age. Harrison and Shaw (2004) indicated that the background of museum visitors, including age, education, place of residence and nationality, can provide enough detail for managers to visualize their primary visitors for purpose of museum marketing.

In another study, McLean (1994) focused on museum visitors' residence and indicated the importance of both community and non-community visitors in the success

of museums. Two primary reasons were provided: 1) both local and inbound visitors to museums can bring profits to maintain their operations; and 2) museums' socio-cultural impacts can positively influence local visitors who can represent the broad community. However, non-resident and resident visitors may have significantly different opinions about their experiences when visiting museums. Harrison and Shaw (2004) suggested that it is important to museum managers and marketers to appeal to both groups. Followed by Jurowski and Gursoy (2004), they found that the distance between residents' homes and tourism attractions had a significant effect on how the costs and benefits were evaluated. For example, residents who lived closest to the site supported tourism development more and evaluated the benefits more highly than more distant residents, possibly due to the increased opportunities for employment or benefit from improvements in infrastructure and public services. Black (2005) further indicated that local residents and day-trippers make up the core market for most heritage sites and museums in the United Kingdom and other countries; additionally, those local residents represent the bulk of repeat visitors, reflecting an unwillingness to travel long distances (more than 30 minutes) to revisit a site.

In travel behavior research, museum visitors' travel behavior has not been explored widely. The few studies that have discussed this issue concluded that tourists visiting heritage or cultural sites tend to stay longer and spend more money during their trips than tourists in other market segments (Kerstetter, Confer, & Graefe, 2001; Silberberg, 1995).

In terms of the association and causal relationship between socio-demographics and previously mentioned constructs (e.g., motivation, satisfaction, loyalty), prior research

demonstrated that socio-demographic factors have significant effects on tourists' push and pull motivations (Bogari et al., 2003; Jang & Cai, 2002; Jamrozy & Uysal, 1994; Kim, Lee, & Klenosky, 2003; Prentice et al., 1997; Zhang, Qu, & Tang, 2004). Prentice et al. (1997) indicated that socio-demographics have been used in profiling museum visitors, and are useful in explaining museum visit motivations, which may vary by social group. Kim et al.'s (2003) study found that older respondent groups, compared to younger respondents, generally viewed the pull factors of the "key tourist resources," "information," "convenience of facilities," and "accessibility and transportation" as more important. Tsotsou and Vasioti (2006) used demographics (e.g., gender, age, family status, education, employment status) to predict the level of satisfaction with tourism services in Greece. They found that education and age discriminated between the two groups of consumers (high satisfaction and low satisfaction), in which educated younger tourists are more likely to be satisfied than less educated older tourists. As to the residence factor, the residence of visitors has a significant impact on the visit frequency as well as loyalty due to considerations of travel time and distance as indicated by Black (2005). Yucelt (2000) stated that socio-demographic variables such as age and marital status of visitors are good indicators for target market decision-making. Based on the above research, both demographic backgrounds and travel behavior of visitors can be effective tools for target market analysis and advertising strategies in the museum field.

A moderating effect, in which one moderator variable is manipulated, can alter the strength of a causal relationship between two variables. In the 2000s, the moderating effect of two moderator variables, including socio-demographics and travel behavior variables, have been tested on the relationship between performance and satisfaction



(Kozak, 2001; Matzler, Fuller, Renzl, Herting, & Spath, 2008; Matzler, Hattenberger, Pechlaner, & Abfalter, 2005; Matzler, Renzl, & Rothenberger, 2006; Wu, DeSarbo, Chen, & Fu, 2006), the relationship between satisfaction and loyalty (Garbarino & Johnson, 1999; Harrison & Shaw, 2004), and the relationship between value perception and loyalty (Chen & Tsai, 2008) in the tourism and recreation fields. Little research has tested the moderating effect of social demographics and travel behavior variables on the above three relationships in the museum context. A discussion of three moderating effects is provided below.

### ***Moderating Effect of Visitor Type and Length of Stay on Three Causal Relationships***

Prior studies in many fields, including tourism, have supported the moderating effects of variables (socio-demographic and travel behavior) on the relationship between “perception of service quality” and “overall satisfaction,” between “overall satisfaction” and “loyalty,” and between “perception of value” and “loyalty” (e.g., Chen & Tsai, 2008; Evanschitzky & Wunderlich, 2006; Harrison & Shaw, 2004; Matzler et al., 2008; Matzler et al., 2005; Matzler et al., 2006; Kozak, 2001; Wang & Wu, 2009; Wu, DeSarbo, Chen, & Fu, 2006).

Harrison and Shaw (2004) demonstrated that demographics such as age, gender and education act as moderators of satisfaction and subsequent behavioral intention, including intention to return to a museum and intention to recommend. Another study conducted by Neal, Sirgy, and Uysal (2004) revealed the moderating effect of length of stay on two paths of impact, including from “satisfaction with tourism experiences” to “satisfaction with leisure life” and from “satisfaction with leisure life” to “satisfaction with life in general.” Impacts were stronger for vacationers who stayed longer than for

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those who had a shorter stay.

Three selected variables, visitor type (as indicated by membership status and ticket type) and length of stay, have been shown to have a moderating impact on three paths (perception of service quality-satisfaction, satisfaction-loyalty, perception of value-loyalty) in the travel and tourism field other than the museum context.

### ***Visitor Type***

Visitor type can be referred to as the category of ticket at which different prices are set based on the buyer's demographic characteristics (e.g. age, occupation, residence). Another visitor type can be referred to as membership status ("member" or "nonmember"). Prior studies (Bowman & Narayandas, 2001; Evanschitzky & Wunderlich, 2006; Garbarino & Johnson, 1999) have demonstrated that various types of customers rate perception of service quality, overall satisfaction and loyalty differently. Garbarino and Johnson (1999) found that theater visitors in three groups (subscribers, occasional subscribers, and individual ticket buyers) scored differently on satisfaction and loyalty. In another example, Evanschitzky & Wunderlich (2006) reported that visitor type (general customers, loyalty card members) as a moderator variable in chain stores resulted in different moderating impacts on the relationships between satisfaction and loyalty.

### ***Length of Stay***

Length of stay is important to tourism destinations because visitors' length of stay is positively correlated with aggregate earnings (Barros, Butler, & Correia, 2010). Researchers have suggested that an increase in time spent on leisure and travel enhances

tourists' satisfaction (e.g., Buchanan, 1983; Driver, 1976; Neal, Sirgy, & Uysal, 1999; Neal, 2003; Neal, Uysal, & Sirgy, 2007; Shen & Ho, 2007).

Neal's (2003) study illustrated that satisfaction levels were significantly higher for long-term visitors than for short-term visitors across three relationships among variables: 1) length of stay and perceptions of tourism service quality; 2) length of stay and perception of satisfaction; and 3) length of stay and perception of value of travel and tourism services. They concluded that the length of time spent on leisure travel affected satisfaction with leisure life because tourists have more opportunities to interact with destination service providers, to engage in exhilarating activities during the trip, to meet people, and to spend time with travel companions. On the other hand, when visitors have spent little time enjoying the amenities of the trip, destination service providers do not have a personal relationship with the guests such that individual needs and tastes are identified and satisfied. In another example, Shen and Ho's (2007) study revealed that length of stay is significantly related to tourist's travel experiences (e.g., activities, interaction) and expenditures.

Tables 6, 7 and 8 summarize various moderating variables on impact paths between "performance" (i.e., perception of service quality) and "overall satisfaction," "overall satisfaction" and "loyalty," and "perception of value" and "loyalty." These moderators include several socio-demographic variables (e.g., gender, age, type of visitor, and nationality) and consumer behavior variables (e.g., length of experience and involvement) across fields of tourism, hospitality and other industries.

Table 6

Previously Identified Variables Moderating the Causal Relationship between Performance and Satisfaction (adapted from Matzler et al., 2008)

<b>Moderator Variable</b>	<b>Study</b>	<b>Respondent</b>
Nationality	Kozak (2001)	1,872 British and German tourists visiting Mallorca and Turkey
Age, gender, type of visitor ( new visitor, repeat visitor)	Matzler, Fuller, Renzl, Herting, and Spath (2008)	14,861 skiing tourists
Lifestyle	Matzler, Hattenberger, Pechlaner, and Abfalter (2005)	1,042 skiing tourists
Nationality	Matzler, Renzl, and Rothenberger (2006)	1,555 hotel guests
Four determinant attributes of customer satisfaction	Wu, DeSarbo, Chen, and Fu (2006)	314 festival visitors

Table 7

Previously Identified Variables Moderating the Causal Relationship between Satisfaction and Loyalty (adapted from Matzler et al., 2008)

<b>Moderator Variable</b>	<b>Study</b>	<b>Respondent</b>
Amount of elaboration (involvement and deliberation)	Bloemer and Kasper (1995)	598 buyers of blank audio cassettes
Length of experience	Bolton (1998)	650 customers of cell phone providers
High loyalty, heavy user, type of contact	Bowman and Narayandas (2001)	1,715 customers of seven manufacturers of frequently purchased consumer goods
Personal characteristics: Age, income, and education; Situational characteristics: Expertise, price orientation, critical incident recovery, loyalty card membership	Evanschitzky and Wunderlich (2006)	888 customers of a do-it-yourself chain store
Type of subscribers (subscribers, occasional subscribers, and individual ticket buyers)	Garbarino and Johnson (1999)	173 subscribers, 91 occasional subscribers, and 80 individual theater ticket buyers
Age, education, and gender	Harrison and Shaw (2004)	172 museum visitors
Income, involvement, gender, age, variety seeking	Homburg and Giering (2001)	943 customers of a car manufacturer
Gender, education, age, children	Mittal and Kamakura (2001)	100,040 automotive customers

**Table 8**  
**Previously Identified Variables Moderating the Causal Relationship between Perception of Value and Loyalty**

<b>Moderator Variable</b>	<b>Study</b>	<b>Respondent</b>
Involvement	Chen and Tsai (2008)	407 TV-shopping customers
Length of relationship	Wang and Wu (2009)	279 general consumer

Based on the above review, visitor type of a museum and visitor's length of stay can be moderator variables due to their importance and little research existing in the museum field. In this study, all respondents were categorized into "member" or "nonmember" in terms of membership status. The nonmember group was further categorized into "adult ticket buyer" and "discount ticket buyer" depending on the price in which their ticket was purchased. Therefore, three variables were selected as moderator variables; 1) membership status (member or nonmember) and 2) visitor type as indicated by ticket type (adult or discount ticket buyer) from socio-demographic characteristics; and 3) length of stay (lengthy stay or shorter stay) from travel behavior variables, to examine their moderating effects on three specific links (perception of service quality- satisfaction, satisfaction-loyalty, perception of value-loyalty). Nine following hypotheses were generated to test for moderation effects in relational paths from "perception of service quality" to "overall satisfaction," from "overall satisfaction" to "future intentions to return, to recommend visiting to others, and to renew or gain membership," and from "perception of value" to "future intentions to return, to recommend visiting to others, and to renew or gain membership."

- H11a:** *Visitor type by membership status (member and nonmember) moderates the effect of museum visitors' perceptions of service quality on the overall satisfaction with quality of museum service at the post-visit stage;*
- H11b:** *Visitor type (adult and discount ticket) moderates the effect of museum visitors' perceptions of service quality on the overall satisfaction with quality of museum service at the post-visit stage;*
- H12a:** *Visitor type by membership status (member and nonmember) moderates the effect of museum visitors' overall satisfaction with quality of museum service on their intentions to return, to recommend visiting to others, and to renew or gain membership in the future;*
- H12b:** *Visitor type (adult and discount ticket) moderates the effect of museum visitors' overall satisfaction with quality of museum service on their intentions to return, to recommend visiting to others, and to renew or gain membership in the future;*
- H13a:** *Visitor type by membership status (member and nonmember) moderates the effect of museum visitors' perceptions of value of their museum experiences on their intentions to return, to recommend visiting to others, and to renew or gain membership in the future;*
- H13b:** *Visitor type (adult and discount ticket) moderates the effect of museum visitors' perceptions of value of their museum experiences on their intentions to return, to recommend visiting to others, and to renew or gain membership in the future;*
- H14:** *The length of visitors' stay in museums moderates the effect of museum visitors' perceptions of service quality on the overall satisfaction with quality of museum service at the post-visit stage in which the relationship is likely to be positively stronger for visitors' lengthy stays in the museum than for shorter stays; and*

**H15:** *The length of visitors' stay in museums moderates the effect of museum visitors' overall satisfaction with quality of museum service on their intentions to return, to recommend visiting to others, and to renew or gain membership in the future in which the relationship is likely to be positively stronger for visitors' lengthy stays in the museum than for shorter stays; and*

**H16:** *The length of visitors' stay in museums moderates the effect of museum visitors' perceptions of value of their museum experiences on their intentions to return, to recommend visiting to others, and to renew or gain membership in the future in which the relationship is likely to be positively stronger for visitors' lengthy stays in the museum than for shorter stays.*

### **Summary of the Relationships among Key Constructs**

Tourism research has addressed the importance of empirically assessing the antecedent, mediating and consequent relationships among key constructs. The relationships between perception of service quality, perception of value and overall satisfaction have been modeled in numerous studies (Antanassopoulos et al., 2001; Baker & Crompton, 2000; Cronin, Brady, & Hult, 2000; Oh, 1999; Petrick & Beckman, 2002; Zeithaml, Berry, & Parasuraman, 1996). Moreover, the relationships among motivation, satisfaction and loyalty are supported by several studies (Severt et al., 2007; Shen & Tseng, 2006; Wu, Huan, & Chiu, 2004; Yoon & Uysal, 2005).

As already discussed, one model and one theory provide the basis of causal relationships between key constructs, including: 1) SERVPERF model (perception of service quality → overall satisfaction); and 2) destination loyalty theory (overall satisfaction → behavioral intentions). Nevertheless, beyond the two identified relationships based on theories and literature, there is a need for summarizing and



comparing all relationships identified in this study to clarify the complex museum tourist behavioral process.

Using Pearson correlation analysis, the correlations (no cause-effect association) among key constructs in the museum literature are summarized in Table 9. Furthermore, previous tourism research using structural equation modeling (SEM) is summarized in Table 10 to illustrate the potential causal relationships among several constructs of tourist behavior.

**Table 9**  
**Prior Museum Studies Regarding Correlations between Constructs Using Pearson Correlation Analysis**

<b>Researcher; Museum; Sample size</b>	<b>Testing Variable</b>	<b>Identified Relationship</b>
Packer and Ballantyne (2002); museum, art gallery, and aquarium in Queensland, Australia; N=499	Motivational factors; motivated learning behavior; experience of learning; visitor satisfaction	Motivational factors ↔ motivated learning behavior ↔ experience of learning ↔ satisfaction
Simpson (2000); museum or art gallery in New Zealand; N=141	Satisfaction; behavioral intentions	Satisfaction ↔ behavioral intentions
Nowacki (2005); Rogalin museum in Poland; N=102	Service quality; satisfaction	Service quality ↔ satisfaction
Huo and Miller (2007); Robert Louis Stevenson (RLS) museum in Samoa; N=112	Satisfaction; behavioral intentions	Satisfaction ↔ behavioral intentions

**Table 10**  
**Prior Tourism Studies Regarding Causal Relationships among Constructs Using SEM**

<b>Researcher; Context; Sample size</b>	<b>Exogenous constructs</b>	<b>Endogenous constructs</b>	<b>Identified causal relationships</b>
Hsieh (1998); leisure activities; N=503	Leisure attitude	Leisure motivation; leisure participation; leisure satisfaction	Leisure attitude → leisure motivation → leisure participation → leisure satisfaction
Petrick (1999); golf; N=439	Travel experience	Perception of value; loyalty; satisfaction; intention to revisit	Travel experience → loyalty → overall satisfaction → perception of value → intentions to revisit
Tam (2000); restaurant; N=92	Service quality; perception of service quality	Overall satisfaction; behavioral intentions	Service quality → overall satisfaction → behavioral intentions
Hong (2003); special event; N=394	Service performance	Satisfaction; emotion	Service performance → affective factor → satisfaction
Yoon and Uysal (2005); historical site; N=148	Motivation	Satisfaction; intent to return	Motivations → satisfaction → destination loyalty
Cole and Illum (2006); Festival; N=413	Performance quality	Experience quality; overall satisfaction behavioral intentions	Performance quality → experience quality → overall satisfaction → behavioral intentions
Kim (2006); Travel; N=395	Travel involvement	Push motivations; pull motivations; satisfaction; destination loyalty	Travel involvement → motivations → satisfaction → destination loyalty
Kaplanidou (2006); Sport Event; N=495	Event image; subjective norms; perceived behavioral control; past behavior	Destination image; intention to revisit	Event image → destination image → intention to revisit; past behavior → destination image → intention to revisit
Shonk (2006); Sporting Event; N=215	Access quality; venue quality; contest quality	Sport tourism satisfaction; satisfaction; intent to return	Contest quality → sport tourism satisfaction → satisfaction → intent to return
Lee and Beeler (2007); Festival; N=254	Service quality	Satisfaction; future intent	Satisfaction → future intention
Severt et al. (2007); Conference; N=157	Educational benefits; activity & opportunity	Satisfaction; return intention; Word-of mouth	Educational benefits → satisfaction → return intention → word-of-mouth
Shen and Tseng (2006); hot spring restaurant; N= 442	Motivation	Service quality; Satisfaction; Loyalty	motivations → service quality → satisfaction → loyalty

Relevant museum-based studies using SEM mainly focus on the causal relationship between: perception of service quality and overall satisfaction (Deng & Lee, 2006; Peng, 2008); perception of service quality and future intention (Lee & Lin, 2008); and perception of service quality, overall satisfaction and future intentions (Harrison & Shaw, 2004) (see Table 11). Nevertheless, to date, no study has empirically tested structural relationships among the antecedents (i.e., push motive, pull motive, past experience) and consequences (overall satisfaction, perception of value, loyalty) of tourists' perceptions of service quality in the context of museums. As Hwang, Lee, and Chen (2005) claimed, a current research trend in consumer behavior is investigating causal relationships between motivations and other related variables as proposed in this study. The reason is that relationships can help predict how and why individuals are involved in travel and how travel decisions are made regarding preferred destinations for vacation or pleasure.

Black (2005) suggested that museums should place visitors in the "right frame of mind" so that visitors expect to engage with collections and exhibitions; this should include operational and service quality and a sense of welcome and belonging. In addition, museums should provide visitors the stimulus to visit them; this should include attractive destination attributes, proper service quality, effective marketing, prior personal experiences, word-of-mouth recommendations by previous visitors, etc. The above statement has addressed the importance for museum managers to understand museum tourist behavior for the purpose of meeting visitors' overall needs, enhancing their satisfaction and maintaining their loyalty to museums.

Table 11

Summary of Previous Literature Relevant to Structural and Causal Relationships among Key Constructs Using Structural Equation Modeling in Museum Contexts

<b>Researchers; Context; Sample size</b>	<b>Exogenous constructs</b>	<b>Endogenous constructs</b>	<b>Identified relationships</b>
Harrison and Shaw (2004); museums and galleries in Australia; N=184	Exhibition experience; staff services; venue attributes	Overall satisfaction; intention to return; intention to recommend	Service quality (exhibition experience & staff services) → overall satisfaction → intention to return and recommend
Packer (2004); museum, art gallery, a wildlife centre, aquarium, and natural and cultural heritage site in South East Queensland, Australia; N=499	Learning goal; situational incentives	Motivated learning behavior; experience of learning	Situational incentives → motivated learning behavior → experience of learning
Deng and Lee (2006); Taipei Fine Arts Museum in Taiwan; N=371	Tangibles; reliability; responsiveness; assurance; empathy	Overall satisfaction	Perception of service quality → satisfaction
Lee and Lin (2008); Shihsanhang Museum in Taiwan; N=219	Interpretation facilities; exhibition environment; interpretation staff services	Perceived performance of service quality; intention to return; intention to recommend	Perception of service quality → intention to return and recommend
Peng (2008); Children's Museum in Taiwan; N=230	Tangibles & reliability; care & empathy; inspiration & education; operation & entertainment; assurance & response	Overall satisfaction	Perception of service quality → overall satisfaction

This review of literature suggests that significant gaps can be identified based on a review of fundamental theories and models. Two theories and two models were used to construct the theoretical framework for this study in the museum context. The proposed framework, incorporating relationships across seven constructs, attempts to advance the understanding and knowledge base of museum tourist behavior. More specifically,

development of this museum tourist behavior model would benefit from a better understanding of visitors' motivations to visit museums, their perceptions of museum service quality, their perceptions of value of museum experiences, and their behavioral intentions. The hypothesized relationships among seven constructs (push, pull, perception of service quality, past experiences, perception of value, overall satisfaction, loyalty) and two moderating effects (stay length and visitor type) using a structural equation modeling approach, are graphically presented in Figure 6.

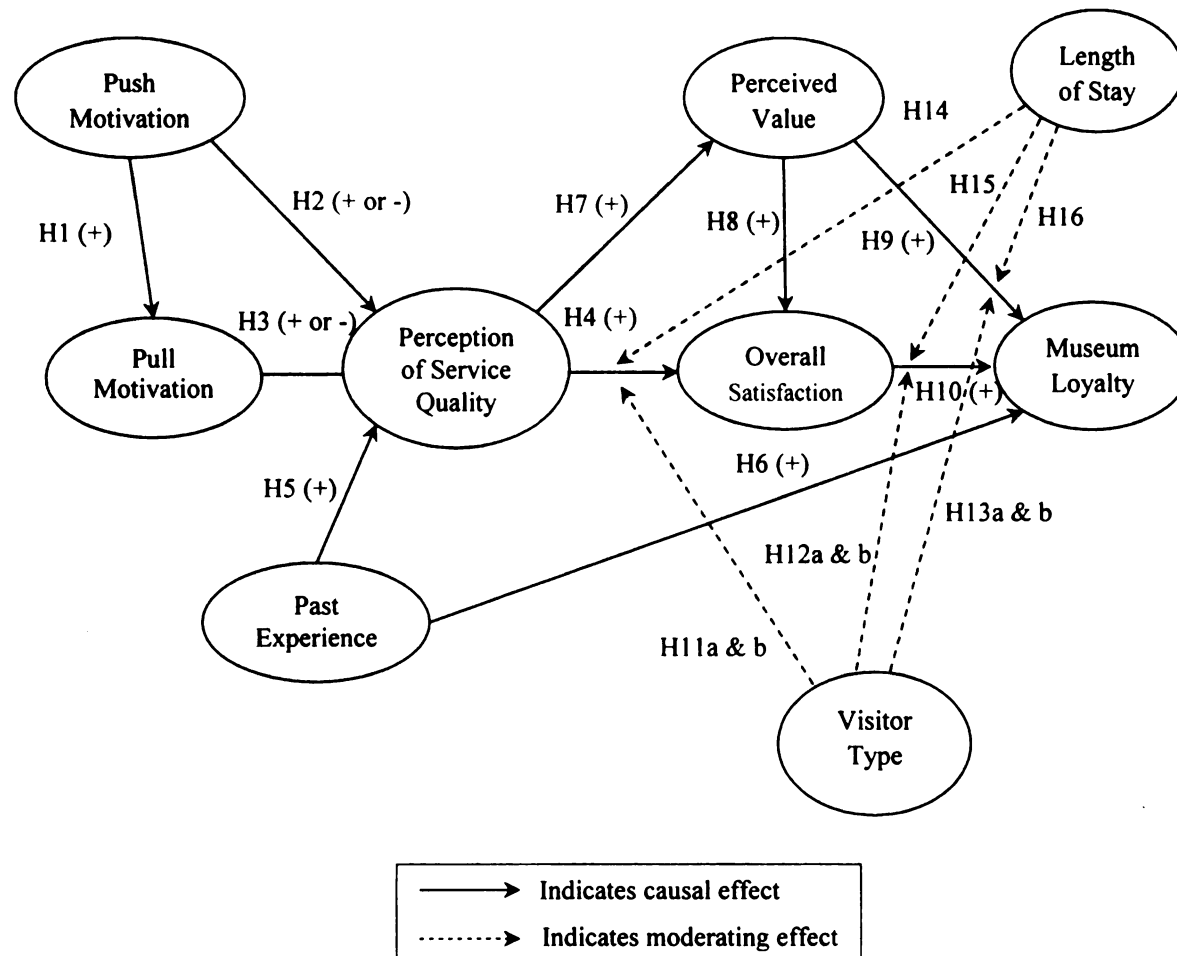


Figure 6. The proposed hypothetical model of the relationships among all constructs

## **CHAPTER 3**

### **METHODS**

#### **Overview**

This study focuses on the determinants of visitors' intentions to revisit or become members of museums in Taiwan. The proposed model, including the interrelationships of seven constructs comprising museum visitor behavior across three stages, was examined using the data collected from one national Taiwanese museum to understand museum visitor behavior.

This chapter discusses the research methods and procedures employed to obtain and analyze the data. First, characteristics of the selected study site are provided in detail. Second, the methods and processes used for developing the survey instrument and measurement scales are presented. A survey instrument was developed as the primary measuring tool, based on the proposed model for assessing key variables. This subsection includes a discussion of the pre-test and pilot study, and of the reliability and validity tests employed. Third, the sampling plan is described, including the sample frame, sample size, sampling methods, and survey time frame. A stratified and systematic sample was used to draw a sufficient number of respondents from the study museum. These selected participants, who possessed the characteristics of typical museum visitors, should be representative of the targeted museum visitor population. Fourth, data collection procedures are discussed; these include asking participants to complete two survey components (one before and one after their visits). Finally, several data analysis methods are employed to describe the sample and examine the proposed

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hypotheses, including descriptive analyses, chi-square test, independent sample t-test, and structural equation modeling (SEM).

### **Study Site**

The determinants of museum visitors' intentions to revisit were investigated in the largest national museum in terms of annual visit in Taiwan, which is the National Museum of Natural Science (NMNS). One of the objectives of this study was to create and test a service quality scale that is usable for public museums in Taiwan. Thus, it was important to choose one representative museum that had an appropriate range of quality facilities and services, and a large annual number of visitors. The NMNS has the following features, qualifying it as a representative public museum in Taiwan:

1) geographical convenience: located in Taichung metropolis in central Taiwan, one of the three major metropolises in Taiwan, and accessible to most people across Taiwan (see Figure7); 2) large population of the host city: a population of 2.63 million; 3) high annual visit: 3.3 million annual visitors within five years; 4) varied facilities and services: open areas for the public, including tourism exhibitions, multimedia center with new technologies, websites and other on-line resources, interpretation services, gift shops and restaurants; and 5) permanent and temporary offerings: permanent exhibits, temporary exhibits and special events that would attract repeat visitors.

Figure 7 shows the geographical location of the three largest museums from north to south in Taiwan, including the study museum. Specifically, Table 12 lists the main characteristics of these three national museums for purposes of comparison between the study site and the other two museums in terms of museum scale and scope of services.



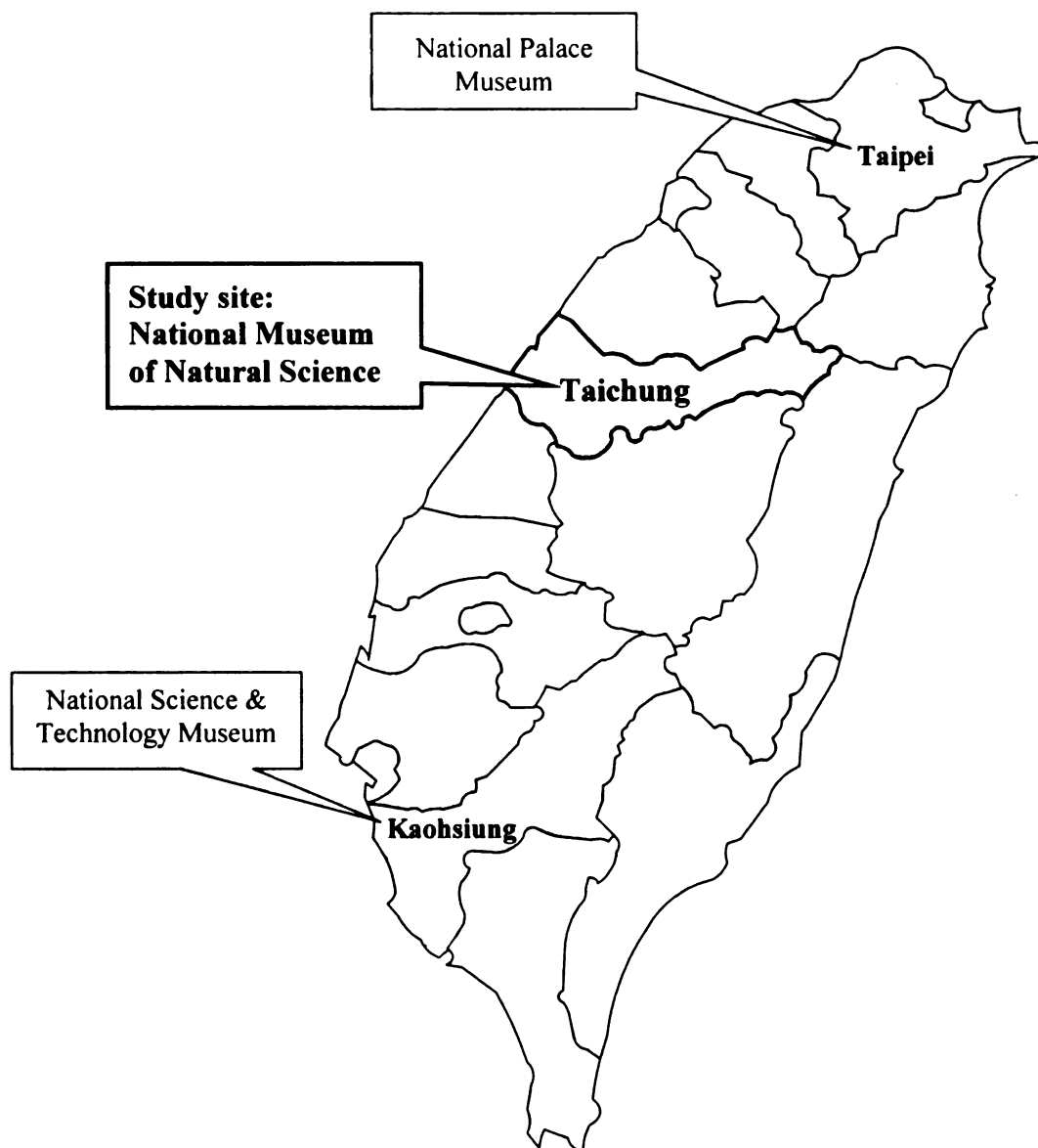


Figure 7. Map showing the location of the National Museum of Natural Science and two other major national museums in Taiwan.

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**Table 12**  
**Characteristics of the National Museums**

<b>Museum</b>	<b>National Palace Museum (NPM)</b>	<b>National Museum of Natural Science (NMNS)</b>	<b>National Science &amp; Technology Museum (NSTM)</b>
<b>Attribute</b>	Historical art and artifacts	Natural science	Natural science and technology
<b>Affiliation</b>	Executive Yuan	Council for Cultural Affairs	Ministry of Education
<b>Location</b>	Taipei metropolis in Northern Taiwan	Taichung metropolis in Central Taiwan	Kaohsiung metropolis in Southern Taiwan
<b>Year built</b>	1965	1986	1997
<b>Metropolis population</b>	2.62 million	2.63 million	2.78 million
<b>Exhibition area</b>	9,614 m <sup>2</sup> , including five exhibition halls	16,000 m <sup>2</sup> , including four exhibition halls, four theaters, and one botanical garden	112,404 m <sup>2</sup> , including 16 exhibition halls
<b>Facilities &amp; services</b>	Exhibitions, interpretation services, collections and research, special events and activities, multimedia center with new technologies, websites and other on-line resources, and gift shops and restaurants	Exhibitions, interpretation services, collections and research, special events and activities, various theaters (3D and 2D) multimedia center with new technologies, websites and other on-line resources, and gift shops and restaurants	Exhibitions, interpretation services, collections and research, special events and activities, multimedia center with new technologies, websites and other on-line resources, and gift shops and restaurants
<b>Collections</b>	Paintings, calligraphy, rare books, documents, ceramics, bronzes, jades, curios	574,861 specimens across four fields, including zoology, botany, geology and anthropology	Scientific technical heritage, including: printing, weights and measures, electronics, machinery, optical science, and textiles
<b>Average annual visit (2004-2008)</b>	2,214,800	3,299,800	1,391,400
<b>Reputation</b>	Ranked as one of the world's five great museums, along with France's Louvre Museum, the British Museum, America's Metropolitan Museum, and Russia's Hermitage Museum	Most heavily visited museum in Taiwan.	The largest science museum in Taiwan, which is ranked 2nd in the world among applied scientific museums in terms of scale (e.g., collections, exhibition areas)

As previously mentioned, the average annual visitor arrivals to all national museums (12.43 million) of Taiwan have been comparable to more than half of Taiwan's entire population (23 million) in the past decade. The three largest museums (including NMNS) together receive almost 7 million annually, which is equivalent to 30% of Taiwan's entire population and over half (56%) of the visit to all national museums. However, most national museums, including the three largest museums, have encountered decreasing or slow growth in visitor numbers over the past five years (see Table 13 and Figure 8). The visitor count for the study museum declined by 0.462 million (13.7%) between 2007 and 2008, which was the largest decline in total number of visitors (though not in percent) among the three museums.

**Table 13**  
**Annual Visits to Three Largest National Museums in Taiwan: 2005 through 2009**

<b>Museum</b>	<b>Visitor Arrivals (unit: 1,000)</b>					<b>Estimated Year-to-Year Percent Change</b>			
	2004	2005	2006	2007	2008	2004/ 2005	2005/ 2006	2006/ 2007	2007/ 2008
National Palace Museum (NPM)	1,545	2,637	1,996	2,651	2,245	+70.7	-24.3	+32.8	-15.3
National Museum of Natural Science (NMNS)	3,371	3,505	3,364	3,367	2,905	+3.9	-0.4	+0.1	-13.7
National Science & Technology Museum (NSTM)	1,257	1,476	1,642	1,298	1,284	+17.4	+11.2	-20.9	-0.01

Source: Taiwan Tourism Bureau (2009)

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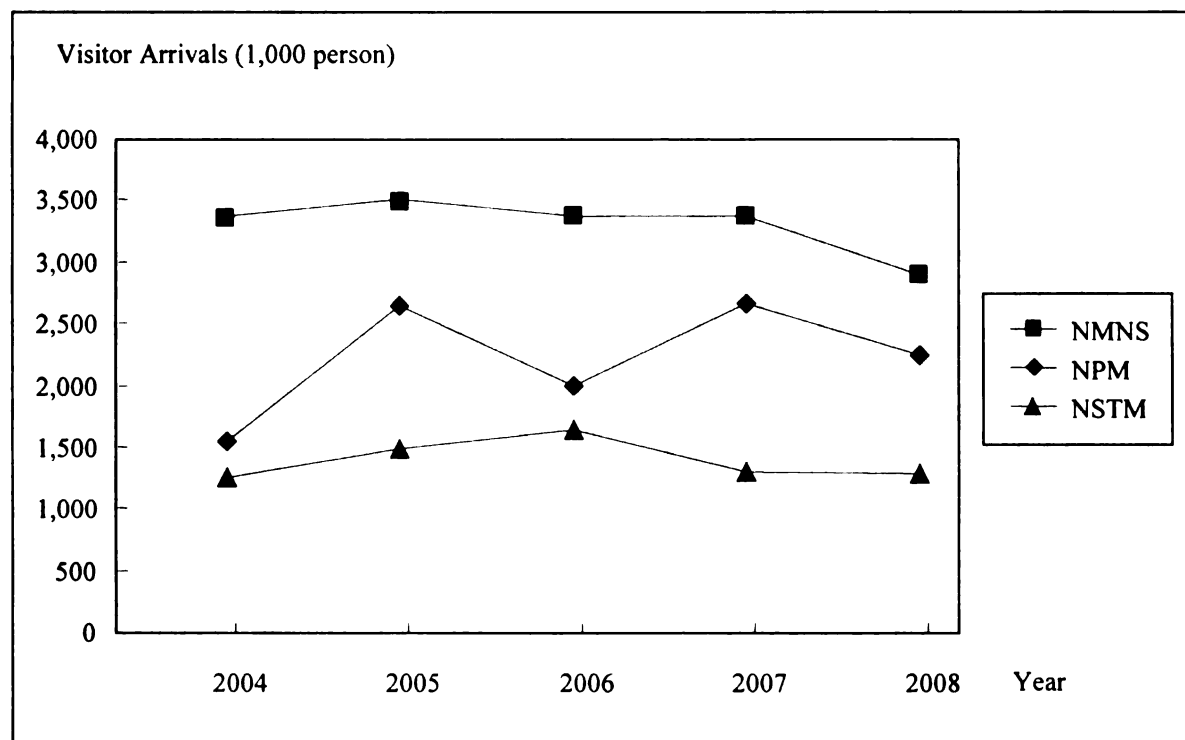


Figure 8. Changes in annual visitor arrivals to the three major museums in Taiwan (2004–2008) (Taiwan Tourism Bureau, 2009).

### Instrument Development and Measurement Scales

A review of the extant literature regarding museum visitor experiences provides the foundation for the development of item statements in the questionnaire, containing multiple-choice and rating-scale questions. A final self-administered survey with the use of close-ended questions was designed to obtain information about participants' attitudes and evaluation of their visits to the targeted museum, National Museum of Natural Science. The structure of this survey includes two stages, in which the first stage has three sections, and the second stage has six sections, as follows.

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At the first stage, the first half of the questionnaire was for the pre-visit phase, containing sections one through three, and asked questions about participants' pre-visit determinants for their destination choice. The first section identified participants' socio-demographic characteristics. The second section identified participants' travel behavior and their evaluation of past experiences at NMNS and other museums. The third section identified participants' motivations for visiting the NMNS.

At the second stage, the second half of the questionnaire was for the post-visit phase, containing sections four through seven, and asked questions about participants' on-site and post-visit evaluation of their experience and their assessment of future behavioral intentions. The fourth section assessed participants' evaluation of service quality of the museum. The fifth section investigated participants' perception of value in terms of the costs and benefits experienced during their museum visits. The sixth section evaluated participants' overall satisfaction with this visit. Finally, the seventh section asked about participants' intentions to return to the museum, to recommend visiting it to others, and to renew or become a new member of the museum within one year. The following sections describe the measurement scales and items utilized, with corresponding literature, in the questionnaire.

### ***Measurement of Motivation and Past Experiences***

Push motivation attributes were derived from previous studies in educational leisure settings, including museums, art galleries and aquariums (Beard & Ragheb, 1983; Crandall, 1980; Crompton, 1979; Ford & Nichols, 1987; Kotler & Kotler, 2000; Packer & Ballantyne, 2002; Prentice et al., 1997; Richard, 2001). Pull motivation attributes also were adapted from previous studies (Hanqin & Lam, 1999; Jang & Cai, 2002; Kau &



Lim, 2005; Oh, Uysal, & Weaver, 1995; Zhang et al., 2004). Altogether, there were twenty question statements in this section. Respondents were asked to indicate their level of agreement with these attributes on a seven-point Likert scale, ranging from 1 (strongly disagree) to 7 (strongly agree). Next, two items were derived from previous studies (Petrick, 1999) and were used to measure past experiences. A seven-point Likert scale was used, with a range of 1 (strongly dissatisfied) to 7 (strongly satisfied). In addition, a zero score was provided for respondents who were first-time visitors and did not have any previous museum experience.

### ***Measurement of Perception of Service Quality***

The section on museum service quality attributes asked respondents how they rated the museum's performance of each service characteristic at the post-visit stage. Items were derived from previous studies in educational leisure settings, including museums, art galleries, historic sites and aquariums (Allen, 2001; Frochot & Hughes, 2000; Harrison & Shaw, 2004; Wang, 2001). Frochot and Hughes's (2000) HISTOQUAL and Allen's (2001) MUSEQUAL, which was mainly adapted from HISTOQUAL, comprised the main measurement scale for service quality. Five dimensions were proposed, based on Frochot and Hughes's (2000) responsiveness, tangibles, communications, and consumables dimensions and Allen's (2001) awareness dimension, to fit the context of museums. Most adapted dimensions with corresponding items were suggested for use in terms of their appropriate levels of internal consistency and overall validity (trait validity, face validity, and convergent validity). Finally, twenty-eight components of museum service quality were used in the final survey. Each item was measured with a seven-point Likert scale, which ranges from 1 (strongly disagree) to 7 (strongly agree).

### ***Measurement of Perception of Value and Overall Satisfaction***

Four items were utilized to measure perception of value of the study museums and were derived from previous studies (Chen, 2008; Petrick, 1999). A seven-point Likert scale was used, with a range of 1 (strongly disagree) to 7 (strongly agree). Overall post-visit satisfaction was measured by one item, as supported by prior studies (Baloglu, Pekcan, Chen, & Santos, 2003; Burns, Graefe, & Absher, 2003; Severt et al., 2007; Shen & Tseng, 2006; Shonk, 2006; Wu et al., 2004).

### ***Measurement of Museum Loyalty***

Museum loyalty was measured by two items that asked respondents how likely they were to revisit the museum and recommend it to others in the next 12 months. Two items have been identified and used by previous researchers (Baker & Crompton, 2000; Bitner, 1990; Dick & Basu, 1994; Kozak, 2001; Oliver, 1999; Oppermann, 2000; Yuksel, 2001). A seven-point Likert scale was employed to measure the degree of likelihood for each statement: 1 (extremely unlikely) to 7 (extremely likely). This study also included one additional loyalty item based on scholars' opinions, asking about their intent to renew or become a member. Thus, the last endogenous dependent variable included three observed variables to increase the possibility of significant correlations between loyalty variables and other variables.

### ***Constructs and Variables***

The proposed model was designed to examine the interrelationships among seven constructs using structural equation modeling (SEM). Theoretically, SEM deals with exogenous independent variables and endogenous dependent variables. The seven constructs include: two exogenous constructs (push motivation, past experience); four

mediate endogenous constructs (pull motivations, perception of service quality, perception of value, overall satisfaction,); and one ultimate endogenous construct (museum loyalty).

A summary of all constructs, observed variables, measurement item statements, scales and studies from which the study items were adapted, is presented in Table 14. All survey questions/statements are presented in Appendix B. The proposed structural model with all relationships among constructs, observed variables and their error terms for SEM testing is depicted in Figure 9.

Table 14

Variables and Sources for Scale Items Used for Measurement

Constructs	Observed Variables	Item No.	Measurement Item Statement	Scale	Studies from which item is adapted
<b>Motivations</b>	Pus1	1.	<b><u>Measurement of Motivation for Visiting Museums</u></b> To relax	1: Strongly disagree to 7: Strongly agree	Beard and Raghe (1983); Crandall (1980); Crompton (1979); Ford and Nichols (1987); Hanqin and Lam (1999); Jang and Cai (2002); Kau and Lim (2005); Kotler and Kotler(2000); Oh et al. (1995); Packer and Ballantyne (2002) ; Prentice et al. (1997); Richard (2001) ; Zhang et al. (2004)
	Pus2	2.	To spend quality time with family or friends		
	Pus3	3.	To expand knowledge		
	Pus4	4.	To have a change from routine		
	Pus5	5.	To enjoy social interaction with new people		
	Pus6	6.	To enjoy new experiences		
	Pus7	7.	To recover from stress and tension		
	Pus8	8.	To be with people who enjoy the same things I do		
	Pus9	9.	To enjoy exhibits in different settings		
	Pul1	10.	To hear a famous guest speaker		
	Pul2	11.	Because museum has enjoyable facilities		
	Pul3	12.	Because museum has standards of hygiene and cleanliness		
	Pul4	13.	To see new exhibits		
	Pul5	14.	Because museum has good souvenir stores		
	Pul6	15.	Because museum has comfortable environment		
	Pul7	16.	Because museum has enjoyable activities		
	Pul8	17.	Because museum has good restaurants		
	Pul9	18.	Because museum is safe and secure		
	Pul10	19.	To attend special events		
	Pul11	20.	Because museum has friendly people		
<b>Past Experiences</b>	PE1	1.	Overall past experiences with this museum	1: Strongly dissatisfied to 7: Strongly satisfied	Petrick (1999)
	PE2	2.	Overall past experiences with other museums		

Note: "Pus" indicates push motivation, "Pul" indicates pull motivation, and "PE" indicates past experience.

Table 14 (cont'd)

Constructs	Observed Variables	Item No.	Measurement Item Statement	Scale	Studies from which item is adapted
Perceptions of Services Quality			<b>Measurement of Perception of Service Quality</b>		
	Tan1	1.	The parking lot is available	1: Strongly disagree to 7: Strongly agree	Allen (2001); Frochot (2000); Harrison and Shaw (2004); Wang (2001)
	Tan2	3.	Toilet facilities are available		
	Tan3	4.	Staff is well dressed		
	Tan4	10.	The exhibits are well maintained		
	Tan5	15.	The museum is clean		
	Tan6	23.	The exhibit themes are diverse		
	Res1	11.	Staff responds to visitors' requests promptly		
	Res2	20.	Interpreters are professional (e.g., accessible, knowledgeable of the subjects)		
	Res3	21.	Staff is willing to spend time helping visitors		
	Res4	24.	Staff is available in a sufficient number when needed		
	Res5	26.	Staff is friendly		
	Emp1	5.	The atmosphere in the museum is in keeping with the exhibits		
	Emp2	6.	The level of crowding is acceptable		
	Emp3	12.	The level of noise is acceptable		
	Emp4	18.	The museum caters to the needs of less able visitors		
	Emp5	19.	There are adequate seats in the museum		
	Emp6	28.	The facilities for children are sufficient		
	Com1	2.	Directional signs in the museum make it easy to navigate		
	Com2	7.	Overall, physical display of the interpretation/exhibits (size of signs, layout of design, brightness of light) is well provided		
	Com3	9.	Road and street signs make it easy to find the museum		
	Com4	13.	Interpreters have good communication skills (e.g., clarity, speed, fluency, interaction with audience, time control, etc)		
	Com5	17.	The written leaflets and/or website provide enough information		
	Com6	22.	Exhibit descriptions are understandable (texts and graphs)		

Note: "Tan" indicates tangibility, "Res" indicates responsiveness, "Emp" indicates empathy, and "Com" indicates Communication.

Table 14 (cont'd)

Constructs	Observed Variables	Item No.	Measurement Item Statement	Scale	Studies from which item is adapted
<b>Perceptions of Services Quality</b>	Con1 Con2 Con3 Con4 Con5	8. 14. 16. 25. 27.	<b><u>Measurement of Perceptions of Services Quality</u></b>	1: Strongly disagree to 7: Strongly agree	
			The restaurants' staff provides efficient service The restaurants offer quality food/drink The shops offer diverse choices of items The restaurants offer multiple choices of food/drink The shops offer quality items		
<b>Perception of Value</b>	PV1 PV2 PV3 PV4	1. 2. 3. 4.	<b><u>Measurement of Perceptions of Value</u></b>	1: Strongly disagree to 7: Strongly agree	Chen (2008); Petrick (1999)
			The overall price I paid for this visit was reasonable Considering the price I paid for the visit, the overall exhibits were Considering the price I paid for the visit, the overall activities were Considering the price I paid for the visit, the overall services were useful		
<b>Overall Satisfaction</b>	Sat1	1.	<b><u>Measurement of Overall Satisfaction</u></b>	1: Strongly dissatisfied to 7: Strongly satisfied	Baloglu et al. (2003); Burns et al. (2003); Severt et al. (2007); Shen and Tseng (2006); Shonk (2006); Wu et al. (2004)
			Overall satisfaction with all facilities and services.		
<b>Museum Loyalty</b>	Loy1 Loy2 Loy3	1. 2. 3.	<b><u>Measurement of Museum Loyalty</u></b>	1: Extremely unlikely to 7: Extremely likely	Baker and Crompton (2000); Bitner (1990); Dick and Basu (1994); Kozak (2001); Oliver (1999); Oppermann (2000); Yucsek (2001)
			Revisit this museum Recommend this museum to others Renew membership or become a member		

Note: "Con" indicates consumables, "PV" perception of value, "Sat" indicates overall satisfaction, and "Loy" indicates museum loyalty.

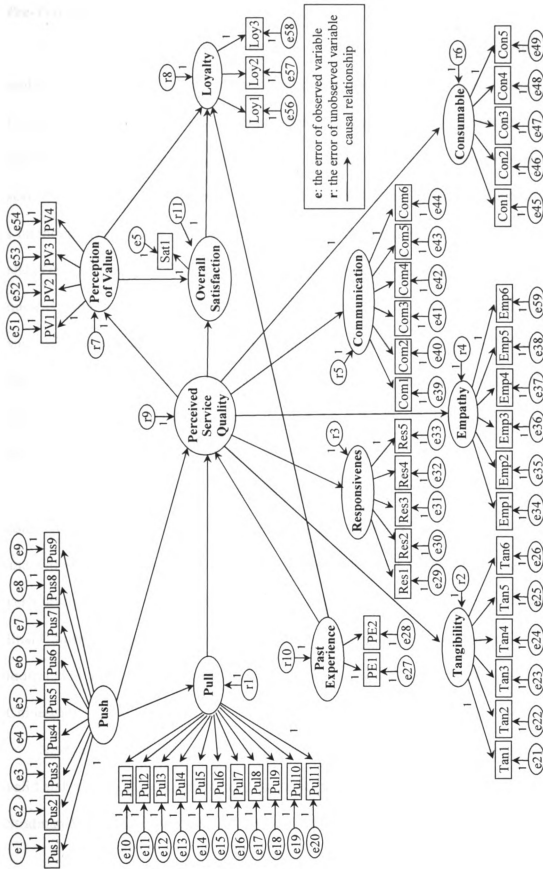


Figure 9. The proposal structural model with all constructs and observed variables before modification

### ***Pre-Test and Pilot Study***

A pre-test was used to determine if there were obvious deficiencies or quality problems in the survey instrument and/or the survey distribution procedures before the formal study was run. First, the initial survey instrument was developed based on the literature review. This first draft was circulated to dissertation committee members and several graduate students in the tourism and recreation field of the Department of Community, Agriculture, Recreation and Resources Studies. The intention of the scholar and peer reviews was to find any deficiency in the instrument, including question design, question wording, question sequence, and formatting or layout. Their comments and suggestions were incorporated into the design of the questionnaire used in the pilot study. The final measurement scales and the design of the survey questionnaire were further clarified and confirmed through the above procedures (see Appendix A for consent form and Appendix B for the final survey instrument in English).

The revised questionnaire was translated into Chinese and was administrated to a convenience sample of twelve Taiwanese graduate students at Michigan State University and two NMNS research staffs who were able to answer both English and Chinese versions to check for accuracy (e.g., clarity and readability) of questions in translation. A final Chinese instrument was developed by correcting wording and meanings as indicated by these twelve respondents (see Appendix C for the final survey instrument in Chinese).

Next, a pilot study was employed to ensure that measurement scales were reliable, valid and supported in a confirmatory factor analysis (Anderson & Gerbing, 1991; Stratman & Roth, 2002). After the above pre-test, a pilot study of the revised, translated



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instrument was conducted to examine both the reliability and validity of the scales and to delete items with a low reliability score. Pilot study can identify potential problems before they become costly mistakes, such as too much time needed to complete the survey or any items that are confusing or difficult to answer.

Schriesheim et al. (1993) and Anderson and Gerbing (1991) suggested that a sample of 65 is appropriate for a pilot study. Wang (1999) suggests that a sample size of 100 or over is necessary to obtain sufficient information using Confirmatory Factor Analysis (CFA). To obtain a reliable measurement by employing CFA among 7 latent variables (with a total of 56 observed variables), this study used a sample size of 500 for conducting a pilot study. An explanation of determining the number of 500 will be discussed in a following section about “sample size.”

### ***Reliability and Validity Test***

Two major criteria for assessing measurement are reliability and validity. Both were evaluated for the constructs in the pilot study and the formal study through various statistical techniques. They are important to assist in developing measurement scales in this study, and are described as follows:

***Reliability*** means repeatability—the ability to yield consistent results over time from several measurements made in the same way. Reliability is a necessary condition for validity (Kerlinger, 1986), namely, a measurement that lacks reliability will also lack validity (Walonick, 2004). *Internal consistency reliability*, which has been the most commonly used reliability method in developing measurement scales, was applied to examine reliability within a similar set of items on a test using Cronbach’s alpha.

**Validity** is the validation for measurement and refers to the accuracy or truthfulness of a measurement. That is to say, validity is the extent to which differences found with a measuring tool reflect true differences among respondents being tested. After a survey instrument is developed, each question is scrutinized and modified through certain procedures until it is acceptable as an accurate measure of the desired construct.

Two validities were used in this study, including content validity and construct validity. Content validity refers to the subjective agreement among professionals that a scale logically appears to reflect accurately what it is intended to measure (Yang, 2005). Namely, content validity is the degree to which the content of the items adequately represents the universe of all relevant items under study. Construct validity is the extent to which the measure correlates with other measures designed to measure the same thing (Ap & Crompton, 1998). Construct validity is evaluated by examining the item loadings and their associated *t*-values, as well as the composite reliabilities and the average variance extracted in this study (Fornell & Larcker, 1981).

Two main assessment tools were used to help examine reliability and validity in the pilot and formal studies: item analysis and confirmatory factor analysis.

**Item analysis** was used for improving item measurement once the data from the pilot study sample were collected. Item analysis is a process to examine participants' responses to each item (question) to assess the quality of each item and of the test as a whole. Three testing indices are included in the item analysis in this study, including critical ratio (CR) analysis, correlation analysis, and internal consistency reliability. The critical ratio is generated by using a *t*-test. It is suggested that an item be deleted if its ratio is less than 3. In addition, correlation analysis, which is the correlation or

relationship between the test item and the total test score, was used to test the corrected item-to-total correlation. Any item-to-total correlation less than 0.3 should be eliminated, according to Chiou (2002). Last, it is suggested that Cronbach's alpha of internal consistency reliability should be above the minimum of 0.7, recommended by Nunnally (1978), and the item should be deleted if the coefficient is below 0.6 (Wu, 2001).

***Confirmatory factor analysis (CFA)*** was used on the pilot study to examine the standardized factor loading, construct reliabilities and variance-extracted values for all constructs via Amos maximum likelihood method. A standardized factor loading of 0.30 is suggested as the benchmark for including items in a factor. The variance extracted measure, another measure of reliability, represents the overall amount of variance in the indicators accounted for by the latent construct. The score is recommended to exceed .50 for the construct (Hair, 1998).

Next, in the formal study, convergent validity was examined in the measurement model by estimating t-tests of all confirmatory factor loadings and their corresponding significance (Anderson & Gerbing, 1988). If all factor loadings for the indicators under the same construct were more than 0.5, and t-values were statistically significant at the level of 0.05, this supported the convergent validity of the constructs.

In conclusion, these analyses were used to determine the appropriate items to be scaled, and the effective scales to be used. All of these tested items and measurement scales were analyzed for selection based on several procedures. Considered in the final instrument development were reviews of previous empirical studies, academic scholars' opinions, review by peers in the tourism and recreation field, and examination of overall reliability and validity through item analysis and CFA in the pilot and formal studies as

well as SEM analysis. This study established sufficient evidence of reliability and validity based on above procedures. Results of both reliability and validity tests are reported in Chapter Four.

### **Sampling Plan**

The advantage of conducting survey research is that it allows generalization from a sample to a population, so that inferences can be made about the population's characteristics, attitudes and behaviors. This study's questionnaires were distributed to visitors during their pre- and post-visit at NMNS in Taiwan.

### ***Sample Frame***

Museum visitors/tourists are comprised of both domestic and international visitors, including tourists who visit various types of for-profit and nonprofit museums. The composition of domestic museum visitors in Taiwan includes resident and nonresident visitors. According to common definitions of what constitutes a tourist (World Tourism Organization, 2001), the domestic visitors/tourists used in this study can be categorized into: 1) domestic tourists who are not local residents, and who are traveling to one of the study communities for at least one night; and 2) same-day visitors, who may be residents or non-residents of the study community they are visiting. The population for this study included all Taiwanese aged 20 to 64 years who visited NMNS during the survey period, who bought tickets and were capable of expressing their opinions about motivation, service quality and perception of value—as asked in this study. Excluded were international visitors, Taiwanese under the age of 20 and over 64, and free-ticket visitors.

### ***Sample Size***

An appropriate sample can represent the population of interest, and can assure enough reliability and validity in the assessment of responses. This study determined the appropriate sample size based on considerations of statistical principles and advice from empirical studies using structural equation modeling (SEM).

Statistically, a commonly used formula for determining a sample size for the population mean, if the population variance  $\sigma^2$  is known, is as follows:

$$n = \frac{z^2 \cdot \sigma^2}{E^2}$$

where

$n$  is the required sample size;

$z$  is the z-value associated with the desired confidence interval;

$\sigma^2$  is the population variance; and

$E$  is the maximum acceptable difference (maximum error) or margin of error that can also be used to mean sampling error in general.

The sample variance ( $S^2$ ) can be obtained from previous studies, or through pilot testing if the population variance ( $\sigma^2$ ) is unknown. Because there was no available information about population and sample variance for this study's population, a pilot study was used to determine the sampling variance. Subsequently, the sample error was estimated based on above equation and is provided in Chapter Four (see p. 119)

Empirically, this study employed structural equation modeling (SEM) as the primary analytical tool for testing the proposed model and hypotheses. In general, there is no absolutely correct sample size, although larger samples are preferable (Yoon, 2002). Nevertheless, prior empirical studies related to structural equation modeling (SEM)

supported two ways of determining sample size, including 1) the ratio of sample size to the number of observed variables (or free parameters), and 2) a suggested minimum or maximum sample size based on prior empirical studies. There is a wide variety of opinions in the literature. Some authors suggest a ratio of sample size to number of observed variables ranging from 1:5 (Bentler & Chou, 1987) through 1:10 (Hair et al., 1998). However, another rule of thumb suggests a range from 1:10 to 1:20 (Hwang, 2003). Other sample size considerations include: 100 to 150 as the minimum sample size (Anderson & Gerbing, 1988); an appropriate sample of between 100 and 400, using the Maximum Likelihood Estimation (MLE) for SEM (Hair et al., 1998); a sample size ranging from 200 to 500 for most research (Shumacker & Lomax, 1996); an appropriate sample size of 200 to 400 (Boomsma & Hoogland, 2001); a sufficient sample size of 150 observations, which should be sufficient for obtaining an acute solution in exploratory factor analysis (EFA), as long as item inter-correlations are reasonably strong (Guadagnoli & Velicer, 1988); and a minimum sample size of 200 recommended for confirmatory factor analysis (Hoelter, 1983).

An appropriate sample size for this study was determined based on budgetary constraints in combination with other considerations. It is suggested by the above researchers that the appropriate ratios range between 1:5 and 1:20, and that the appropriate sample sizes range from 100 to 500. This study has 56 measurement items to test museum visitors' behavior, which requires a sample size between 280 ( $5 \times 56$ ) and 1120 ( $20 \times 56$ ), in terms of the suggested ratio. Ideally, this study expected to achieve a sample size of 500 usable questionnaires from the study site by distributing 500 or more questionnaires to visitors in the pilot study (500 questionnaires) and formal study (610

questionnaires), respectively, in case there would be incomplete or blank responses.

### ***Sampling Methods***

A combination of sampling methods was used to select sampling units (museum visitors), from which a sample size of 610 respondents (estimated from pilot study response rate) at the study museum was drawn, as representative of the targeted museum population.

#### **1. Stratified Sampling**

##### ***Ticket (Visitor) Types***

Stratified sampling, which is also called quota sampling using random selection, was used to ensure that the sample was representative. In this way, a proportion of the sample elements can possess certain characteristics that are approximately the same as the same proportion of the elements with the same characteristics in the total population (Churchill & Iacobucci, 2002). NMNS museum, which has more visitors than other museums, has published annual reports from 1994 through 2008 summarizing the characteristics of its entire population in terms of different types of tickets sold (see Table 15). Table 15 also shows that the previous visitor population is divided into separate groups (strata) based on certain characteristics: number of visitors (group and individual), age (child, adult, senior), and occupation (labor, student, government employee). The visitor type, with corresponding proportions, are: 1) group: labor group (0.15%), student group (16.90%), general group (3.43%); and 2) individual: adult ticket (28.03%), adult discount ticket (11.97%) and free ticket (39.52%).





Table 15

Characteristics of the Sample Ticket Type Categories of NMNS (National Museum of Natural Science, 2009)

	Group (20 people or more )			Individual			Total
	Labor Group	Student Group	General Group	Adult	Discount (students & government employees)	Free	
1994	7,270 (0.22%)	614,941 (18.56%)	115,031 (3.47%)	906,119 (27.35%)	341,272 (10.30%)	1,329,003 (40.11%)	3,313,636 (100%)
1995	6,146 (0.19%)	589,936 (18.68%)	139,879 (4.43%)	1,056,176 (33.44%)	528,113 (16.72%)	838,470 (26.54%)	3,158,726 (100%)
1996	10,173 (0.33%)	598,863 (19.24%)	108,520 (3.49%)	974,571 (30.44%)	467,377 (15.01%)	980,790 (31.50%)	3,113,294 (100%)
1997	9,277 (0.34%)	549,248 (20.36%)	120,336 (4.46%)	852,323 (31.59%)	419,025 (15.53%)	748,066 (27.72%)	2,698,275 (100%)
1998	1,982 (0.08%)	457,780 (19.40%)	100,457 (4.26%)	787,406 (33.36%)	401,837 (17.03%)	610,645 (25.87%)	2,360,107 (100%)
1999	1,826 (0.06%)	375,429 (12.34%)	146,923 (4.83)	1051,234 (34.56)	484,214 (15.92)	981,937 (32.28)	3,041,563 (100%)
2000	1,657 (0.04%)	836,212 (22.60%)	215,814 (5.83%)	1,097,389 (29.65%)	375,955 (10.16%)	1,173,559 (31.71%)	3,700,586 (100%)
2001	488 (0.02%)	493,964 (15.49%)	74,833 (2.35%)	946,850 (29.69%)	374,958 (11.76%)	1,298,403 (40.71%)	3,189,496 (100%)
2002	678 (0.03%)	497,377 (19.15%)	69,153 (2.66%)	668,459 (25.73%)	240,594 (9.26%)	1,121,595 (43.17%)	2,597,856 (100%)
2003	15,494 (0.61%)	476,155 (18.65%)	80,673 (3.16%)	654,904 (25.65%)	209,552 (8.21%)	1,116,388 (43.73%)	2,553,166 (100%)
2004	6,799 (0.20%)	556,360 (16.50%)	96,438 (2.86%)	865,646 (25.68%)	233,114 (6.92%)	1,612,977 (47.84%)	3,371,334 (100%)
2005	392 (0.01%)	486,781 (14.69%)	103,509 (3.12%)	759,834 (22.93%)	346,299 (10.45%)	1,808,680 (54.58%)	3,505,495 (100%)
2006	336 (0.01%)	454,813 (13.5%)	81,279 (2.4%)	834,775 (24.8%)	394,199 (11.7%)	1,598,834 (47.5%)	3,364,236 (100%)
2007	311 (0.01%)	436,721 (12.9%)	71,640 (2.1%)	847,243 (25.2%)	463,862 (13.8%)	1,547,188 (45.9%)	3,366,965 (100%)
2008	4 (0.0001%)	420,084 (14.5%)	62,046 (2.1%)	660,678 (22.7%)	255,632 (8.8%)	1,506,113 (51.8%)	2,904,557 (100%)
Average (1994 - 2008)	3,294 (0.15%)	442,653 (16.90%)	88,775 (3.43%)	864,241 (28.03%)	311,108 (11.97%)	1,073,678 (39.52%)	3,074,444 (100%)

*Note:* Free ticket includes: Senior visitors over 65; disabled people; children below 110 centimeter; retired public servants; 9 am -10 am on Wednesday; members (approximately 12,200 visit arrivals, 2003-2008)

One of the objectives of this study was to measure visitors' perception of value, which in turn influences their museum loyalty. As mentioned previously, perception of value focuses on what visitors get for what they pay. This study targeted only paid-admission visitors, and excluded "free ticket" visitors. One complication is that members are categorized as "free" after they pay an annual membership fee. Because "value" is still relevant to them, this study included them in the proportion of sampling elements. This study screened for this either by asking visitors if they were members or by checking the ticket or membership card that the visitors presented to staff when they entered the museum. Between 2003 and 2008, the average annual number of members for NMNS was 12,200 (NMNS, 2009). Member tickets accounted for 1% of the "free" ticket category; these "free" tickets were integrated into the "discount" ticket category for this study. This study excluded group visitors because the sampling unit was based on individual visitors rather than groups. Other reasons to screen out group visitors included: 1) visitors whose travel plans were arranged by travel agencies may not have similar motivations as individuals; 2) the ticket fees might be paid by the group coordinators instead of the individual; 3) groups might not have enough time to experience all of the facilities and activities; and 4) group visitors were generally not willing to do surveys due to time constraints (NPM Customer Investigation in 2006 & 2007). Consequently, after modifications and weighted average calculations, two strata were proposed: 1) 340 respondents from the adult paid tickets (68% after rounding off); and 2) 160 respondents from discount tickets (students aged 20 years or more, government employees and members) (32%), based on previous proportions (28.03%, and 11.97%, plus 1% from members).

## 2. Systematic Sampling

Systematic sampling was used to select the sample at regular intervals, after a random start. Using systematic sampling can reduce sampling errors. With randomization, a representative sample from a population provided the ability to generalize to a population. This study selected one participant approximately every ten minutes, with that person being approached as they entered the main entrance of the study museum, until the number of subjects met the specific fraction predetermined for each group based on ticket type.

In summary, this study employed: 1) a proportion of ticket type, based on the most heavily attended museum (NMNS) across 15 years, and 2) the fraction of each weekday and each weekend day, which was 1:2.33<sup>4</sup> (5,039: 11,741) according to the annual report of the National Museum of Natural Science in 2006. Furthermore, this study assigned an equal number to each time period (morning and afternoon) per day. Thus, this study followed the principles of stratified and systematic (interval) sampling to collect data from target visitors possessing certain characteristics that can represent NMNS. Some adjustments (e.g., survey quota, time interval of participant selection) were made to the sampling methods after identifying any deficiencies in the pilot study and the beginning of the formal on-site survey.

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### ***Survey Time Frame***

A self-administered survey was conducted with visitors of the National Museum of Natural Science in Taiwan in the summer of 2009. Investigators distributed surveys to visitors over the course of four weeks, during open hours—9:00 to 17:00 from Tuesday (NMNS is closed on Monday) through Sunday. The pilot study was distributed from June 16 (Tuesday) through June 28 (Sunday) 2009, and the formal study from June 30 (Tuesday) through July 12 (Sunday) 2009.

This study expected to draw 29 to 41 participants during each three-hour period of morning or afternoon. This means that investigators selected a visitor every ten minutes on weekdays and every four minutes on weekends. With the quota sampling and the fraction of the visitors' numbers on weekdays and weekends, this study proposed the following time frames for their corresponding sample sizes, for conducting the surveys in the study museum, as seen in Tables 16 and 17.

**Table 16**  
**Administration Dates of Pilot Study during 6/16/2009-6/28/2009**

		Tue	Wed	Thu	Fri	Sat	Sun
		6/16	6/17	6/18	6/19	6/20	6/21
9pm to 12pm	Survey Quota	29		29		67	
2pm to 5pm	Survey Quota		29		29		67
		Tue	Wed	Thu	Fri	Sat	Sun
		6/23	6/24	6/25	6/26	6/27	6/28
9pm to 12pm	Survey Quota	29		29		67	
2pm to 5pm	Survey Quota		29		29		67

Table 17

Administration Dates of Formal Study during 6/30/2009-7/12/2009

		Tue	Wed	Thu	Fri	Sat	Sun
		6/30	7/01	7/02	7/03	7/04	7/05
9pm to 12pm	Survey Quota	29		29		67	
2pm to 5pm	Survey Quota		29		29		67
		Tue	Wed	Thu	Fri	Sat	Sun
		7/07	7/08	7/09	7/10	7/11	7/12
9pm to 12pm	Survey Quota		42		42		96
2pm to 5pm	Survey Quota	42		42		96	

*Note:* Adjustment of quota in the second week

### Data Collection Procedures

Data collection was divided into two stages that corresponded with the design of the survey instrument. The survey itself also was divided into two components: 1) the first half of the questionnaire was completed before the visit and after the ticket was purchased, and 2) the second half of the questionnaire was completed after the visit in the museum. Participants were screened in terms of ticket type (adult tickets and discount tickets, including students aged 20 years or more, government employees and members), residence (living in Taiwan), citizenship (Taiwan), and age (20-64 years old). All participants were informed that they would receive an incentive (a museum souvenir) to increase their participation (see Appendix D for photos of incentives). Entering times of participants were recorded on their questionnaires by the investigators. Each

questionnaire was given a unique ID code to ensure that the participant's identity remained anonymous to the researcher. The survey codes were from NMNS 001 through NMNS 500 for the pilot study, and NMNS 501 through NMNS 1100 for the formal study.

Initially, one participant was selected every ten minutes on weekdays and every four minutes on weekend days. After a random start time, the investigators certified visitors' qualifications in terms of their ticket type, until one qualified participant was generated within this ten-minute period. That participant was presented with an entire survey package, including a cover letter and survey questionnaire. The research investigators were trained to briefly explain the survey instructions, and to help clarify the meaning of the survey items if the participant felt unclear about the survey questions.

After the participant finished the first half of the questionnaire and returned it to the investigator, the participant was reminded to take the second half of the questionnaire with him/her during his/her visit and to finish and return it to a designated place near the main exit at the end of his/her visit. To increase the number of completed surveys, the survey assistants at the second counter politely asked participants to quickly examine their completed questionnaires and finish any incomplete parts if participants were willing to do it. The departure times of the participants were recorded on their questionnaires by the investigators. Thus, the length of stay of each participant was calculated based on the recorded entrance and departure times.

### **Data Analysis Methods**

This study employed several statistical techniques to describe the sample and examine proposed hypotheses. Collected data were entered and analyzed in the Statistical Package for the Social Science (SPSS) version 17.0 for Windows, and Amos (Analysis of Moment Structures) version 17.0 for Windows.

#### ***Descriptive Analyses***

Descriptive analyses were performed on museum visitors' socio-demographic characteristics and various travel characteristics. To provide an overview of the respondents' profiles, several items were included: gender, age, place of residence, family status, education, monthly income, employment status, number of museum visits/year, types of travel companies, and length of visit. Distributional characteristics of each variable, including frequencies, percents and mean, were used for descriptive profiles.

#### ***Chi-Square Test and Independent T-Test***

Two tests were used to examine how representative participants were. First, a chi-square test in terms of the type of collected data (categorical variable) was used to determine if there was a significant relationship between test types (pilot study and formal study) and each categorical variable in the socio-demographical characteristics and travel behavior. Second, an independent sample t-test was employed to examine any significant difference of the mean scores in five constructs (motivation, perception of service quality, perception of value, satisfaction, and museum loyalty) between pilot and formal study results.



### ***Structural Equation Modeling***

The proposed model was tested through structural equation modeling (SEM) using Amos. The major feature distinguishing SEM from other multivariate techniques (including path analysis) is that it incorporates two structures, including a measurement model and a structural model in a single structure, in which multiple equations can be estimated simultaneously (Bollen, 1989). First, confirmatory factor analysis (CFA) was performed to estimate the overall fit of the measurement model among seven latent constructs (museum visitors' push motivations, pull motivations, past experience, perception of service quality, perception of value, overall satisfaction, and museum loyalty). The results of CFA were examined with the overall fit index scores, including chi-square statistics, goodness-of-fit index (GFI), adjusted goodness-of-fit index (AGFI), and root mean square residual (RMR). Second, using the covariance matrix resulting from the CFA of the measurement model, the nineteen hypothesized associations were simultaneously tested via the SEM. Direct and indirect effects were examined to determine any significance of the causal relationships.

## **CHAPTER 4**

### **RESULTS**

#### **Overview**

The primary purpose of this study is to identify the structural and causal relationships among key constructs (motivation, perception of service quality, perception of value, satisfaction, and museum loyalty) concurrently in the context of nonprofit museums. To achieve this purpose, a self-administered survey was conducted to collect visitors' information and opinions. Analyses were conducted to examine subjects' backgrounds and the proposed model. In this chapter, the analysis of data is presented according to the following topics: 1) pilot study analysis; 2) survey response rates; 3) description of the sample; 4) comparison of pilot and formal studies; 5) item analysis; 6) testing the measurement model; 7) testing the hypothesized structural model; and 8) examining moderating effects.

#### **Pilot Study Analysis**

A summary of respondents' backgrounds (socio-demographics and travel behavior) is presented in Appendix E, Tables E1–E2. The main purpose of the pilot study was to ensure that the measurement scales worked adequately, and to refine the data collection procedures, prior to collecting the data for the main study. A total of 500 questionnaires was delivered, and 389 usable questionnaires were collected, yielding a 77.8% overall response rate. To examine the reliability and validity of the measurement scales, an item analysis was conducted with 56 items within four constructs—motivation, past

experience, perception of service quality, perception of value, and museum loyalty—in the 389 usable surveys. As suggested by Wu and Tu (2006), item analysis comprised four procedures: critical ratio (CR) analysis, Pearson item-total correlation analysis, assessment of normality, and internal consistency reliability. A full discussion of these four procedures is provided in the section about item analysis for the formal study (p. 144).

Outcomes of the item analysis of the four constructs are listed in Appendix E, Tables E3–E7. The summary of four measurement reliability tests (see Appendix E, Table E–8) shows that Cronbach’s alphas of measurement reliability of the five constructs are as follows: 1) motivation scale,  $\alpha = 0.88$ ; 2) past experience scale,  $\alpha = 0.89$ ; 3) perceived service quality scale,  $\alpha = 0.94$ ; 4) perception of value scale,  $\alpha = 0.93$ ; and 5) loyalty scale,  $\alpha = 0.81$ , indicating that these five constructs are reliable.

The item analysis results of the pilot study show moderate reliability and validity of most measurement scales, except for two items (Pus2 and Pus9) that were below the criteria in terms of Pearson correlation analysis in item Pus9, and Cronbach’s alpha reliability analysis in item Pus2 and Pus9. The two items were slightly below one or two criteria and most of the scores for the other three procedures were above the recommended values. Thus, Pus2 and Pus9 were decided as acceptable and were adopted for further construct assessment in the formal study as suggested by Li (2006). In the pilot study, most of the measurement items were demonstrated to be reliable and content valid, as proposed in the theoretical framework. Subsequently, all of the measurement items in the questionnaire were deemed appropriate to use and data collection procedures were adequately refined and managed to allow for official data collection.

### **Survey Response Rates**

The formal study survey was administered at the National Museum of Natural Science over two weeks, from June 30 through July 12 of 2009. Several procedures were used for dealing with the data collected in the field, including coding the data in a format that the SPSS and Amos software packages could use, entering the data, cleaning the data (identifying missing values or outliers) using frequency tables, and replacing missing data with continuous variables. Two of the researchers double-checked that all data were entered properly, to ensure data accuracy for each questionnaire. A total of 610 respondents returned the first half of the questionnaire. Of these, only 535 respondents completed and returned the second half of the questionnaires. Forty-six eligible visitors who refused to participate in the survey gave several reasons: “did not have the time,” “not interested,” “felt weird to fill out the survey before viewing any exhibit,” “felt two-stage survey was complicated and time-consuming,” “did not want to give personal information,” and “the incentive was not appealing.” Altogether, there was a 7% refusal rate. Of the completed surveys, twenty-three questionnaires were found to be invalid because participants: 1) had omitted a considerable number of items (i.e., incomplete surveys); 2) had considerable outliers (e.g., the rating scores were not between 1 and 7); 3) answered the same way across many items; or 4) returned the second half of the survey less than 30 minutes after they had completed the first half.

During the second week of the formal survey period, a quota adjustment was made to reach a goal of 500 usable surveys. This was done based on both the response rate of the pilot study (77.8%) and the response rate of the formal study (87.6%) during the first week. Because 219 usable surveys were collected in the first week of the formal study, it

was determined that 281 should be collected in the second week to achieve the goal of 500 usable surveys. Thus, a desired collection rate of between 321 (281 divided by .876) and 361 (281 divided by .778) was determined. The quota added an extra 110 surveys to the original plan to collect 250 surveys. Ultimately, 360 surveys were collected during the second week. These were evenly distributed over the weekdays and weekend, based on a ratio of 1:2.23. Twenty-three surveys were considered invalid and were deleted from the sample. Five hundred and twelve usable surveys remained for the formal study, the sample profile and the model test analysis. The overall response rate for this study was 83.9%, which was higher than for the pilot study (77.8%) (see Table 18). Characteristics of the survey response rate during the two-week response are presented in Table 19, indicating that the survey response rates, distributed over weekdays and weekends, were 89.4% and 88.9%, respectively. Table 20 presents the total visitor numbers at NMNS, and the visitor numbers in the largest building of NMNS, Life Science Hall, in which the survey was conducted. The entire population size of the target groups (Adult, Discount and Membership) was 113,241 during the survey period. As a result, the sample was 0.452 percent (610/113,241) of the entire population, and revealed that a 3.96% sampling error<sup>5</sup> was obtained with a 95% confidence level.

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<sup>5</sup> Sampling error is the degree to which a sample might differ from the population

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**Table 18**  
**Survey Response Rates**

	Pilot Study		Formal Study	
	Frequency	Percent (%)	Frequency	Percent (%)
First half questionnaire returned (Total target population)	500	100	610	100
Second half questionnaire returned	399	79.8	535	87.7
Unreturned surveys	101	20.2	75	12.3
Total coded responses	399		535	
Invalid responses <sup>a</sup>	10		23	
Total valid responses	389	77.8	512	83.9

a: Invalid response refers to: missing items, outliers, and the second half of survey being returned in less than 30 minutes.

**Table 19**  
**Administration Dates of Formal Study during June 30, 2009–June 12, 2009**

		Tue	Wed	Thu	Fri	Sat	Sun
		6/30	7/01	7/02	7/03	7/04	7/05
9pm to 12pm	Delivered Questionnaires	29		29		67	
	Returned Questionnaires	23		23		65	
2pm to 5pm	Delivered Questionnaires		29		29		67
	Returned Questionnaires		28		27		53
		Tue	Wed	Thu	Fri	Sat	Sun
		7/07	7/08	7/09	7/10	7/11	7/12
9pm to 12pm	Delivered Questionnaires		42		42		96
	Returned Questionnaires		37		36		85
2pm to 5pm	Delivered Questionnaires	42		42		96	
	Returned Questionnaires	37		38		83	

Note: Adjustment of quota (from 29 to 42 on weekdays; from 67 to 96 on weekends) in the second week.

Table 20

Visitor Numbers in the Life Science Hall of NMNS during June 16, 2009–June 12, 2009

Date	Adult Ticket	Discount Ticket	Visitor number with Dinosaur card	Visitor Number with Family card	Group number	Free ticket	Free entrance on Wed. 9-10am	
							Group	Individual
<b>6/16-6/28</b>								
6/16 (Tue)	603	348	49	47	41	81		
6/17 (Wed)	620	470	24	145	0	81	229	539
6/18 (Thu)	639	581	15	91	38	95		
6/19 (Fri)	935	743	47	135	0	121		
6/20 (Sat)	3,329	3,065	115	801	73	250		
6/21 (Sun)	4,880	3,870	127	901	32	311		
6/23 (Tue)	2,086	792	68	97	20	91		
6/24 (Wed)	2,282	1,106	48	150	20	84	261	853
6/25 (Thu)	1,973	1,045	55	149	160	87		
6/26 (Fri)	3,654	986	39	139	80	120		
6/27 (Sat)	5,552	5,111	156	1,032	92	377		
6/28 (Sun)	6,486	5,543	163	1,039	114	399		
Subtotal <sup>a</sup>	<b>33,039</b>	<b>23,660</b>	<b>906</b>	<b>4,996</b>	<b>670</b>	<b>2,097</b>	<b>490</b>	<b>1,392</b>
<b>6/30-7/12</b>								
6/30 (Tue)	1,643	1,566	49	176	192	142		
7/1 (Wed)	2,605	2,540	83	285	42	142	133	2742
7/2 (Thu)	2,785	3,307	73	445	105	272		
7/3 (Fri)	3,261	2,728	138	412	170	235		
7/4 (Sat)	6,589	5,793	170	1,032	149	482		
7/5 (Sun)	8,825	6,932	231	1,501	84	785		
7/7 (Tue)	2,854	3,103	131	463	177	326		
7/8 (Wed)	2,953	2,603	53	258	81	206	522	3,201
7/9 (Thu)	2,589	3,528	101	447	69	131		
7/10 (Fri)	2,925	2,967	128	383	164	245		
7/11 (Sat)	7,513	6,691	134	1,061	57	634		
7/12 (Sun)	9,806	7,628	202	1,551	158	774		
Subtotal	<b>54,348</b>	<b>49,386</b>	<b>1,493</b>	<b>8,041</b>	<b>1,448</b>	<b>4,374</b>	<b>655</b>	<b>5,943</b>
<b>Total of 6/16-7/12</b>	<b>87,387</b>	<b>73,046</b>	<b>2,399</b>	<b>13,010</b>	<b>2,118</b>	<b>5,697</b>	<b>1,145</b>	<b>7,335</b>
Visit numbers to Life Science Hall in June	N/A	N/A	1,584	9,322	4,023	4,309	1,271	1,978
Visit numbers to NMNS in June	44,438	46,900	3,046	15,813	20,766	12,405	5,243	3,062
Visit numbers to Life Science Hall in July	N/A	N/A	3,049	14,817	3,722	0 <sup>b</sup>	3,593	16,675
Total visitors to NMNS in July	119,939	94,417	5,421	30,089	16,198	41,862	12,024	24,537

Note. Adapted from "2009 Annual Statistical Report of the National Museum of Natural Science."

a: The sample was 0.798 percent (500/62,601) of the entire population during pilot study, and revealed a 4.37% sampling error was obtained with a 95% confidence level.

b: No free tickets to the Life Science Hall for the Darwin Exhibit June 19, 2009–Oct. 11, 2009.



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## **Description of the Sample**

### ***Socio-demographic Characteristics***

The socio-demographic characteristics of the respondents, representing visitors to the NMNS in this study, included ticket type, gender, age current residence, marital status, educational level, monthly income, and occupation (see Table 21). Study participants' (n = 512) ticket type are adult ticket (56.4%), discount ticket (23.8%), member with Family card (14.8%) and member with Dinosaur card (4.9%). Of the 512 respondents, more were female (53.3%) than male (46.7%). The ages of participants ranged from 20 to 64 years, with a higher percentage in the ages between 30-39 and 20-29 (36.7% and 33.2%, respectively). The average age of all participants was 35 years. The majority of them resided in Taichung City/County (46.7%), and 132 (25.8%) were from Northern Taiwan (Keelung, Taipei, Taoyuan, Hsinchu). There were more married respondents with children (53.7%) than single respondents (42%). The majority of them (88.5%) had at least a college degree. Respondents were evenly distributed among income groups: 23.2% had no income; 19.5% had a monthly income greater than NT \$50,000; 17% had a monthly income between NT \$30,000 and \$39,999; and 16% had a monthly income between NT \$20,000 and \$29,999. Average income was in the range of NT \$20,000-\$29,999. Excluding the no-income group (students, retired people, housewives), the average income was between NT \$30,000-\$39,999. About thirty percent of the respondents were employed in the private sector. Teachers and students were 14.8% and 12.9%, respectively; 13.5% were self-employed.

Table 21  
Demographic Characteristics of Museum Respondents (n = 512)

Variable	Frequency	Percent (%)
<b>Ticket type</b>		
Adult (regular)	289	56.4
Discount (student aged 20 years or more, government employee)	122	23.8
Member with Dinosaur card	25	4.9
Member with Family card	76	14.8
<b>Gender</b>		
Male	239	46.7
Female	273	53.3
<b>Age in years</b>		
20-29	170	33.2
30-39	188	36.7
40-49	124	24.2
50-59	26	5.1
60-64	4	0.8
<b>Current residence</b>		
Local (Taichung City/County)	239	46.7
Northern Taiwan (Keelung, Taipei, Taoyuan, Hsinchu)	132	25.8
Central Taiwan (Miaoli, Changhua, Nantou, Yunlin)	67	13.1
Southern Taiwan (Chiayi, Tainan, Kaohsiung, Pingtung)	60	11.7
Eastern Taiwan (Yialn, Hualien, Taitung)	14	2.7
<b>Marital status</b>		
Single, never married	215	42.0
Married with no children	19	3.7
Married with children	275	53.7
Other	3	0.6
<b>Education level</b>		
Completed junior high school or less	8	1.6
Completed senior high school	50	9.8
Completed college	347	67.8
Completed graduate school or more	106	20.7
Missing value	1	0.2
<b>Monthly income</b>		
No income	119	23.2
≤ NT \$20,000	57	11.1
NT \$20,000-29,999	82	16.0
NT \$30,000-39,999	87	17.0
NT \$40,000-49,999	65	12.7
NT \$50,000 or more	100	19.5
Missing value	2	0.4

Table 21 (cont'd)

<b>Variable</b>	<b>Frequency</b>	<b>Percent (%)</b>
<b>Occupation</b>		
Government employee	49	9.6
Private sector employee	153	29.9
Self-employed	69	13.5
Unemployed	16	3.1
Teacher	76	14.8
Student	66	12.9
Retired	5	1.0
Housewife	38	7.4
Other	40	7.8

### ***Travel Behavior Characteristics***

Respondents' travel behavior characteristics included visit frequency, number of visits, number of accompanying people, companions, overnight stay or not, information sources, and museum membership, as presented in Table 22. Of the 512 respondents, 55.1% visited NMNS two times a year, 20.1% visited once a year, and 18.4% visited once in three or more years. First-time visitors comprised 20.9% of the total sample while 79.1% were repeat visitors; over half of them (55.1%) had visited the NMNS more than four times. About 36.3% had two accompanying members, followed by four people (24.4%), three people (18.8%) and five people or more (17.2%). The majority of the visitors' (71.1%) companions were family members (adults or children), followed by friends (27.7%). There were more day-trippers (58.0%) than persons on an overnight trip (42.0%) among the visitors. Visitors' length of stay ranged from less than one hour to more than five hours, with a higher percentage between 1 and less than 2 hours (35.7%) and less than one hour (29.1%), followed by 2 to less than 3 hours (19.53%) and 3 to less than 4 hours (12.1%). The average length of stay was 1.8 hours.

Table 22  
Museum Visit Behavior (n = 512)

Variable	Frequency	Percent (%)
<b>Frequency</b>		
Two or more times per year	282	55.1
One time per year	103	20.1
Once in two years	31	6.1
Once in three years or more	94	18.4
Missing value	2	0.4
<b>Number of visits in the past</b>		
1 time	107	20.9
2-3 times	123	24.0
4-5 times	88	17.2
6-7 times	31	6.1
8 times or more	163	31.8
<b>Accompanying number</b>		
Only myself	16	3.1
2 people	186	36.3
3 people	96	18.8
4 people	125	24.4
5 people or more	88	17.2
Missing value	1	0.2
<b>Companion (multiple choice)</b>		
Family without children	98	19.1
Family with children	266	52.0
Colleague(s) from work	11	2.1
Friend(s)	142	27.7
None, only myself	22	4.3
<b>Overnight staying</b>		
Yes, overnight trip	215	42.0
No, day trip	297	58.0
<b>Length of stay</b>		
Less than 1 hour	149	29.1
1 to less than 2 hours	183	35.8
2 to less than 3 hours	100	19.5
3 to less than 4 hours	62	12.1
4 to less than 5 hours	16	3.1
More than 5 hours	2	0.4
<b>Information</b>		
Family word-of-mouth (WOM)	144	28.1
Friend or colleague WOM	106	20.7
Internet	81	15.8
Radio station or TV program	10	2.0
Brochure/flyer	53	10.4
Newspaper or magazines	33	6.4
Other	80	15.6
Missing value	5	1.0
<b>NMNS member</b>		
Yes	101	19.7
No	411	80.3

Table 22 (cont'd)

<b>Variable</b>	<b>Frequency</b>	<b>Percent (%)</b>
<b>Membership in other museums</b>		
Yes	46	9.0
No	464	90.6
Missing value	2	0.4
<b>Past experiences with NMNS</b>		
No experience	107	20.9
Strongly dissatisfied	5	1.0
Dissatisfied	3	0.6
Somewhat dissatisfied	6	1.2
Neutral	7	1.4
Somewhat satisfied	58	11.3
Satisfied	236	46.1
Strongly satisfied	87	16.9
Missing value	3	0.6
<b>Past experiences with other museums</b>		
No experience	17	3.3
Strongly dissatisfied	8	1.6
Dissatisfied	12	2.3
Somewhat dissatisfied	19	3.7
Neutral	63	12.3
Somewhat satisfied	122	23.8
Satisfied	221	43.2
Strongly satisfied	40	7.8
Missing value	10	2.0

The primary information sources for finding out about and planning a trip to the museum were: family word-of-mouth (WOM) (28.1%), friend or colleague WOM (20.7%), Internet (15.8%), and other sources (15.6%). Of the 512 visitors, 29.7% were members of NMNS and 9% had membership in a least one other museum. A large percent (78.5) of the respondents had visited NMNS before, 94.7% had visited other museums before, and 85.6% had visited both the NMNS and other museums before. Sixty-three percent of the respondents who had visited NMNS said they were “satisfied” or “strongly satisfied,” and 51% of respondents felt satisfied or strongly satisfied with other museums.

### ***Tourist Motivation Profile***

Tourist motivation was measured using two constructs: push motivation, formed by nine indicator variables; and pull motivation, formed by 11 indicator variables. As shown in Table 23, NMNS visitors perceived their level of agreement with push motivation (average mean score was 5.84) to be higher than with pull motivation (average mean score was 5.38).

The mean scores of nine push indicator variables ranged from 5.62 to 6.31; among these, two indicator variables—“to be with people who enjoy the same things I do” (mean = 6.31) and “to recover from stress and tension” (mean = 6.02)—reached the highest level of agreement. On the other hand, “to enjoy social interaction with new people” (mean = 5.62) was at a lower level of agreement than other indicators.

As for the pull motivation, the mean scores of eleven indicator variables ranged from 4.34 to 5.93; “to see new exhibits” (mean = 5.93) and “because museum is safe and secure” (mean = 5.92) achieved the highest scores. “Because museum has good restaurants” (mean = 4.34) had the lowest level of agreement.

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Table 23  
Motivation Profile

Museum Tourist Motivations	Mean	Std. Deviation
<b>Push Motivations<sup>a</sup></b>	<b>5.84<sup>b</sup></b>	<b>0.67<sup>c</sup></b>
To relax	5.80	1.00
To spend quality time with family or friends	5.98	0.96
To expand knowledge	5.63	1.13
To have a change from routine	5.74	1.04
To enjoy social interaction with new people	5.62	1.03
To enjoy new experiences	5.63	1.06
To recover from stress and tension	6.02	0.86
To be with people who enjoy the same things I do	6.31	0.78
To enjoy exhibits in different settings	5.87	0.99
<b>Pull Motivations<sup>a</sup></b>	<b>5.38<sup>b</sup></b>	<b>0.74<sup>c</sup></b>
To hear a famous guest speaker	4.95	1.29
Because museum has enjoyable facilities	5.69	0.99
Because museum has standards of hygiene and cleanliness	4.64	1.45
To see new exhibits	5.93	0.96
Because museum has good souvenir stores	5.02	1.30
Because museum has comfortable environment	5.90	0.95
Because museum has enjoyable activities	5.70	1.07
Because museum has good restaurants	4.34	1.45
Because museum is safe and secure	5.92	0.95
To attend special events	5.79	1.00
Because museum has friendly people	5.27	1.20

a: Scale ranged from “1= strongly disagree” to “7=strongly agree.”

b: Average mean score of all items in the construct.

c: Average standard deviation of all items in the construct.

### ***Past Experience Profile***

Table 24 presents a profile of visitors’ past experiences with visits to NMNS and other museums. Two observed variables, “overall past experiences with this museum” (mean = 5.92) and “overall past experiences with other museums” (mean = 5.27), were used to measure the level of satisfaction with respondents’ visits to NMNS and other museums. Respondents who visited NMNS (n = 402, three missing values) were better

satisfied than those who visited other museums (n = 485, ten missing values) (see Table 22, p. 126). The average mean score of satisfaction with visits to NMNS and other museums was 5.59 (see Table 24).

Table 24  
Past Experiences Profile

<b>Perception of Value<sup>a</sup></b>	<b>Mean</b>	<b>Std. Deviation</b>
<b>Average mean score</b>	<b>5.59</b>	<b>0.91</b>
Overall past experiences with this museum <sup>b</sup>	5.92	0.99
Overall past experiences with other museums <sup>c</sup>	5.27	1.22

a: Scale ranged from “ 1 = strongly dissatisfied” to “7 = strongly satisfied.”

b: NMNS (n = 402, three missing values).

c: Other museums (n =485, ten missing values).

### ***Perception of Service Quality Profile***

Table 25 presents the profile of visitors’ perceptions of service quality, according to five constructs: tangibility, responsiveness, empathy, communication and consumables. The participants’ level of agreement with responsiveness (average mean score is 5.73) was higher than with other constructs, which ranged from 5.11 to 5.71. The consumables construct had the lowest level of agreement for the perception of service quality among the five constructs (average mean score is 5.11).

NMNS visitors indicated their highest and lowest levels of agreement with the indicator variables in each construct, including: 1) *tangibility*: “the museum is clean” (mean = 6.01) had the highest score, while “toilet facilities are available” (mean = 5.33) had the lowest score; 2) *responsiveness*: “staff is friendly” (mean = 5.93) had the highest score, while “staff is available in a sufficient number when needed” (mean = 5.61) had the lowest score; 3) *empathy*: “the atmosphere in the museum is in keeping with the

exhibits” (mean = 5.39) had the highest score, while “there are adequate seats in the museum” had the lowest score (mean = 5.03); 4) *communication*: “exhibit descriptions are understandable” (mean = 5.86) had the highest score, while “directional signs in the museum make it easy to navigate” had the lowest score (mean = 4.78); and 5) *consumables*: “the shop offers quality items” (mean = 5.62) had the highest score, while “the restaurant offers multiple choices of food/drink” (mean = 4.74) had the lowest score.

Table 25  
Perceptions of Service Quality Profile

<b>Museum Tourist Motivations<sup>a</sup></b>	<b>Mean</b>	<b>Std. Deviation</b>
<b>Tangibility</b>	<b>5.71</b>	<b>0.71</b>
The parking lot is available	5.55	1.04
Toilet facilities are available	5.33	1.16
Staff is well dressed	5.84	0.84
The exhibits are well maintained	5.71	1.11
The museum is clean	6.01	0.86
The exhibit themes are diverse	5.80	0.93
<b>Responsiveness</b>	<b>5.73</b>	<b>0.80</b>
Staff responds to visitors' requests promptly	5.73	1.01
Interpreters are professional (e.g., accessible, knowledgeable of the subjects)	5.62	1.07
Staff is willing to spend time helping visitors	5.77	0.98
Staff is available in a sufficient number when needed	5.61	1.06
Staff is friendly	5.93	0.89
<b>Empathy</b>	<b>5.25</b>	<b>0.87</b>
The atmosphere in the museum is in keeping with the exhibits	5.39	1.10
The level of crowding is acceptable	5.29	1.16
The level of noise is acceptable	5.16	1.38
The museum caters to the needs of less able visitors	5.36	1.16
There are adequate seats in the museum	5.03	1.32
The facilities for children are sufficient	5.27	1.16
<b>Communication</b>	<b>5.57</b>	<b>0.79</b>
Directional signs in the museum make it easy to navigate	4.78	1.49
Overall, physical display of the interpretation/exhibits (e.g. size of signs, layout of design, brightness of light) is well provided	5.63	1.06
Road and street signs make it easy to find the museum	5.78	1.03
Interpreters have good communication skills (e.g., clarity, speed, fluency, interaction with audience, time control, etc.)	5.68	1.01
The written leaflets and/or website provide enough information	5.71	1.05
Exhibit descriptions are understandable (texts and graphs)	5.86	0.99
<b>Consumables</b>	<b>5.11</b>	<b>0.87</b>
The restaurants' staff provides efficient service	4.92	1.24
The restaurants offer quality food/drink	5.42	1.11
The shops offer diverse choices of items	4.84	1.21
The restaurants offers multiple choices of food/drink	4.74	1.34
The shops offer quality items	5.62	1.15

a: Scale ranged from "1 = strongly disagree" to "7 = strongly agree."

### ***Perception of Value Profile***

The visitors' perception of value for their NMNS experience was measured with four indicator variables. As shown in Table 26, scores ranged from 5.57 to 5.86. Among them, "considering the price I paid for the visit, the overall activities were helpful" (mean = 5.86) reached the highest level of agreement, whereas "the overall price I paid for this visit was reasonable" (mean = 5.57) had the lowest level of agreement.

Table 26  
Perception of the Value Profile

<b>Perception of Value<sup>a</sup></b>	<b>Mean</b>	<b>Std. Deviation</b>
<b>Average mean score</b>	<b>5.75</b>	<b>0.87</b>
The overall price I paid for this visit was reasonable	5.57	1.13
Considering the price I paid for the visit, the overall exhibits were valuable	5.80	0.96
Considering the price I paid for the visit, the overall activities were helpful	5.86	0.89
Considering the price I paid for the visit, the overall services were useful	5.78	0.94

a: Scale ranged from "1 = strongly disagree" to "7 = strongly agree."

### ***Overall Satisfaction Profile***

One item, "overall satisfaction with all facilities and services," was used to measure the visitors' level of satisfaction with their visit. Most of the participants (75.4%) rated their overall satisfaction with all facilities and services as "satisfied" and "strongly satisfied" in this category. The mean score was 5.86 (see Table 27).

Table 27  
Overall Satisfaction Profile

<b>Overall Satisfaction<sup>a</sup></b>	<b>Mean</b>	<b>Std. Deviation</b>
Overall satisfaction with all facilities and services.	5.86	0.85

a: Scale ranged from “1 = strongly dissatisfied” to “7 = strongly satisfied.”

### ***Museum Loyalty Profile***

The visitors’ loyalty to the museum was measured with three indicator variables. As shown in Table 28, NMNS visitors felt they were “likely” to revisit this museum (mean = 6.09), and were “likely” to recommend this museum to others (mean = 6.08), whereas they were “somewhat likely” to renew membership or become a member (mean = 5.16).

Table 28  
Museum Loyalty Profile

<b>Museum Loyalty<sup>a</sup></b>	<b>Mean</b>	<b>Std. Deviation</b>
<b>Average mean score</b>	<b>5.78</b>	<b>0.95</b>
Revisit this museum	6.09	1.03
Recommend this museum to others	6.08	0.99
Renew membership or become a member	5.16	1.31

a: Scale ranged from “1 = very unlikely” to “7 = very unlikely.”

### **Item Analysis**

Item analysis was estimated for each construct with corresponding items (56 items as a total), by employing four procedures (critical ratio, correlation analysis, assessment of normality, and internal consistency reliability), as was done for the pilot study. Results are presented in Tables 29-33. First, the critical ratio was estimated using a t-test. The t-value was a measure of the extent to which a given statement differentiates the

high-scoring group (the highest 27%) from the low-scoring group (the lowest 27%) for each item. All 56 item statements were found to be significant at a  $p < .001$  level, with t-values ranging from 10.413 to 19.139 in the motivation construct (Table 29); from 15.458 to 21.872 in the past experience construct (Table 30); from 9.106 to 19.966 in the perception of service quality construct (Table 31); from 23.963 to 26.518 in the perception of value (Table 32); and from 21.212 to 31.905 in the loyalty construct (Table 33). The recommended value of the critical ratio is greater than or equal to the value of the t-test (3.0), demonstrating that all 56 items have high discrimination (Wu, 2008).

Next, Pearson correlation analysis, which is the correlation or relationship between an individual item score and the total items score, was used to test the corrected item-to-total correlation. The results indicated that all items are moderately correlated with the total test score, with values ranging from 0.356 to 0.673 in the motivation construct (Table 29); from 0.869 to 0.897 in the past experience construct (Table 30); from 0.389 to 0.715 in the service quality construct (Table 31); from 0.804 to 0.890 in the perception of value (Table 32); and from 0.587 to 0.732 in the loyalty construct (Table 33). The recommended value of Pearson item-total correlation is greater than 0.4 and significant between the item score and the total score (Chiou, 2002; Wu, 2008). All items in the four constructs are greater than 0.4 except Emp2 (0.389), indicating a middle-high correlation.

Third, skewness and kurtosis were used to assess the normality of the data and to describe the distribution property of all the data by using Amos, as suggested by Kline (2004). The recommended values for a normality assessment are:  $-3 < \text{skewness} < 3$ ; and  $-8 < \text{kurtosis} < 8$ . The results showed that all values were within the recommended

values as follows:  $-1.693 < \text{skewness} < -0.440$  and  $-0.316 < \text{kurtosis} < 5.788$  in the motivation construct (Table 29);  $-1.322 < \text{skewness} < -0.363$  and  $-0.129 < \text{kurtosis} < 3.136$  in the construct of past experience (Table 30);  $-1.379 < \text{skewness} < -0.257$  and  $-0.307 < \text{kurtosis} < 2.805$  in the construct of perception of service quality construct (Table 31);  $-1.192 < \text{skewness} < -0.928$  and  $0.966 < \text{kurtosis} < 1.986$  in the perception of value construct (Table 32); and  $-1.490 < \text{skewness} < -0.221$  and  $-0.582 < \text{kurtosis} < 2.723$  in the loyalty construct (Table 33).

Finally, Cronbach's alpha of reliability for internal consistency was used and an item was deleted if the coefficient was less than 0.7, according to Nunnally (1978). The tests showed that most values of Cronbach's alpha (greater than 0.806), along with factor loading (greater than 0.45), were within the recommended values, except Pul8 ("because museum has good restaurants") and Emp2 ("the level of crowding is acceptable"), demonstrating an internal consistency reliability in most constructs. A summary of the measurement reliability, using Cronbach's alpha, is presented in Table 34.

In summary, 56 items in the formal study were suggested to possess reliability and content validity except for two items (Pul8 and Emp2), which were deleted because the values were below the recommended values in three analyses (Pearson correlation, Cronbach's alpha reliability, and factor loading).



Table 29  
Summary of Item Analysis of Motivations for Visiting Museum

Item	Critical ratio	Pearson correlation	Skewness	Kurtosis	Cronbach's alpha if item deleted	Factor loading	Item accepted or deleted
Pus1	13.178***	0.624**	-1.693	4.735	0.894	0.658	Accepted
Pus2	10.413***	0.541**	-1.198	2.276	0.896	0.563	Accepted
Pus3	10.840***	0.542**	-1.141	1.401	0.896	0.581	Accepted
Pus4	11.246***	0.495**	-1.142	2.075	0.897	0.492	Accepted
Pus5	11.832***	0.537**	-0.962	0.753	0.899	0.472	Accepted
Pus6	15.471***	0.672**	-1.067	1.617	0.892	0.691	Accepted
Pus7	14.312***	0.620**	-1.669	5.788	0.894	0.641	Accepted
Pus8	14.216***	0.677**	-1.505	4.250	0.892	0.696	Accepted
Pus9	12.522***	0.570**	-1.103	1.909	0.895	0.603	Accepted
Pus11	15.099***	0.601**	-0.468	0.112	0.895	0.549	Accepted
Pul2	13.775***	0.640**	-0.809	0.655	0.893	0.652	Accepted
Pul3	15.330***	0.673**	-0.138	-0.316	0.892	0.699	Accepted
Pul4	12.911***	0.556**	-1.281	2.389	0.895	0.563	Accepted
Pul5	13.859***	0.580**	-0.605	0.344	0.896	0.529	Accepted
Pul6	16.027***	0.695**	-1.201	2.231	0.892	0.720	Accepted
Pul7	19.139***	0.686**	-1.070	1.563	0.892	0.700	Accepted
Pul8	11.047***	<b>0.356**</b>	-0.440	0.142	<b>0.900</b>	<b>0.419</b>	<b>Deleted</b>
Pul9	15.506***	0.621**	-0.839	0.544	0.894	0.635	Accepted
Pul10	13.049***	0.547**	-1.078	1.400	0.896	0.499	Accepted
Pul11	17.425***	0.637**	-0.639	0.448	0.893	0.660	Accepted
Criteria	$\geq 3.0$	$\geq 0.400$	$-3 < s^a < 3$	$-8 < k^b < 8$	$\geq 0.899^c$	$\geq 0.450$	

Note. All values of Critical Ratio are significant at  $\alpha = 0.001$  level. All values of Pearson correlation are significant at  $\alpha = 0.01$  level. The bold numbers are below the criteria.

a: "s" indicates skewness.

b: "k" indicates kurtosis.

c: Cronbach's alpha of overall motivation construct.

\*\*p < 0.01, \*\*\* p < 0.001.

**Table 30**  
**Summary of Item Analysis of Past Experience**

<b>Item</b>	<b>Critical ratio</b>	<b>Pearson correlation</b>	<b>Skewness</b>	<b>Kurtosis</b>	<b>Cronbach's alpha if item deleted</b>	<b>Factor loading</b>	<b>Item accepted or deleted</b>
PE1 <sup>a</sup>	15.458***	0.897**	-1.322	3.136	0.561	0.823	Accepted
PE2	21.872***	0.869**	-0.363	-0.129	0.561	0.823	Accepted
Criteria	≥ 3.0	≥ 0.400	-3 < s < 3	-8 < k < 8	≥ .716 <sup>b</sup>	≥ 0.450	

a: "PE" indicates Past Experience.

b: Cronbach's alpha of Perception of Value construct.

\*\*p < 0.01, \*\*\* p < 0.001.

Table 31  
Summary of Item Analysis of Perception of Service Quality

Item	Critical ratio	Pearson correlation	Skewness	Kurtosis	Cronbach's alpha if item deleted	Factor loading	Item accepted or deleted
Tan1	11.348***	0.431**	-0.590	-0.156	<b>0.944</b>	0.456	Accepted
Tan2	13.022***	0.562**	-1.037	1.273	0.941	0.590	Accepted
Tan3	13.900***	0.570**	-1.253	2.805	0.941	0.614	Accepted
Tan4	16.113***	0.576**	-1.111	1.110	0.941	0.615	Accepted
Tan5	15.142***	0.600**	-1.049	1.543	0.941	0.641	Accepted
Tan6	14.565***	0.629**	-0.754	0.620	0.940	0.674	Accepted
Res1	19.400***	0.643**	-0.724	0.084	0.940	0.691	Accepted
Res2	17.976***	0.615**	-0.638	0.009	0.940	0.658	Accepted
Res3	19.087***	0.694**	-0.762	0.682	0.940	0.744	Accepted
Res4	15.482***	0.664**	-0.850	1.466	0.940	0.712	Accepted
Res5	18.755***	0.679**	-0.795	0.508	0.940	0.725	Accepted
Emp1	13.014***	0.566**	-0.597	0.300	0.941	0.606	Accepted
Emp2	9.106***	<b>0.389**</b>	-0.801	0.572	<b>0.943</b>	<b>0.418</b>	Deleted
Emp3	13.993***	0.531**	-0.590	0.081	0.941	0.563	Accepted
Emp4	15.835***	0.603**	-0.624	0.004	0.941	0.636	Accepted
Emp5	13.477***	0.570**	-0.868	0.367	0.941	0.601	Accepted
Emp6	14.894***	0.626**	-0.533	0.157	0.940	0.651	Accepted
Com1	13.636***	0.556**	-1.062	1.202	0.941	0.587	Accepted
Com2	14.816***	0.609**	-1.068	1.582	0.941	0.648	Accepted
Com3	16.933***	0.629**	-0.592	-0.464	0.940	0.666	Accepted
Com4	18.800***	0.662**	-0.642	-0.181	0.940	0.708	Accepted
Com5	19.966***	0.715**	-0.938	0.969	0.939	0.754	Accepted
Com6	15.413***	0.665**	-1.165	1.988	0.940	0.712	Accepted
Con1	16.352***	0.533**	-0.278	-0.307	0.941	0.553	Accepted
Con2	15.835***	0.573**	-1.379	2.641	0.941	0.591	Accepted
Con3	19.778***	0.669**	-0.257	0.001	0.940	0.699	Accepted
Con4	16.019***	0.611**	-1.092	1.141	0.941	0.627	Accepted
Con5	18.064***	0.659**	-0.303	-0.180	0.940	0.688	Accepted
Criteria	≥ 3.0	≥ 0.400	-3 < s < 3	-8 < k < 8	≥ 0.942 <sup>a</sup>	≥ 0.450	

Note. All values of Critical Ratio are significant at  $\alpha = 0.001$  level. All values of Pearson correlation are significant at  $\alpha = 0.01$  level. The bold numbers are below the criteria.

a: Cronbach's alpha of Perception of Service Quality construct.

\*\*p < 0.01, \*\*\* p < 0.001.

Table 32  
Summary of Item Analysis of Perception of Value

Item	Critical ratio	Pearson correlation	Skewness	Kurtosis	Cronbach's alpha if item deleted	Factor loading	Item accepted or deleted
PV1 <sup>a</sup>	26.518***	0.804**	-1.192	1.986	0.898	0.886	Accepted
PV2	23.963***	0.876**	-0.955	0.966	0.854	0.933	Accepted
PV3	25.353***	0.890**	-0.928	1.503	0.867	0.945	Accepted
PV4	24.562***	0.877**	-0.959	1.196	0.866	0.935	Accepted
Criteria	≥ 3.0	≥ 0.400	-3 < s < 3	-8 < k < 8	≥ 0.937 <sup>b</sup>	≥ 0.450	Accepted

a: "PV" indicates Perception of Value

b: Cronbach's alpha of Perception of Value construct

\*\*p < 0.01, \*\*\* p < 0.001.

Table 33  
Summary of Item Analysis of Loyalty

Item	Critical ratio	Pearson correlation	Skewness	Kurtosis	Cronbach's alpha if item deleted	Factor loading	Item accepted or deleted
Loy1 <sup>a</sup>	21.212***	0.732**	-1.490	2.723	0.662	0.900	Accepted
Loy2	21.588***	0.682**	-1.186	1.329	0.718	0.875	Accepted
Loy3	31.905***	0.587**	-0.221	-0.582	0.839	0.798	Accepted
Criteria	≥ 3.0	≥ 0.400	-3 < s < 3	-8 < k < 8	≥ 0.806 <sup>b</sup>	≥ 0.450	Accepted

a: "Loy" indicates Loyalty

b: Cronbach's alpha of Loyalty construct

\*\*p < 0.01, \*\*\* p < 0.001.

Table 34  
Summary of the Measurement Reliability (Cronbach's Alpha)

Measurement Scale <sup>a</sup>	Number of Items	Cronbach's alpha (α)
Motivations	20	0.899
Past Experience	2	0.716
Perception of Service Quality	28	0.942
Perception of Value	4	0.937
Loyalty	3	0.806

a: Construct of overall satisfaction is not included because there is only one indicator variable.

### **Comparison of Pilot and Formal Studies**

The purpose of this comparative analysis was to explore any differences between visitors (n = 389) in the pilot study and visitors (n = 512) in the formal study with respect to their socio-demographic characteristics and travel (visit) behavior, as well as their measurement scales. First, sample profiles of socio-demographic characteristics and travel behavior were compared to identify any significantly different variables between the samples (pilot study and formal study). A chi-square test, in terms of the type of collected data (categorical variable), was performed to determine if there was a significant relationship between test types (pilot study and formal study) and each categorical variable. Several chi-square statistics were significant at the critical alpha level ( $\alpha = 0.05$ ,  $p < .05$ ) in the demographic characteristics across samples, including: age ( $\chi^2 = 41.79$ ), marital status ( $\chi^2 = 23.96$ ) and occupation ( $\chi^2 = 30.18$ ) (see Table 35). Table 36 shows several significant differences in visitor behaviors across samples, including: frequency of visits ( $\chi^2 = 10.83$ ), number of visits ( $\chi^2 = 107.57$ ), visiting group size ( $\chi^2 = 41.22$ ), overnight stay or not ( $\chi^2 = 16.67$ ), and information ( $\chi^2 = 20.21$ ).

Second, in the formal study, there were 75 non-respondents who did not complete the second half of survey. A comparison of non-respondents (the 75 respondents who did not return the second half of the survey) and respondents (n = 512) was run to identify any significant differences across samples. Table 37 presents data that show that all of the categorical variables displayed no significant differences between non-respondents and respondents, except for occupation ( $\chi^2 = 30.10$ ), indicating that, generally, the profile of the non-respondent sample was similar to that of the respondents.

Table 35  
Comparison of Demographic Characteristics between Pilot and Formal Studies

Characteristic	Pilot study group (n = 389)	Formal study group (n = 512)	Test statistics
<b>Ticket type</b>			$\chi^2 = .42$
Adult (regular)	224	289	
Discount	94	122	
Member with Dinosaur card	16	25	
Member with Family card	55	76	
<b>Gender</b>			$\chi^2 = 1.83$
Male	164	239	
Female	225	273	
<b>Age in years</b>			$\chi^2 = 41.79^*$
20-29	189	170	
30-39	146	188	
40-49	50	124	
50-59	3	26	
60-64	1	4	
<b>Current residence</b>			$\chi^2 = 7.43$
Local (Taichung City/County)	156	239	
Northern Taiwan	132	132	
Central Taiwan	54	67	
Southern Taiwan	39	60	
Eastern Taiwan	5	14	
Island County	3	0	
<b>Marital status</b>			$\chi^2 = 23.96^*$
Single, never married	179	215	
Married with no children	22	19	
Married with children	187	275	
Other	1	3	
<b>Education level</b>			$\chi^2 = 3.66$
Completed junior high school or less	5	8	
Completed senior high school	31	50	
Completed college	287	347	
Completed graduate school or more	66	106	
Missing value	0	1	
<b>Monthly income</b>			$\chi^2 = 8.68$
No income	87	119	
≤ NT \$20,000	68	57	
NT \$20,000-29,999	62	82	
NT \$30,000-39,999	60	87	
NT \$40,000-49,999	51	65	
NT \$50,000 or more	61	100	
Missing value	0	2	

\* p < 0.05

Table 35 (cont'd)

Characteristic	Pilot study group (n = 389)	Formal study group (n = 512)	Test statistics
<b>Occupation</b>			$\chi^2 = 30.18^*$
Government employee	25	49	
Private sector employee	107	153	
Self-employed	52	69	
Unemployed	13	16	
Teacher	30	76	
Student	82	66	
Retired	1	5	
Housewife	27	38	
Other	52	40	

\* p &lt; 0.05

Table 36  
Comparison of Visit Behavior between Pilot and Formal Studies

Characteristic	Pilot study group (n = 389)	Formal study group (n = 512)	Test statistics
<b>Frequency</b>			$\chi^2 = 10.83^*$
Two or more times per year	182	282	
One time per year	82	103	
Once in two years	20	31	
Once in three years or more	105	94	
Missing value	0	2	
<b>Number of visits</b>			$\chi^2 = 107.57^*$
1 time	105	107	
2-3 times	118	123	
4-5 times	61	88	
6-7 times	20	31	
8 times or more	84	163	
Missing value	1	0	
<b>Accompanying number</b>			$\chi^2 = 41.22^*$
Only myself	13	16	
2 people	215	186	
3 people	71	96	
4 people	55	125	
5 people or more	34	88	
Missing value	1	1	
<b>Companion (multiple choice)</b>			$\chi^2 = 0.79$
Family without children	82	98	
Family with children	131	266	
Colleague(s) from work	13	11	
Friend(s)	157	142	
Only myself	9	22	

Table 36 (cont'd)

Characteristic	Pilot study group (n = 389)	Formal study group (n = 512)	Test statistics
<b>Overnight staying</b>			$\chi^2 = 16.67^*$
Yes, overnight trip	111	215	
No, day trip	275	297	
Missing value	3	0	
<b>Length of stay</b>			$\chi^2 = 3.08$
Less than 1 hour	94	149	
1 to less than 2 hours	125	183	
2 to less than 3 hours	95	100	
3 to less than 4 hours	42	62	
4 to less than 5 hours	28	16	
More than 5 hours	5	2	
<b>Information</b>			$\chi^2 = 20.21^*$
Family word-of-mouth (WOM)	101	144	
Friend or colleague WOM	93	106	
Internet	78	81	
Radio station or TV program	12	10	
Brochure/flyer	45	53	
Newspaper or magazines	27	33	
Other	26	80	
Missing value	7	5	
<b>NMNS member</b>			$\chi^2 = 0.31$
Yes	71	101	
No	318	411	
<b>Membership in other museum(s)</b>			$\chi^2 = 2.97$
Yes	23	46	
No	365	464	
Missing value	1	2	

\* p &lt; 0.05



Table 37  
Comparison of Demographic Characteristics between Non-Response and Response  
Samples

Characteristic	Non-response Sample (n = 75)	Response Sample (n = 512)	Test Statistics
<b>Ticket type</b>			$\chi^2 = 5.25$
Adult (regular)	45	289	
Discount	23	122	
Member with Dinosaur card	2	25	
Member with Family card	5	76	
<b>Gender</b>			$\chi^2 = 0.19$
Male	33	239	
Female	42	273	
<b>Age in years</b>			$\chi^2 = 4.55$
20-29	30	170	
30-39	31	188	
40-49	12	124	
50-59	2	26	
60-64	0	4	
<b>Current residence</b>			$\chi^2 = 6.96$
Local (Taichung City/County)	27	239	
Northern Taiwan	21	132	
Central Taiwan	14	67	
Southern Taiwan	13	60	
Eastern Taiwan	0	14	
Island County	0	0	
<b>Marital status</b>			$\chi^2 = 4.16$
Single, never married	37	215	
Married with no children	0	19	
Married with children	38	275	
Other	0	3	
<b>Education level</b>			$\chi^2 = 2.05$
Completed junior high school or less	0	8	
Completed senior high school	6	50	
Completed college	50	347	
Completed graduate school or more	19	106	
Missing value	0	1	
<b>Monthly income</b>			$\chi^2 = 5.89$
No income	17	119	
≤ NT \$20,000	7	57	
NT \$20,000-29,999	8	82	
NT \$30,000-39,999	13	87	
NT \$40,000-49,999	7	65	
NT \$50,000 or more	23	100	
Missing value	0	2	

Table 37(cont'd)

Characteristic	Non-response <sup>a</sup> Sample (n = 75)	Response Sample (n = 512)	Test Statistics
<b>Occupation</b>			$\chi^2 = 30.10^*$
Government employee	9	49	
Private sector employee	11	153	
Self-employed	3	69	
Unemployed	4	16	
Teacher	9	76	
Student	19	66	
Retired	1	5	
Housewife	5	38	
Other	15	40	

a: Non-respondents are these who did not complete the part of the survey.

\*  $p < 0.05$

Third, an independent sample *t*-test was used to determine whether statistically significant differences existed in the mean scores for each item between the pilot and formal studies. Table 38 shows that nine of 20 measurement items in the motivation construct were significantly different across the samples; five of 28 items in the “perception of service quality” construct were significantly different across samples; one of four items in the “perception of value” construct was significantly different; and one of three items in the loyalty construct was significantly different.

**Table 38**  
**T-test Results of Measurement Scale between Pilot Study and Formal Studies**

<b>Constructs</b>	<b>Observed variables</b>	<b>Pilot study Mean</b>	<b>Formal study Mean</b>	<b>t-value</b>
<b>Motivations</b>	Pus1	5.95	5.80	1.87
	Pus2	5.85	5.98	-1.67
	Pus3	6.11	5.63	5.91*
	Pus4	5.72	5.74	-0.21
	Pus5	5.56	5.62	-0.86
	Pus6	6.09	5.63	4.75*
	Pus7	5.94	6.02	-1.23
	Pus8	6.10	6.31	-2.76*
	Pus9	6.27	5.87	-4.88*
	Pul1	4.61	4.95	4.16*
	Pul2	5.58	5.69	-1.65
	Pul3	4.98	4.64	4.18*
	Pul4	5.84	5.93	-1.24
	Pul5	5.32	5.02	3.77*
	Pul6	6.22	5.90	4.21*
	Pul7	5.71	5.70	0.11
	Pul8	4.47	4.34	1.78
	Pul9	6.04	5.92	1.65
	Pul10	5.29	5.79	-6.21*
	Pul11	5.34	5.27	1.09
<b>Perception of Services Quality</b>	Tan1	5.67	5.55	1.58
	Tan2	5.25	5.33	-1.19
	Tan3	5.76	5.84	-1.01
	Tan4	5.68	5.71	-0.45
	Tan5	6.09	6.01	1.19
	Tan6	5.88	5.80	1.02
	Res1	5.72	5.73	-0.08
	Res2	5.84	5.62	3.12*
	Res3	5.96	5.77	2.68*
	Res4	5.64	5.61	0.46
	Res5	6.12	5.93	2.54*
	Emp1	5.45	5.39	0.54
	Emp2	5.36	5.29	0.98
	Emp3	5.18	5.16	0.35
	Emp4	5.41	5.36	0.62
	Emp5	5.09	5.03	0.73
	Emp6	5.38	5.27	1.14

\*p < 0.05

Table 38 (cont'd)

Constructs	Observed variables	Pilot study Mean (Rank)	Formal study Mean (Rank)	t-value
Perception of Services Quality	Com1	4.72	4.78	-0.78
	Com2	5.56	5.63	-1.17
	Com3	5.64	5.86	-2.68*
	Com4	5.62	5.68	-0.93
	Com5	5.63	5.71	-1.15
	Com6	6.05	5.86	3.06*
	Con1	4.87	4.92	-0.72
	Con2	5.51	5.42	1.23
	Con3	4.78	4.84	-0.73
	Con4	4.67	4.74	-0.98
	Con5	5.54	5.62	-0.79
Perception of Value	PV1	5.52	5.57	-0.57
	PV2	5.72	5.80	-1.17
	PV3	5.59	5.86	-3.85*
	PV4	5.69	5.78	-1.12
Overall Satisfaction	Sat1	5.98	5.86	1.59
Loyalty	Loy1	5.90	6.09	-2.61*
	Loy2	6.05	6.08	-0.48
	Loy3	5.09	5.16	-1.04

\*p &lt; 0.05

In addition to the above comparison between two groups, a chi-square goodness-of-fit test was performed to determine how all respondents (n = 901, pilot and formal studies), who were randomly selected in terms of the visitor type, represented the entire NMNS museum visitor population. Table 39 shows that ticket type was not significantly different between the respondents and the entire population during survey period as demonstrated, with  $\chi^2 = 5.112$  (df = 3, p > 0.05), indicating that the percentages of the four visitor types (Adult, Discount, Dinosaur, and Family) of 901 respondents were consistent with those of the entire museum population during survey period.

**Table 39**  
**Comparison of the Ticket Type between the Entire Visitors and the Entire Respondents during the Survey Period**

Ticket type	Total number of museum visitors <sup>a</sup> from 6/16 to 7/12/2009	Study respondents (n = 901; 389 for pilot study, and 512 for formal study)	Chi-square test statistics
	Percent	Percent	
Adult ticket	59.1	57.0	$\chi^2 = 5.112^c$
Discount ticket	24.7 <sup>b</sup>	24.0	
Member with Dinosaur card	3.6	4.6	
Member with Family card	12.6	14.5	

a: The total number of museum visitors during the survey period was 175,869 (see Table 20, p. 121)

b: The number of discount tickets in Table 19 (p. 120) comprises all visitors who were students of any age or a government employee. This study targeted only students aged 20 years or more and government employees. The percentage is adjusted according to the proportion (46.2%) of discount ticket respondents (students aged 20 or more and government employees) to total respondents in the prior research conducted by NMNS in 2008 (National Museum of Natural Science, 2008), in which a probability sample was used to gain a sample size of 2,001. A percentage of 24.7 for the discount ticket in the above table is estimated based on 46.2%.

c: The critical value of chi-square with df = 3 for significance at the 0.05 level is 7.815.

In summary, test results comparing the pilot and formal study groups showed that five of eight (62.5%) socio-demographic variables were not significantly different across samples; four of nine (44.4%) visitor behavior variables were not significantly different across samples; and 41 of 56 (73.2%) measurement items were not significantly different across samples. Moreover, seven of eight (88%) socio-demographic variables were not significantly different between non-response and response samples for the formal study group. Thus, comparison analysis of the two groups in the pilot and formal studies supports the conclusion that the majority of the participants in the two studies were similar during the survey period, except that the two groups differed in the category of museum visitor behaviors, including visit frequency, number of visits, group size,

overnight stay or not, and information. All the above significant differences could have been caused by differences in sample size (389 vs. 512), sampling time (June vs. July) and sampling methods (survey quota and time interval of participant selection) between the two tests. In addition, other potential impacts within the normal variation should not impact the study results. Last, the test results demonstrated the representativeness of the respondents ( $n = 901$ ) of the total museum visitor population ( $N = 175,869$ ) from June 16 (Tuesday) through July 12 (Sunday) in 2009 in terms of the ticket type.

Both pilot and formal studies met the recommended values (see Table E-8, p. 237 and Table 34, p. 139), indicating that Cronbach's alpha coefficients of internal consistency reliability were above the minimum of 0.7 (Nunnally, 1978). Thus, this study used the remaining 56 items in the formal study in the following analyses: construct validity, confirmatory factor analysis (CFA), and structural equation modeling. CFA measurements follow the item analysis, below.

### **Testing the Measurement Model**

The measurement model was evaluated before the structural model, using the two-step approach suggested by Anderson and Gerbing (1988). The measures were validated through a process of confirmatory factor analysis (CFA), which tested the measurement model by specifying the posited association of the observed variables and the underlying constructs, using *Amos for Windows*. In processing the CFA, this study utilized maximum likelihood estimation (MLE) as the method of parameter estimation when the sample number was greater than 100 (Ding, Velicer & Harlow, 1995). The

sample size ( $n = 512$ ) of the current study was adequate to be assessed with this CFA measurement model.

### ***Correlation for the Second-Order MUSEQUAL***

The five constructs of museum service quality were combined to form one measure of museum service quality, as suggested earlier in the literature regarding service quality. This study conducted a correlation test to examine whether the overall perceptions of museum service quality were represented by the five constructs for museum service quality. Table 40 shows that the correlations between the five constructs ranged from 0.588 through 0.947, which are adequate correlation parameters, and all ten covariances were significantly different (i.e.,  $t\text{-value} > 1.96$ ). These results indicate that the five measures converge on a common underlying construct (Lages et al., 2005; Li, 2006; Wu, 2008), and suggest that there should be a higher order model that can fairly explain the data (Bauer, Falk, & Hammerschmidt, 2006). The above findings confirmed that the five sub-dimensions were adequately modeled as first-order constructs (tangibility, responsiveness, empathy, communication, consumables), and one dimension was needed as a second-order construct (named MUSEQUAL). A chi-square difference test was performed to test for discriminate validity, demonstrating whether or not the five constructs were distinguishable factors in the later section of “discriminant validity.”

**Table 40**  
**Correlations among First Order Constructs for Second-Order MUSEQUAL**

Covariances			Estimate	S.E.	C.R. (t-value)	Correlations
Responsiveness	↔	Tangibility	.393	.040	9.73***	.752
Empathy	↔	Responsiveness	.520	.052	10.07***	.812
Empathy	↔	Communication	.485	.049	9.88***	.767
Consumables	↔	Communication	.513	.056	9.19***	.622
Empathy	↔	Tangibility	.359	.041	8.81***	.678
Tangibility	↔	Communication	.422	.041	10.25***	.822
Tangibility	↔	Consumables	.430	.049	8.77***	.624
Responsiveness	↔	Communication	.590	.052	11.43***	.947 <sup>a</sup>
Responsiveness	↔	Consumables	.491	.056	8.83***	.588
Empathy	↔	Consumables	.668	.067	9.99***	.787

a: Assessment of discriminant validity between Responsiveness and Communication is provided in Table 43 (p. 163)

\*\*\* p < 0.001

### ***Measurement Model Evaluation and Modification***

The proposed final measurement model is comprised of eleven latent constructs and 54 observed variables. All constructs and variables in the proposed model were presented earlier, in Table 14, and their interrelationships were depicted in Figure 9. The perception of museum service quality (i.e., MUSEQUAL) as the second-order latent construct, was embraced in the proposed model, which was specified by five service quality constructs as the first-order latent constructs.

The CFA measurement model was assessed to determine whether the proposed measurement model fit the data set by examining the model fit indices. As recommended by other researchers (Hoyle & Panter, 1995; Hu & Bentler, 1999), five common goodness-of-fit indices (chi-square, CFI, NNFI, RMSEA, and SRMR) about how well the CFA model fit the data are as follows: 1) the value of the relative chi-square ( $\chi^2/df$ )



should be less than 3 (Kline, 2005; Simon, & Paper, 2007); 2) the comparative fit index (CFI) should be equal to or greater than 0.90 (Bollen, 1989; Byrne, 1998; Hoyle & Panter, 1995); 3) the non-normed fit index (NNFI) should be equal to or greater than 0.90 (Bollen, 1989; Byrne, 1998; Hu & Bentler, 1999); 4) the root mean square error of approximation (RMSEA) should be less than 0.07 (Bollen, 1989; Byrne, 1998); and 5) the standardized root mean residual (SRMR) should be less than 0.08 (Hu & Bentler, 1999). It is important to note, however, that  $\chi^2$  has a strong tendency to indicate significance if the sample size is large (Hair et al., 2006).

Model modification is necessary if the fit of the implied theoretical model is not as strong as one would like (i.e., fit indices are less than recommended values). In the process of model modification, it has been suggested that one identify low standardized factor loadings, a high modification index and high standardized residuals, and then delete them so as to arrive at an acceptable model fit criterion level. Specifically, the standardized factor loadings of observed variables should be greater than 0.63, because constructs could explain 40% of the variance of the corresponding items if the factor loading of each item is greater than 0.63 (Tabachnick and Fidell, 2007). Those loadings equal to or less than 0.63 or exceeding 1.0 should be eliminated (Hair et al., 1998). Next, a modification is needed if a modification index (MI) between a pair of correlated error terms exceeds 20 (Li, 2006). Last, a large standardized residual covariance between pairs of residuals for statistical significance (i.e., t-value > 1.96 at  $p < .05$  or 2.58 at  $p < .01$ ) should be deleted (Joreskog & Sorbom, 1984; Schumacker & Lomax, 1996) or most standardized residuals should be less than two in absolute value with a correct model (Joreskog & Sorbom, 1984). After removing observed variables with the above poor

scores (i.e., standardized factor loadings, MI, and standardized residuals), five goodness-of-fit indices were re-estimated to create a better fitting model.

The overall goodness-of-fit indices of the CFA measurement model through modification procedures are summarized in Table 41. In the initial estimation of the proposed model, which was estimated with 56 observed variables, the results showed that the proposal model was not acceptable. The chi-square ( $\chi^2/\text{df}$ ) was 2.536 and statistically significant at  $p < .001$ , as suggested by Kline (2005). RMSEA is 0.055, less than 0.07 as recommended by Browne and Cudeck (1993). The RMR = 0.0645 was less than 0.08, as suggested by Hu and Bentler (1999). The t-value of each factor loading was significant at the level of 0.05, as suggested by Byrne (1998). However, two indices provided evidence of an unacceptable model, with CFI = 0.860 and NNFI = 0.851. As a result, there was a need for further modification of the proposed model.

**Table 41**  
**A Summary of the Measurement Model Assessment and Modification**

	$\chi^2$	$\chi^2/\text{df}$	CFI	NNFI	RMSEA	SRMR
Proposed Model	3259	2.53***	0.860	0.851	0.055	0.065
1st Modified Model <sup>a</sup>	2145	2.36***	0.901	0.892	0.052	0.049
2nd Modified Model <sup>b</sup>	1542	2.19***	0.926	0.918	0.048	0.041
Final Modified Model <sup>c</sup>	1334	2.09***	0.933	0.937	0.046	0.041
Recommended value <sup>d</sup>	N/A	< 3.0	≥ 0.900	≥ 0.900	< 0.070	< 0.080

a: Deleting Pus4, Pus5, Pus7, Pus8, Pul1, Pul3, Pul11, Com3 from the proposed model.

b: Deleting Pul5, Tan2, Emp5, Con2, Con4, creating the first modified model.

c: Deleting Tan3, Tan5, Res4, Emp1, Com5 creating the second modified model.

\*\*\*  $p < .001$

In the first modified model, eight observed variables with factor loadings below 0.5,

as suggested by Kline (2004), were eliminated, including: Pus4, Pus5, Pus7, and Pus8 from the push motivation construct; Pul1, Pul3, and Pul11 from the pull motivation construct; and Com3 from the communication construct. After eliminating eight variables, the CFA was run with 48 variables, to estimate the first modification of the model. The results indicated that the chi-square ( $\chi^2/\text{df}$ ) was significant at  $p < .001$ . Other goodness-of-fit indices (CFI = 0.90, RMSEA = 0.053, SRMR = 0.05) represented a better fit compared to the proposal model. The NNFI index still exhibited a poor fit, with a value of 0.89, which is below the recommended value of 0.90. Thus, a second modification was required.

In the second modified model, five observed variables were identified and deleted because of a lower factor loading than 0.5 (Kline, 2005), including: Pul5 from the pull motivation construct; Tan2 from the tangibility construct; Emp5 from the empathy construct; and Con2 and Con4 from the consumables construct. After these five variables were deleted, the CFA with 43 variables was re-run to estimate whether or not the collected data fit the second modified model. The results showed that the chi-square ( $\chi^2/\text{df}$ ) was significant at a level of .05. All other fit indices also showed that the data fit the model fairly, with CFI = 0.926, NNFI = 0.918, RMSEA = 0.048, and SRMR = 0.041. However, the high modification indices (MI) showed that the second revised model would improve if highly correlated variables were adjusted. Moreover, covariances between observed variables could be explained better by modifying the large standardized residuals in this second model. Thus, an additional modification was needed for a better fitting model.

In the third and final modified model, three sets of correlated error terms were

identified: 1) MI is 46.49 between the Tan3 error term and the Tan5 error term in the tangibility construct; 2) MI is 26.96 between the Res1 error term and the Res4 error term in the responsiveness construct; and 3) MI is 24.23 between the Com5 and the Com6 error terms in the communication construct. Each pair of the terms above was conceptually related in the underlying construct. For example, Res1 “staff responds to visitors’ requests promptly” and Res5 “staff is available in a sufficient number when needed,” were conceptually associated with responsiveness in museum service quality. One item in each set was eliminated from the same underlying construct (Li, 2006). Thus, three observed variables (Tan3, Res4, Com5) were eliminated because modification indices (MI) were above the threshold level of 20, as suggested by Li (2006), to improve the model fit. Additionally, the value of the standardized residual covariance between Tan5 and Emp1 was 3.29 greater than the threshold level of 2.0 (Joreskog & Sorbom, 1984). Using this third revised model with 38 variables, CFA was run to re-estimate the modified model. Results from testing this final revised model showed that the goodness-of-fit indices and other estimated parameters and variances substantially support that the final revised model fit the data fairly well, with  $\chi^2/df = 2.09$ , CFI = 0.933, NNFI = 0.937, RMSEA = 0.046, and SRMR = 0.041.

In summary, 18 observed variables were eliminated because of: low factor loadings (Pus4, Pus5, Pus7, Pus8, Pul1, Pul3, Pul11, Com3, Pul5, Tan2, Emp5, Con2, and Con4), high modification index (Tan3, Res4, and Com5), and high standardized residual covariance (Tan5 and Emp1). These deleted items were conceptually associated to some extent with the remaining items in the underlying construct. For example, Pus4 (to have a change from routine) was closely related to Pus6 (to enjoy new experiences), and Pus7

(to recover from stress and tension) is conceptually related to Pus1 (to relax). The final modified model exceeded the proposed model on all goodness-of-fit indices after two revision processes, providing evidence to support that these model modifications were necessary and meaningful.

Figure 10 shows the final revised measurement model. Thirty-eight observed variables were employed as indicators of these twelve latent constructs, including one second-order construct and eleven first-order constructs, and were used to test the subsequent structural model.

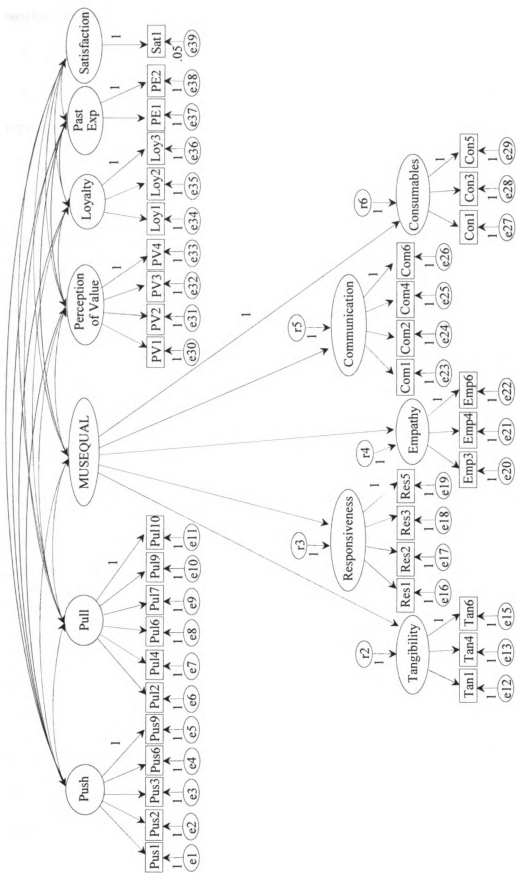


Figure 10. Final measurement model

### ***Construct Reliability and Validity***

Final results of examining the revised measurement model are summarized in Table 42, including the measurement construct and indicator, standardized factor loading, composite reliability, and average variance extracted (AVE). These results show how these data fit the factor model by examining construct validity and discriminant validity. As presented earlier in Table 34 (p. 139), all constructs were above the threshold level of 0.6 ( $\alpha \geq 0.6$ ), which is a criterion for reliability (Fornell & Larcker, 1981). The main criterion for construct reliability is the index of composite reliability (CR), which needs to be greater than 0.7 and is more robust than Cronbach's alpha (Fornell & Larcker, 1981). Construct validity was evaluated by examining the item loadings and their associated t-values, as well as the composite reliabilities and average variance extracted.

Table 42 presents all forty-three item loadings, which ranged from 0.640 to 0.971, indicating that constructs provided a better explanation of the variance for the corresponding items when the factor loading of each item was greater than 0.63 (Tabachnick and Fidell, 2007). All loadings in the final CFA were significant, with a standardized loading of at least 0.640, and t-values were all significant as well, at the level of  $\alpha = 0.001$ ; this is evidence of convergent validity (Bagozzi et al., 1991; Fornell and Larcker, 1981). The composite reliability value ranged from 0.721 to 0.904—greater than 0.70 (Fornell & Larcker, 1981)—demonstrating reliable factors and an internal consistency for all items. Moreover, the average variance extracted (AVE) ranged from 0.518 through to 0.929 for all values, which exceeded 50% (Barclay et al., 1995), indicating that the measurement error variance was less than the variance captured by the latent variable, and that measurement error was not driving the results.

Table 42  
Final Measurement Model (n = 512)

Construct & indicators	Factor Loading ( $\lambda$ )	t-value	Composite Reliability	Average Variance Extracted
<b><u>First-order Constructs</u></b>				
<b><i>Push Motivation</i></b>			<b>0.880</b>	<b>0.595</b>
Pus1	0.776	19.963		
Pus2	0.797	20.764		
Pus3	0.783	20.249		
Pus6	0.781	20.162		
Pus9	0.709	17.606		
<b><i>Pull Motivation</i></b>			<b>0.871</b>	<b>0.529</b>
Pul2	0.751	19.063		
Pul4	0.754	19.179		
Pul6	0.783	20.228		
Pul7	0.677	16.569		
Pul9	0.708	17.586		
Pul10	0.677	16.564		
<b><i>Tangibility</i></b>			<b>0.768</b>	<b>0.524</b>
Tan1	0.745	14.430		
Tan4	0.708	$\lambda$ set to 1		
Tan6	0.710	13.890		
<b><i>Responsiveness</i></b>			<b>0.833</b>	<b>0.556</b>
Res1	0.722	$\lambda$ set to 1		
Res2	0.703	15.111		
Res3	0.810	17.374		
Res5	0.744	15.999		
<b><i>Empathy</i></b>			<b>0.769</b>	<b>0.526</b>
Emp3	0.702	$\lambda$ set to 1		
Emp4	0.772	14.872		
Emp6	0.695	13.689		
<b><i>Communication</i></b>			<b>0.811</b>	<b>0.518</b>
Com1	0.703	$\lambda$ set to 1		
Com2	0.668	14.079		
Com4	0.735	15.432		
Com6	0.761	15.949		
<b><i>Consumables</i></b>			<b>0.806</b>	<b>0.581</b>
Con1	0.721	$\lambda$ set to 1		
Con3	0.786	15.179		
Con5	0.773	15.033		
<b><i>Perception of Value</i></b>			<b>0.904</b>	<b>0.701</b>
PV1	0.775	20.296		
PV2	0.871	24.366		
PV3	0.851	23.404		
PV4	0.862	23.887		



Table 42 (cont'd)

Construct & Indicators	Factor Loading ( $\lambda$ )	t-value	Composite Reliability	Average Variance Extracted
<b><i>Loyalty</i></b>			<b>0.827</b>	<b>0.618</b>
Loy1	0.841	21.970		
Loy2	0.859	22.636		
Loy3	0.640	15.263		
<b><i>Past Experience</i></b>			<b>0.721</b>	<b>0.564</b>
PE1	0.790	15.935		
PE2	0.710	14.612		
<b><i>Overall Satisfaction</i><sup>a</sup></b>			<b>0.929</b>	<b>0.929</b>
Sat1	0.964	29.736		
<b><u>Second-order Construct</u></b>				
<b><i>Service Quality</i></b>			<b>0.936</b>	<b>0.746</b>
Tangibility	0.838	14.609		
Responsiveness	0.939	17.059		
Empathy	0.849	14.698		
Communication	0.971	16.987		
Consumables	0.690	12.574		

a: Set the error variance of overall satisfaction equal to 0 or 0.05 when there is one latent "overall satisfaction" with only one observed variable "Sat1," as suggested by Wu (2008).

### ***Discriminant Validity***

Two test methods of examining discriminant validity were used in this study, including a chi-square difference test (Anderson & Gerbing, 1988; Bagozzi & Phillip, 1982) for the five second-order constructs in this study, and a comparison between the square root of the average variance extracted (AVE) and correlations (Fornell and Larcker, 1981) for the seven first-order constructs. Each of them can achieve the purpose of examining the discriminant validity as discussed below:

#### **Discriminant validity of five first-order constructs for second-order MUSEQUAL.**

All five second-order constructs were verified to be separate factors (i.e., to exhibit construct discriminant validity) by conducting a series of chi-square difference tests. The  $\chi^2$  value was generated for the constrained model by constraining the correlation

parameter to 1, indicating that the correlation between the two constructs is perfect. Similarly, the  $\chi^2$  value was generated for the unconstrained model for which the correlation parameter was not manipulated. Discriminant validity between the pair of constructs is achieved if the chi-square difference (with 1 df) between the constrained and unconstrained model is significant, indicating that the model in which the two constructs are viewed as distinct (but correlated) is superior (Anderson & Gerbing, 1988; Bagozzi & Phillip, 1982). As presented earlier in Table 40 (p. 151), the estimated correlations between ten pairs of second-order constructs were not excessively high except for the correlation (0.947) between responsiveness and communication. Thus, a stronger test method, the chi-square difference test suggested here, was further used to assess the discriminant validity of the five second-order constructs in this study. As presented in Table 43, all  $\chi^2$  differences ranged from 17.0 through 94.3, which all exceeded  $\chi^2 (1) = 3.841$  at the 0.05 level of significance, demonstrating that discriminant validity existed among these five constructs.

**Table 43**  
**Chi-Square Difference Test for Assessing Discriminant Validities**

<b>Construct pair</b>	<b>Unconstrained model</b> <b><math>\chi^2 (109) = 363.6</math></b>	
	<b>Constrained model</b> <b><math>\chi^2 (110)</math></b>	<b>Chi-square difference</b> <b><math>\Delta\chi^2</math></b>
(Tangibility, Responsiveness)	453.8	90.2*
(Tangibility, Empathy)	457.9	94.3*
(Tangibility, Communication)	446.4	82.8*
(Tangibility, Consumables)	427.1	63.5*
(Responsiveness, Empathy)	407.4	43.8*
(Responsiveness, Communication)	399.7	36.1*
(Responsiveness, Consumables)	407.5	43.9*
(Empathy, Communication)	418.7	55.1*
(Empathy, Consumables)	380.6	17.0*
(Communication, Consumables)	406.0	42.4*

\*  $p < 0.05$

Discriminant validity of seven first-order constructs for the entire model. An alternative test method of examining the discriminant validity was used by comparing the square root of the average variance extracted for a given construct with the correlations between that construct and all other constructs. Discriminant validity was supported by the square root of the average variance extracted, which was greater than absolute correlations between two constructs (Fornell and Larcker, 1981). Table 44 shows that the diagonal elements have been replaced by the square roots of AVE. All square roots of AVE on the diagonal ranged from 0.77 to 0.96, which were greater than their correlation coefficients off the diagonal; these ranged from 0.16 through 0.71, indicating that each construct shared more variance with its items than it did with other constructs.

Table 44  
Summary of Discriminant Validities and Correlations

Construct	1	2	3	4	5	6	7
<b>1. Push</b>	<b>0.77<sup>a</sup></b>						
<b>2. Pull</b>	0.57***	<b>0.73</b>					
<b>3. PE</b>	0.44***	0.54***	<b>0.75</b>				
<b>4. MUSEQUAL</b>	0.16**	0.53***	0.43***	<b>0.97</b>			
<b>5. PV</b>	0.22***	0.42***	0.32***	0.66***	<b>0.84</b>		
<b>6. Sat</b>	0.16***	0.36***	0.28***	0.57***	0.62***	<b>0.96</b>	
<b>7. Loy</b>	0.17***	0.47**	0.37***	0.59***	0.71***	0.59***	<b>0.79</b>

a: The bold numbers on the diagonal are the square root of Average Variance Extracted (AVE); off diagonal numbers are the correlations among constructs.

\*\*p < 0.01, \*\*\* p < 0.001.

In sum, all five second-order constructs for the second-order MUSEQUAL, and seven first-order constructs for the entire model in this study passed the test of convergence validity and discriminant validity, indicating that the final modified measurement model possessed construct validity and reliability. A final step, to be followed by measurement model testing and model modification, was testing structural equation analysis with the entire group of samples (n = 512), which is discussed in the next section.

### **Testing the Hypothesized Structural Model**

Structural equation modeling (SEM) has been considered an effective way to test specified theories prescribing associations between underlying constructs and observed variables that are indicators of latent variables (Hoyle, 1995; Joreskog, 1995). In this study, SEM was used to test ten cause-and-effect hypotheses among twelve latent constructs, which were drawn from theories and models, as mentioned previously. Overall goodness-of fit statistics, hypotheses testing and path analysis are discussed below.

#### ***Overall Goodness-of-Fit of the Structural Equation Model***

The proposed structural model presented earlier in Figure 9 (p. 99) was analyzed here using the refined constructs and variables that resulted from the processes of the measurement analysis. The overall goodness-of-fit statistics for the structural model showed a moderate fit of the data to the model with  $\chi^2 = 1475.6$  (df = 650,  $p < 0.001$ ),  $\chi^2/\text{df} = 2.27$ , CFI = 0.921, NNFI = 0.914, RMSEA = 0.050, and SRMR = 0.0781). A summary of the goodness-of-fit statistics for the structural model as well as the final measurements are presented in Table 45.

Table 45  
Summary of Goodness-of Fit Indices for the Final Measurement and Structural Models

Model	$\chi^2$	df	$\chi^2/\text{df}$	CFI	NNFI	RMSEA	SRMR
Second-order measurement model of MUSEQUAL	447.96	114	2.930	0.922	0.907	0.076	0.051
Overall revised measurement model	1334.36	640	2.085	0.933	0.927	0.046	0.041
Structural model	1475.57	650	2.270	0.921	0.914	0.050	0.078
Recommended value	N/A	N/A	< 3.00	$\geq 0.90$	$\geq 0.900$	< 0.070	< 0.080

### ***Research Hypotheses Testing and Path Coefficients***

Ten sets of research hypotheses (twelve hypotheses in all) were proposed and tested for their causal relationships, using structural equation modeling. The causation between the constructs was identified by estimated path coefficients (i.e.,  $\beta$ ), standard errors and t-values (Byrne, 1998; Hair et al., 1998). Test results, along with associated path coefficients, are discussed below.

*Hypothesis 1: Museum visitors' push motivations positively affect their pull motivations at the pre-visit stage* is supported by the test results. The SEM analysis indicated that the path coefficient from push motivations to pull motivations (push motivations  $\rightarrow$  pull motivations) was statistically significant at the 0.001 level, having a strong and positive causation ( $\beta = 0.57$ ,  $t = 10.39$ ,  $p < 0.001$ ). Specifically, museum visitors who had high scores on internal motivations, such as “to relax” and “to be with people who enjoy the same things I do,” would also have high scores on pull motivations, such as to visit a museum with “a comfortable environment” and “enjoyable activities.”

*Hypothesis 2alt: Museum visitors' push motivations negatively affect their perceptions of service quality in the museum at the post-visit stage* is supported by the test results. The path coefficient from push motivations to visitors' perceptions of service quality (push motivations → perceptions of service quality) was significant at the 0.001 level, demonstrating a moderate and positive causation ( $\beta = -0.24$ ,  $t = -3.95$ ,  $p < 0.001$ ). Accordingly, the results showed that if museum visitors had a higher push motivation score before their visits, they would have a lower score on perception of museum service quality after their visit.

*Hypothesis 3: Museum visitors' pull motivations positively affect their perceptions of service quality in the museum at the post-visit stage* is supported by the test results. The path coefficient from pull motivations to visitors' perceptions of service quality (pull motivations → perceptions of service quality) was significant at the 0.001 level, having a strong and positive causation ( $\beta = 0.59$ ,  $t = 7.88$ ,  $p < 0.001$ ). Museum visitors with higher pull motivation score also gave the higher score for museum service quality on factors such as tangibility, responsiveness, empathy, communication, and consumables.

*Hypothesis 4: Museum visitors' perceptions of service quality at the post-visit stage positively affect their overall satisfaction* is supported by the test results. The path coefficient from perceptions of service quality to visitors' overall satisfaction (perceptions of service quality → overall satisfaction) was significant at the 0.001 level, having a positive causation ( $\beta = 0.23$ ,  $t = 3.92$ ,  $p < 0.001$ ). It was supported that if museum visitors experienced a higher quality of museum service, their overall satisfaction with their museum visits was higher.

*Hypothesis 5: Museum visitors' past experiences at the pre-visit stage positively affect their perceptions of service quality at the post-visit stage* is supported by the test results. The path coefficient from past experience to visitors' perceptions of service quality (past experience → perceptions of service quality) was significant at the 0.001 level, showing a positive causal relationship ( $\beta = 0.11$ ,  $t = 2.33$ ,  $p < 0.05$ ). Specifically, this result supported that if museum visitors felt satisfied with their past experiences in visiting museums, they were more likely to have a positive perception of service quality.

*Hypothesis 6: Museum visitors' past experiences at the pre-visit stage positively affect their intentions to return, to recommend visiting to others, and to renew or gain a membership in the future* is supported by the test results. The path coefficient from past experience to visitors' museum loyalty (past experience → museum loyalty) was significant at the 0.001 level, having a moderate and positive causation ( $\beta = 0.37$ ,  $t = 5.27$ ,  $p < 0.001$ ). This result supported that museum visitors who felt satisfied with their past experiences in visiting museums were likely to express loyalty to the museums they had visited.

*Hypothesis 7: Museum visitors' perceptions of service quality at the post-visit stage positively affect their perceptions of value of their museum experiences at the post-visit stage* is supported by the test result. The path coefficient from perceptions of service quality to visitors' perceptions of value (perceptions of service quality → perceptions of value) was significant at the 0.001 level, having a strong and positive causation ( $\beta = 0.65$ ,  $t = 10.03$ ,  $p < 0.001$ ). This result supported that if museum visitors experienced a high quality of museum service, they gave a high score on their perceptions of the value of their museum experiences.



*Hypothesis 8: Museum visitors' perceptions of value of their museum experiences at the post-visit stage positively affect their overall satisfaction* is supported by the test results. The path coefficient from visitors' perceptions of value to their overall satisfaction (perceptions of value → overall satisfaction) was significant at the 0.001 level, having a strong and positive causation ( $\beta = 0.55$ ,  $t = 8.07$ ,  $p < 0.001$ ). This result indicated that, when museum visitors experienced a higher perception of value in their museum experiences, they had greater overall satisfaction with their museum visits.

*Hypothesis 9: Museum visitors' perceptions of value of their museum experiences at the post-visit stage positively affect their intentions to return, to recommend visiting to others, and to renew or gain membership in the future* is supported by the test results. The path coefficient from visitors' perceptions of value to their museum loyalty (perceptions of value → museum loyalty) was significant at the 0.01 level, having a strong and positive causation ( $\beta = 0.50$ ,  $t = 3.22$ ,  $p < 0.01$ ). The result supported that museum visitors who experienced a high perception of value in their museum experiences were also likely to express an intention to return, to recommend the museum visiting to others, and to renew or gain membership in the future.

*Hypothesis 10: Museum visitors' overall satisfaction at the post-visit stage positively affects their intentions to return, to recommend visiting to others, and to renew or gain membership in the future* is supported by the test results. The path coefficient from visitors' overall satisfaction to their loyalty (overall satisfaction → museum loyalty) was significant at the 0.001 level, having a moderate and positive causation ( $\beta = 0.28$ ,  $t = 2.12$ ,  $p < 0.05$ ). This result supported that, as museum visitors experienced high overall satisfaction with their museum visits, their loyalty to the museums increased.

A summary of the above ten sets of hypothesis test results is presented in Table 46. Overall, all of the ten cause-effect hypotheses were supported with a positive, moderate or strong association (most values of  $\beta \geq 0.25$ ) except that the path coefficient of the link between push motivations and perceptions of service quality is negative ( $\beta = -0.28$ ) and the path coefficient of the link between past experience and museum loyalty is slight ( $\beta = 0.11$ ). Figure 11 shows graphically the resulting path coefficients of the structural model.

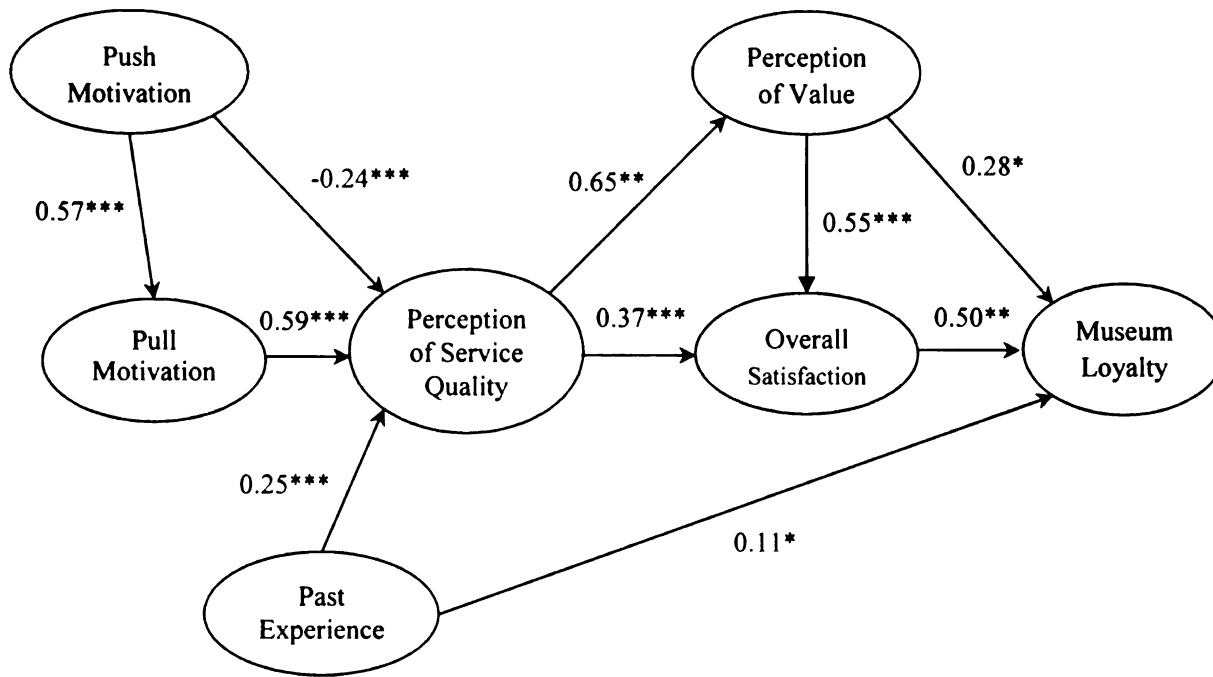
Table 46  
Summary of the Tested Hypotheses 1–10

Research hypothesis	Hypothesized path	Expected sign	Path coefficient	t-value	Std. Error	Results
H1	Push Motivations → Pull Motivations	+	0.57	10.39***	0.047	Supported
H2alt <sup>a</sup>	Push Motivations → Perception of Service Quality	+	-0.24	-3.95***	0.053	Supported
H3 <sup>b</sup>	Pull Motivations → Perception of Service Quality	+	0.59	7.88***	0.078	Supported
H4	Past Experience → Perception of Service Quality	+	0.23	3.92***	0.058	Supported
H5	Past Experience → Museum Loyalty	+	0.11	2.33*	0.020	Supported
H6	Perception of Service Quality → Overall Satisfaction	+	0.37	5.27***	0.066	Supported
H7	Perception of Service Quality → Perception of Value	+	0.65	10.03***	0.080	Supported
H8	Perception of Value → Overall Satisfaction	+	0.55	8.07***	0.051	Supported
H9	Overall Satisfaction → Museum Loyalty	+	0.50	3.22**	0.051	Supported
H10	Perception of Value → Museum Loyalty	+	0.28	2.12*	0.131	Supported

a: The competing hypothesis of H2alt is H2: *Museum visitors' push motivations positively affect their perceptions of service quality in the museum at the post-visit stage.*

b: The competing hypothesis of H3 is H3alt: *Museum visitors' pull motivations negatively affect their perceptions of service quality in the museum at the post-visit stage.*

\*p < 0.05, \*\*p < 0.01, \*\*\* p < 0.001.



\*p < 0.05, \*\*p < 0.01, \*\*\* p < 0.001.

Figure 11. Summary of tested hypotheses (H1–H10)

### ***Path Effects Analysis***

In this study, museum loyalty is the final outcome or consequence variable, determined directly and indirectly through six constructs (push motives, pull motives, perception of service quality, past experiences, perception of value, overall satisfaction). The total path effects of the six constructs on museum loyalty, including indirect effects, direct effects and total effects, were estimated based on the test results of the structural model (see Table 47).

**Table 47**  
**Path Effects on Museum Loyalty**

<b>Hypothesized path</b>	<b>Indirect effect</b>	<b>Direct effect</b>	<b>Total effect</b>
Push Motivation → Museum Loyalty	0.057	–	0.057
Pull Motivation → Museum Loyalty	0.327	–	0.327
Past Experiences → Museum Loyalty	0.136	0.106	0.242
Perception of Service Quality → Museum Loyalty	0.550	–	0.550
Perception of Value → Museum Loyalty	0.279	0.281	0.560
Overall Satisfaction → Museum Loyalty	–	0.504	0.504

First, push motivation had no direct effect on museum loyalty; the total effect of push motivation on museum loyalty was weak (0.057). On the other hand, the total effect (only through the indirect effect) of pull motivation on museum loyalty was stronger (0.327) than that of push motivation. Next, past experiences with museum visits had a significant impact on museum loyalty, with a total effect (indirect and direct effect) of 0.242. Further, the perception of service quality had a strong total effect (indirect effect only) with 0.550 on museum loyalty, indicating that MUSEQUAL played a substantial mediator role in the model, especially between pull motivation and museum loyalty. The perception of value had a higher (0.560) total effect (indirect and direct effect) on museum loyalty than the other five constructs, which indicated that perception of value was an important mediator among three constructs (pull motivation, past experiences, perception of service quality) and museum loyalty. Finally, the overall satisfaction also had a substantial total effect (direct effect only) on museum loyalty (0.504).

### **Examination of Moderating Effects**

Three moderator variables and nine hypotheses are addressed in this section. The moderating effects of visitor type (member and nonmember, adult and discount ticket) and length of stay on three causal relationships were assessed to determine any significant differences across groups, including the relationship between perception of service quality and overall satisfaction, and the relationship between overall satisfaction and museum loyalty. A specific discussion is provided below.

#### ***Measurement Invariance Analysis***

It is necessary to assess factor invariance of the measurement prior to comparisons between groups because there is reason to believe that the structure of the compared construct is not equal across groups (Nuevo et al., 2008). This study statistically compared the equivalence of the factor structures across two samples by following the guidelines suggested by Joreskog (1971) and elaborated by Byrne, Shavelson, and Muthen (1989). Factor structure equivalence was tested across the two groups by constraining the item loadings, the factor covariances, and the factor variances across groups known to be equal, and then testing the hypotheses of equal lambdas, covariances, and variances (Byrne et al., 1989). The number (a minimum of 101) of respondents in each subgroup in three models was greater than 100, as mentioned earlier (Ding et al., 1996), indicating the adequacy of fit assessment. Table 48 indicates that most of the items in each construct exhibit equivalent factor loadings (i.e., full invariance) across samples except for a few constructs that had a partial invariance in these three models (adult ticket vs. discount ticket model, nonmember vs. member model, short stay vs. long stay model).

**Table 48**  
**Test Results of Measurement Invariance across Groups**

Construct & Indicators	Equivalent of $\lambda$ across Visitor-Type Groups (Nonmember/n = 411; Member/n = 101)	Equivalent of $\lambda$ across Visitor-Type Groups (Adult/n = 289; Discount/n = 122)	Equivalent of $\lambda$ across Length of Stay Groups (Short/n = 256; Long/n = 256)
<b><u>First-order Constructs</u></b>			
<b><i>Push Motivation</i></b>			
Pus1	Yes ( $p > 0.05$ )	Yes ( $p > 0.05$ )	Yes ( $p > 0.05$ )
Pus2	Yes ( $p > 0.05$ )	Yes ( $p > 0.05$ )	No ( $p < 0.05$ )
Pus3	Yes ( $p > 0.05$ )	Yes ( $p > 0.05$ )	Yes ( $p > 0.05$ )
Pus6	Yes ( $p > 0.05$ )	Yes ( $p > 0.05$ )	Yes ( $p > 0.05$ )
Pus9	Yes ( $p > 0.05$ )	Yes ( $p > 0.05$ )	Yes ( $p > 0.05$ )
<i>Full or partial invariance</i>	<i>Full invariance</i>	<i>Full invariance</i>	<i>Partial invariance</i>
<b><i>Pull Motivation</i></b>			
Pul2	Yes ( $p > 0.05$ )	Yes ( $p > 0.05$ )	No ( $p < 0.05$ )
Pul4	Yes ( $p > 0.05$ )	Yes ( $p > 0.05$ )	Yes ( $p > 0.05$ )
Pul6	Yes ( $p > 0.05$ )	Yes ( $p > 0.05$ )	Yes ( $p > 0.05$ )
Pul7	Yes ( $p > 0.05$ )	Yes ( $p > 0.05$ )	Yes ( $p > 0.05$ )
Pul9	Yes ( $p > 0.05$ )	Yes ( $p > 0.05$ )	Yes ( $p > 0.05$ )
Pul10	Yes ( $p > 0.05$ )	Yes ( $p > 0.05$ )	Yes ( $p > 0.05$ )
<i>Full or partial invariance</i>	<i>Full invariance</i>	<i>Full invariance</i>	<i>Partial invariance</i>
<b><i>Past Experience</i></b>			
PE1	Yes ( $p > 0.05$ )	Yes ( $p > 0.05$ )	Yes ( $p > 0.05$ )
PE2	Yes ( $p > 0.05$ )	Yes ( $p > 0.05$ )	Yes ( $p > 0.05$ )
<i>Full or partial invariance</i>	<i>Full invariance</i>	<i>Full invariance</i>	<i>Full invariance</i>
<b><i>MUSEQUAL</i></b>			
Tangibility	Yes ( $p > 0.05$ )	Yes ( $p > 0.05$ )	Yes ( $p > 0.05$ )
Responsiveness	Yes ( $p > 0.05$ )	Yes ( $p > 0.05$ )	Yes ( $p > 0.05$ )
Empathy	Yes ( $p > 0.05$ )	Yes ( $p > 0.05$ )	Yes ( $p > 0.05$ )
Communication	Yes ( $p > 0.05$ )	Yes ( $p > 0.05$ )	Yes ( $p > 0.05$ )
Consumables	Yes ( $p > 0.05$ )	Yes ( $p > 0.05$ )	Yes ( $p > 0.05$ )
<i>Full or partial invariance</i>	<i>Full invariance</i>	<i>Full invariance</i>	<i>Full invariance</i>
<b><i>Perception of Value</i></b>			
PV1	Yes ( $p > 0.05$ )	Yes ( $p > 0.05$ )	Yes ( $p > 0.05$ )
PV2	Yes ( $p > 0.05$ )	Yes ( $p > 0.05$ )	Yes ( $p > 0.05$ )
PV3	Yes ( $p > 0.05$ )	Yes ( $p > 0.05$ )	Yes ( $p > 0.05$ )
PV4	Yes ( $p > 0.05$ )	Yes ( $p > 0.05$ )	Yes ( $p > 0.05$ )
<i>Full or partial invariance</i>	<i>Full invariance</i>	<i>Full invariance</i>	<i>Full invariance</i>
<b><i>Overall Satisfaction</i></b>			
Sat1	Yes ( $p > 0.05$ )	Yes ( $p > 0.05$ )	Yes ( $p > 0.05$ )
<i>Full or partial invariance</i>	<i>Full invariance</i>	<i>Full invariance</i>	<i>Full invariance</i>

Table 48 (cont'd)

Construct & Indicators	Equivalent of $\lambda$ across Visitor-Type Groups (Nonmember/n = 411; Member/n = 101)	Equivalent of $\lambda$ across Visitor-Type Groups (Adult/n = 289; Discount/n = 122)	Equivalent of $\lambda$ across Length of Stay Groups (Short/n = 256; Long/n = 256)
<b><i>Loyalty</i></b>			
Loy1	Yes ( $p > 0.05$ )	Yes ( $p > 0.05$ )	Yes ( $p > 0.05$ )
Loy2	No ( $p < 0.05$ )	Yes ( $p > 0.05$ )	Yes ( $p > 0.05$ )
Loy3	Yes ( $p > 0.05$ )	Yes ( $p > 0.05$ )	Yes ( $p > 0.05$ )
<i>Full or partial invariance</i>	<i>Partial invariance</i>	<i>Full invariance</i>	<i>Full invariance</i>
<b><u>Second-order Construct</u></b>			
<b><i>Tangibility</i></b>			
Tan1	No ( $p < 0.05$ )	Yes ( $p > 0.05$ )	Yes ( $p > 0.05$ )
Tan4	Yes ( $p > 0.05$ )	Yes ( $p > 0.05$ )	Yes ( $p > 0.05$ )
Tan6	$\lambda$ set to 1 (Not tested)	$\lambda$ set to 1 (Not tested)	$\lambda$ set to 1 (Not tested)
<i>Full or partial invariance</i>	<i>Partial invariance</i>	<i>Full invariance</i>	<i>Full invariance</i>
<b><i>Responsiveness</i></b>			
Res1	Yes ( $p > 0.05$ )	Yes ( $p > 0.05$ )	Yes ( $p > 0.05$ )
Res2	Yes ( $p > 0.05$ )	Yes ( $p > 0.05$ )	Yes ( $p > 0.05$ )
Res3	Yes ( $p > 0.05$ )	Yes ( $p > 0.05$ )	Yes ( $p > 0.05$ )
Res5	$\lambda$ set to 1 (Not tested)	$\lambda$ set to 1 (Not tested)	$\lambda$ set to 1 (Not tested)
<i>Full or partial invariance</i>	<i>Full invariance</i>	<i>Full invariance</i>	<i>Full invariance</i>
<b><i>Empathy</i></b>			
Emp3	Yes ( $p > 0.05$ )	Yes ( $p > 0.05$ )	Yes ( $p > 0.05$ )
Emp4	No ( $p < 0.05$ )	Yes ( $p > 0.05$ )	Yes ( $p > 0.05$ )
Emp6	$\lambda$ set to 1 (Not tested)	$\lambda$ set to 1 (Not tested)	$\lambda$ set to 1 (Not tested)
<i>Full or partial invariance</i>	<i>Partial invariance</i>	<i>Full invariance</i>	<i>Full invariance</i>
<b><i>Communication</i></b>			
Com1	Yes ( $p > 0.05$ )	No ( $p < 0.05$ )	Yes ( $p > 0.05$ )
Com2	Yes ( $p > 0.05$ )	Yes ( $p > 0.05$ )	Yes ( $p > 0.05$ )
Com4	No ( $p < 0.05$ )	Yes ( $p > 0.05$ )	Yes ( $p > 0.05$ )
Com6	$\lambda$ set to 1 (Not tested)	$\lambda$ set to 1 (Not tested)	$\lambda$ set to 1 (Not tested)
<i>Full or partial invariance</i>	<i>Partial invariance</i>	<i>Partial invariance</i>	<i>Full invariance</i>
<b><i>Consumables</i></b>			
Con1	$\lambda$ set to 1 (Not tested)	$\lambda$ set to 1 (Not tested)	$\lambda$ set to 1 (Not tested)
Con3	Yes ( $p > 0.05$ )	Yes ( $p > 0.05$ )	Yes ( $p > 0.05$ )
Con5	Yes ( $p > 0.05$ )	Yes ( $p > 0.05$ )	No ( $p < 0.05$ )
<i>Full or partial invariance</i>	<i>Full invariance</i>	<i>Full invariance</i>	<i>Partial invariance</i>

The constructs with inequivalent factor loadings (i.e., partial invariance) include:  
one item (Item Com1) in the communication construct in the adult-discount ticket model;



four items (Item Tan1, Emp4, Com4, Loy2) in the “tangibility,” “empathy,” “communication,” and “loyalty” constructs, respectively, in the nonmember-member model; and three items (Item Pus2, Pul2, Con5) in the “push,” “pull,” and “consumables” constructs, respectively, in the length-of-stay model. Overall, the test results demonstrated support for full measurement and partial measurement invariance<sup>6</sup> for the three models (Byrne et al., 1989; Vandewalle, 1997; Watson, Meade, Surface, & Vandewalle). Thus, an examination of moderating effects across groups was further conducted and explained in the next section.

#### ***Moderating Effect of Visitor Type (Nonmember and Member)***

Visitor type by membership status was used as a moderator of three paths (perception of service quality-overall satisfaction, overall satisfaction-museum loyalty, and perception of value-museum loyalty) in the structural model. In this study, all respondents were split into two subgroups: member group (those who had NMNS membership, with a total number of 101) and nonmember group (those who purchased adult and discount ticket, with a total number of 411). A multiple group analysis within Amos was used to assess the moderator variable effects of visitor type on the structural model (Byrne, 2001) by comparing the two subsamples (i.e., adult ticket vs. discount ticket). The examination of the moderating effect was conducted in a three-step approach suggested by Li (2006) and Kim (2007). Two structural models were created for a comparison of statistics. The first model was an unconstrained model in which path

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<sup>6</sup> Full invariance (Past Experience, MUSEQUAL, Empathy, Communication, Consumables, Perception of Value, Overall Satisfaction) and partial invariance (Push, Pull, Loyalty, Tangibility, Responsiveness) were found between pilot study (n = 389) and formal study (n = 512).

coefficients were allowed to vary across two subgroups (member vs. nonmember). The second model was a constrained model in which path coefficients were constrained to be equal across the two subgroups.

The next step was to test the difference between the unconstrained and constrained models. The chi-square value ( $\chi^2$ ) difference was determined to compare the  $\chi^2$  values of the unconstrained structural model and the constrained structural model. The unconstrained model has less degree of freedom than the constrained model, so the  $\chi^2$  value would always be lower for the unconstrained model than for the constrained model. If  $\chi^2$  improved significantly when moving from the unconstrained model to the constrained model, the testing moderator variable would have had a differential effect on the tested causal path, and could be confirmed as a moderator. Table 49 shows that the  $\chi^2$  value for the unconstrained and the constrained models were 2355.91 (df = 1300) and 2428.97 (df = 1341), respectively. The difference between the two  $\chi^2$  values was 73.06 with 41 degrees of freedom, which was statistically significant at the level of  $\alpha = 0.01$  ( $p < 0.001$ ), indicating that membership status had a moderating effect on the structural model.

Table 49  
Results of the Moderating Effects of Visitor Type (Member and Nonmember)

	Unconstrained model	Partial constrained model	$\chi^2$ difference	Moderating effect
$\chi^2$ (df)	$\chi^2 = 2355.91$ (df = 1300)	$\chi^2 = 2428.97$ (df = 1341)	73.06 (df = 41) $p = 0.002^{**}$	Supported

Note.  $\chi^2$  (df = 41) = 56.94 at  $\alpha = 0.05$ .

$^{**}p < 0.01$ .

The second step was to test the difference in the individual paths. The chi-square difference was performed again to test for moderating effects on three targeted paths (PSQ → Sat, Sat → Loy, and PV → Loy). Table 50 indicates that the influence of visitor type on the causal relationship between perception of service quality (PSQ) and overall satisfaction (Sat) was significantly different between the adult ticket group and the discount ticket group, with  $\Delta\chi^2(1) = 0.94$ ,  $p > 0.05$ . As a result, *hypothesis 11a: Visitor type (member and nonmember) moderates the effect of museum visitors' perceptions of service quality on the overall satisfaction with the quality of museum service at the post-visit stage* was not supported.

Table 50  
Chi-Square Difference Test Results for Moderating Effects of Membership Status

Hypothesized moderated path	Unconstrained model	Partial constrained model <sup>a</sup>	$\chi^2$ difference	Moderating effect
H11a: PSQ <sup>b</sup> → Sat	$\chi^2 = 2355.91$ (df = 1300)	$\chi^2 = 2356.85$ (df = 1301)	$\Delta\chi^2 = 0.94$ (df = 1) p = 0.332	Not Supported
H12a: Sat <sup>c</sup> → Loy <sup>d</sup>	$\chi^2 = 2355.91$ (df = 1300)	$\chi^2 = 2359.98$ (df = 1301)	$\Delta\chi^2 = 4.07$ (df = 1) p = 0.044*	Supported
H13a: PV <sup>e</sup> → Loy	$\chi^2 = 2355.91$ (df = 1300)	$\chi^2 = 2362.14$ (df = 1301)	$\Delta\chi^2 = 6.23$ (df = 1) p = 0.012*	Supported

Note.  $\chi^2$  (df = 1) = 3.84 at  $\alpha = 0.05$ ; \*p < 0.05.

a: Partial constrained model means that “only the target path coefficient (PSQ-Sat, Sat-Loy, PV-Loy) was set to be equal for cross-group data sets” (Kim, 2007)

b: “PSQ” indicates perception of service quality.

c: “Sat” indicates overall satisfaction.

d: “Loy” indicates museum loyalty.

e: “PV” indicates perception of value.

Next, the effect of visitor type in terms of the possession of NMNS membership on the causal relationship between overall satisfaction (Sat) and museum loyalty (Loy) was significantly different between the member group and nonmember group, with  $\Delta\chi^2(1) = 4.07, p < 0.05$ . *Hypothesis 12a: Visitor type (member and nonmember) moderates the effect of museum visitors' overall satisfaction with quality of museum service on their intentions to return, to recommend visiting to others, and to renew or gain membership in the future* was supported. This study found that the moderating effect of visitor type (member and nonmember) on the relationships between perception of value (PV) and museum loyalty (Loy) was significantly different between two groups, with  $\Delta\chi^2(1) = 6.23, p < 0.05$ . Thus, *hypothesis 13b: Visitor type (member and nonmember) moderates the effect of museum visitors' perceptions of value of their museum experiences on their intentions to return, to recommend visiting to others, and to renew or gain membership in the future* was supported.

The third step was to compare the path coefficient between the two groups. The independent t-value was employed to compare two path coefficients within the Amos program. Table 51 indicates that the effect of overall satisfaction on museum loyalty was stronger in the nonmember group ( $\beta = 0.68, t = 1.63, p < 0.001$ ) than the effect in the member group ( $\beta = 0.44, t = 2.69, p < 0.05$ ), and the effect of perception of value was stronger in the member group ( $\beta = 0.56, t = 5.63, p < 0.001$ ) than the effect in the nonmember group ( $\beta = 0.23, t = 2.61, p < 0.05$ ). The results of the three moderating effects are shown in Figure 12.

Table 51

Comparison Results of Path Coefficients and T-Value (Member and Nonmember)

Hypothesized moderated path	Member		Nonmember		Comparison (M <sup>a</sup> , NM <sup>b</sup> )
	Path coefficient	t-value	Path coefficient	t-value	
H11b: PSQ → Sat	0.272	1.974*	0.401	4.939***	M = NM
H12b: Sat → Loy	0.441	2.694*	0.676	3.611***	M < NM
H13b: PV → Loy	0.561	5.627***	0.232	2.605*	M > NM

a: "M" indicates member group.

b: "NM" indicates nonmember group.

\*p &lt; 0.05, \*\*\* p &lt; 0.001.

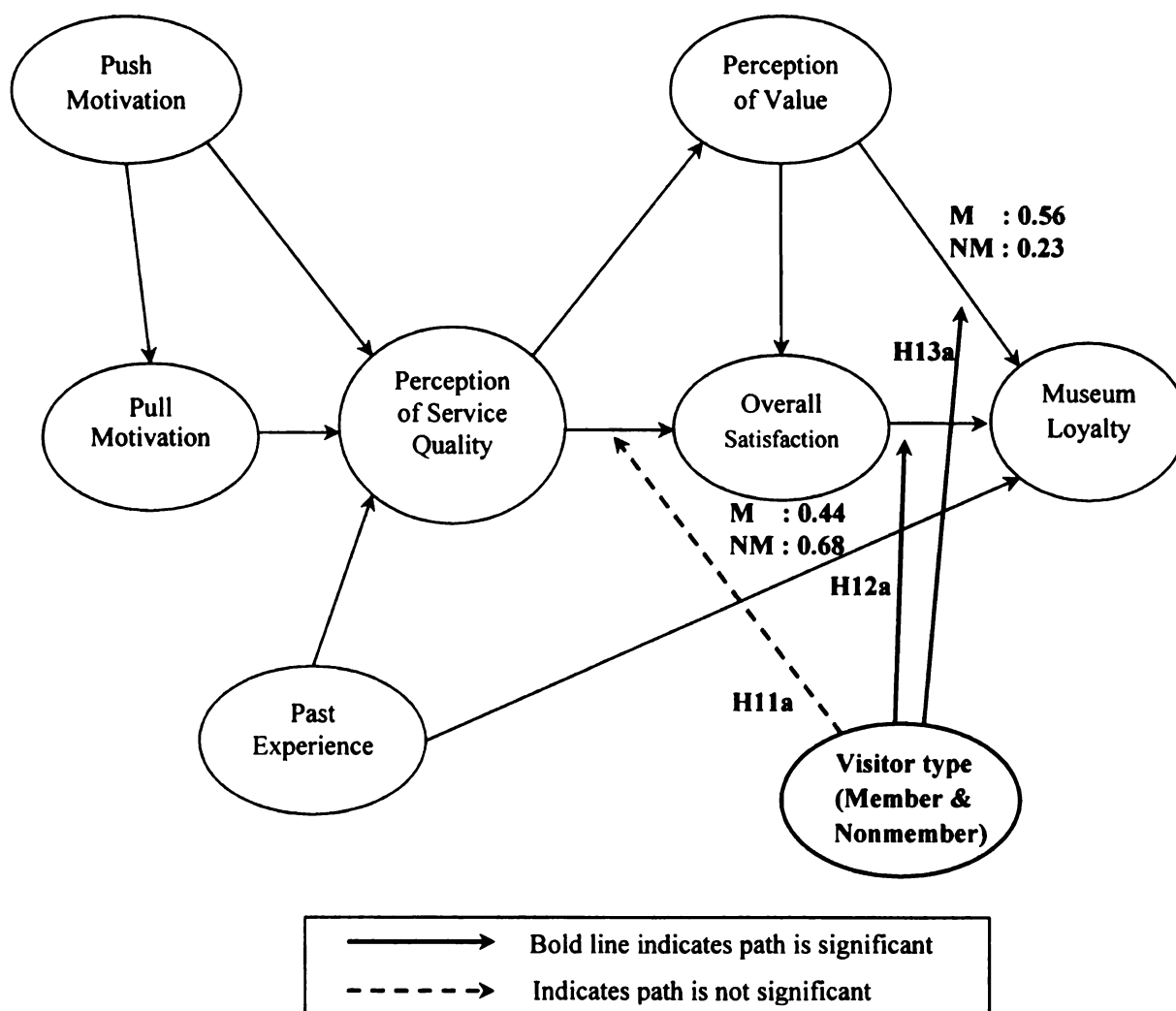


Figure 12. Results of the moderating effects with the hypotheses (H11a–H13a)

### ***Moderating Effect of Visitor Type (Adult and Discount Ticket)***

This study used another visitor characteristic—ticket type—as a moderator of three paths (perception of service quality-overall satisfaction, overall satisfaction-museum loyalty, and perception of value-museum loyalty) in the structural model. In this study, visitors who purchased different tickets were split into two subgroups: those buying full-priced adult tickets for those who are Taiwanese citizens, aged 20 to 64 years old, with a sample size of 289; and those buying discount tickets for students who are Taiwanese citizens, aged 20 years or more, and government employees, with a sample size of 122.

Similar to that used in analyzing the moderating effect of member and nonmember model, a three-step approach was used to test the moderating effect of ticket type. First, the chi-square difference was performed to test the difference between the unconstrained and constrained models. Table 52 shows that the  $\chi^2$  values of the unconstrained and the constrained models were 2415.24 (df = 1300) and 2482.50 (df = 1341), respectively. The difference between the two  $\chi^2$  values was 67.26 with 41 degrees of freedom, which was statistically significant at the level of  $\alpha = 0.01$  ( $p < .01$ ), indicating that visitor type had a moderating effect on the structural model.

**Table 52**  
**Results of the Moderating Effects of Visitor Type (Adult and Discount Ticket)**

	<b>Unconstrained model</b>	<b>Constrained model</b>	<b><math>\chi^2</math> difference</b>	<b>Moderating effect</b>
$\chi^2$ (df)	$\chi^2 = 2415.24$ (df = 1300)	$\chi^2 = 2482.50$ (df = 1341)	67.26 (df = 41) $p = 0.006^{**}$	Supported

Note.  $\chi^2$  (df = 41) = 56.94 at  $\alpha = 0.05$ .

$^{**}p < 0.01$ .

Next, the chi-square difference was performed again to test for the moderating effects on three hypothesized paths of PSQ  $\rightarrow$  Sat, Sat  $\rightarrow$  Loy, and PV  $\rightarrow$  Loy. Table 53 indicates that the effect of ticket type on the causal relationship between PSQ and Sat was not significantly different between the member group and nonmember group,  $\Delta\chi^2(1) = 6.14$ ,  $p < 0.001$ .

Table 53  
Chi-Square Difference Test Results for Moderating Effects of Ticket Type

Hypothesized moderated path	Unconstrained model	Partial constrained model	$\chi^2$ difference	Moderating effect
H11b: PSQ $\rightarrow$ Sat	$\chi^2 = 2415.24$ (df = 1300)	$\chi^2 = 2421.38$ (df = 1301)	$\Delta\chi^2 = 6.14$ (df = 1) $p = 0.013^*$	Supported
H12b: Sat $\rightarrow$ Loy	$\chi^2 = 2415.24$ (df = 1300)	$\chi^2 = 2415.90$ (df = 1301)	$\Delta\chi^2 = 0.66$ (df = 1) $p = 0.417$	Not Supported
H13b: PV $\rightarrow$ Loy	$\chi^2 = 2415.24$ (df = 1300)	$\chi^2 = 2415.78$ (df = 1301)	$\Delta\chi^2 = 0.54$ (df = 1) $p = 0.463$	Not Supported

Note.  $\chi^2$  (df = 1) = 3.84 at  $\alpha = 0.05$ .

\* $p < 0.05$ .

As a result, *hypothesis 11b: Visitor type (adult and discount ticket) moderates the effect of museum visitors' perceptions of service quality on the overall satisfaction with the quality of museum service at the post-visit stag* was supported. Further, the effect of visitor type in terms of the possession of NMNS membership on the causal relationship between overall satisfaction (Sat) and museum loyalty (Loy) was significantly different between the member group and nonmember group, with  $\Delta\chi^2(1) = 0.66$ ,  $p > 0.05$ .

*Hypothesis12b: Visitor type (adult and discount ticket) moderates the effect of museum visitors' overall satisfaction with the quality of museum service on their intentions to return, to recommend visiting to others, and to renew or gain membership in the future* was not supported. Next, this study found that the moderating effect of visitor type (member and nonmember) on the relationships between perception of value (PV) and museum loyalty (Loy) was significantly different between two groups, with  $\Delta\chi^2(1) = 0.54$ ,  $p > 0.05$ . *Hypothesis13b: Visitor type (adult and discount ticket) moderates the effect of museum visitors' perceptions of value of their museum experiences on their intentions to return, to recommend visiting to others, and to renew or gain membership in the future* was not supported.

Last, Table 54 indicates that the effect of the perception of service quality on overall satisfaction was stronger in the adult ticket group ( $\beta = 0.42$ ,  $t = 4.07$ ,  $p < 0.001$ ) than in the discount ticket group ( $\beta = 0.30$ ,  $t = 3.08$ ,  $p < 0.01$ ). The results of the three moderating effects are shown in Figure 13.

**Table 54**  
**Comparison Results of Path Coefficients and T-Value (Adult and Discount Ticket)**

<b>Hypothesized moderated path</b>	<b>Adult ticket</b>		<b>Discount ticket</b>		<b>Comparison (A<sup>a</sup>, D<sup>b</sup>)</b>
	<b>Path coefficient</b>	<b>t-value</b>	<b>Path coefficient</b>	<b>t-value</b>	
<b>H11a: PSQ → Sat</b>	<b>0.421</b>	<b>4.066***</b>	<b>0.303</b>	<b>3.081**</b>	<b>A &gt; D</b>
H12a: Sat → Loy	0.536	3.073**	0.438	1.315	A = D
H13a: PV → Loy	0.364	1.708**	0.184	1.153	A = D

a: "A" indicates adult ticket group.

b: "D" indicates discount ticket group.

\*\* $p < 0.01$ , \*\*\*  $p < 0.001$ .



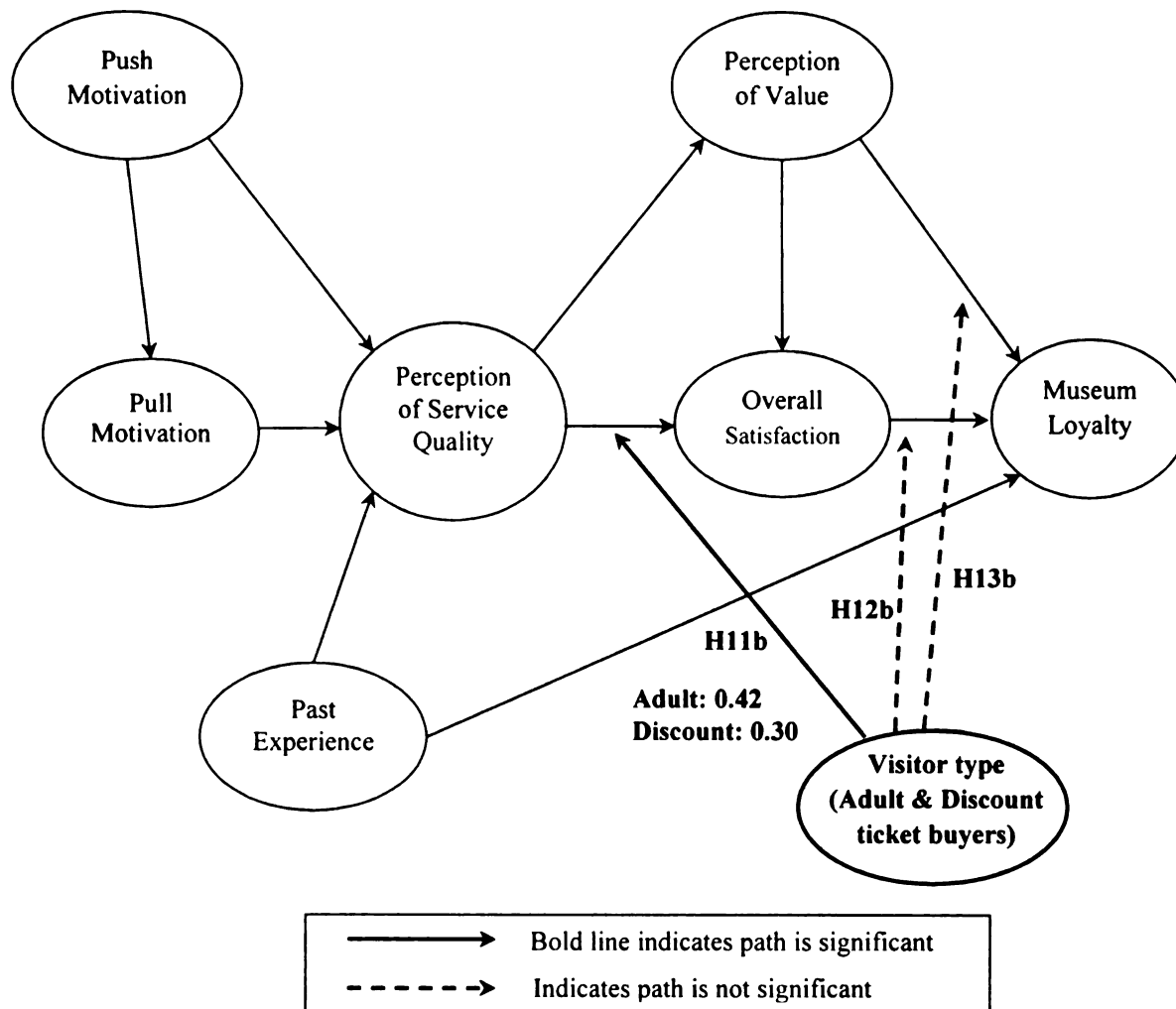


Figure 13. Results of the moderating effects with the hypotheses (H11b–H13b)

### ***Moderating Effect of Length of Stay***

This study examined the moderating effects of visitors' length of stay on three hypothesized paths (PSQ → Sat, Sat → Loy, and PV → Loy). Visitors were split into two groups based on median length of stay, which was 1.5 hour: short stay visitors (those who stayed from 0.6 hour to less than 1.5 hours in the NMNS museum) and long stay visitors (those who stayed from 1.5 hours to less than 5.2 hours).

The same three procedures as for the above two moderating effects were manipulated to examine the moderating effect of membership. Table 55 shows that the difference between the  $\chi^2$  values of the unconstrained model (2338.35, df = 1300) and the constrained models (2402.29, df = 1341) was 63.94 with 41 degrees of freedom, which was statistically significant at the level of  $\alpha = 0.05$  ( $p < .05$ ), demonstrating a moderating effect of visitors' length of stay between two groups.

Table 55  
Results of the Moderating Effects of Length of Stay

	Unconstrained model	Partial constrained model	$\chi^2$ difference	Moderating effect
$\chi^2$ (df)	$\chi^2 = 2338.35$ (df = 1300)	$\chi^2 = 2402.29$ (df = 1341)	63.94 (df = 41) $p = 0.012^*$	Supported

Note.  $\chi^2$  (df = 41) = 56.94 at  $\alpha = 0.05$ .

\* $p < 0.05$ .

Table 56 showed the test results of the chi-square difference for the moderating effects on three paths. The moderating effect of length of stay on the path of PSQ  $\rightarrow$  Sat was significant ( $\Delta\chi^2(1) = 3.93$ ,  $p < 0.05$ ) between the short and long stay groups, supporting *hypothesis 14: The length of visitors' stay in museums moderates the effect of museum visitors' perceptions of service quality on the overall satisfaction with the quality of museum service at the post-visit stage in which the relationship is likely to be positively stronger for visitors' lengthy stays in the museum than for shorter stays.*

Table 56  
Chi-Square Difference Test Results for Moderating Effects of Length of Stay

Hypothesized moderated path	Unconstrained model	Partial constrained model	$\chi^2$ difference	Moderating effect
H14: PSQ $\rightarrow$ Sat	$\chi^2 = 2338.35$ (df = 1300)	$\chi^2 = 2342.21$ (df = 1301)	$\Delta\chi^2 = 3.93$ (df = 1) p = 0.0474*	Supported
H15: Sat $\rightarrow$ Loy	$\chi^2 = 2338.35$ (df = 1300)	$\chi^2 = 2339.36$ (df = 1301)	$\Delta\chi^2 = 1.01$ (df = 1) p = 0.315	Not Supported
H16: PV $\rightarrow$ Loy	$\chi^2 = 2338.35$ (df = 1300)	$\chi^2 = 2342.93$ (df = 1301)	$\Delta\chi^2 = 4.58$ (df = 1) p = 0.032*	Supported

Note.  $\chi^2$  (df = 1) = 3.84 at  $\alpha = 0.05$ .

\*p < 0.05.

On the other hand, *hypothesis 15: The length of visitors' stay in museums moderates the effect of museum visitors' overall satisfaction with quality of museum service on their intentions to return, to recommend visiting to others, and to renew or gain membership in the future in which the relationship is likely to be positively stronger for visitors' lengthy stays in the museum than for shorter stays* was not supported, with  $\Delta\chi^2(1) = 1.01$ ,  $p > 0.05$ . As for the moderating effect of length of stay on the path of PV  $\rightarrow$  Loy, the  $\chi^2$  statistic ( $\Delta\chi^2(1) = 4.58$ ,  $< 0.05$ ) was significant and supported *hypothesis 16: The length of visitors' stay in museums moderates the effect of museum visitors' perceptions of value of their museum experiences on their intentions to return, to recommend visiting to others, and to renew or gain membership in the future in which the relationship is likely to be positively stronger for visitors' lengthy stays in the museum than for shorter stays*.

Finally, this study found that the effect of the perception of service quality on

overall satisfaction was stronger in the long stay group ( $\beta = 0.46$ ,  $t = 5.24$ ,  $p < 0.001$ ) than short stay group ( $\beta = 0.23$ ,  $t = 1.86$ ,  $p < 0.05$ ), as presented in Table 57. Moreover, the effect of the perception of value on museum loyalty was stronger in the long stay group ( $\beta = 0.36$ ,  $t = 2.34$ ,  $p < 0.05$ ) than its effect in the short stay group ( $\beta = 0.19$ ,  $t = 2.84$ ,  $p < 0.05$ ). Finally, the results of the three moderating effects in terms of the length of stay are shown in Figure 14.

Table 57  
Comparison Results of Path Coefficients and T-Value (Short and Long Stay)

Hypothesized moderated path	Short stay		Long stay		Comparison (S <sup>a</sup> , L <sup>b</sup> )
	Path coefficient	t-value	Path coefficient	t-value	
<b>H14: PSQ → Sat</b>	<b>0.229</b>	<b>2.018*</b>	<b>0.448</b>	<b>5.239***</b>	<b>S &lt; L</b>
H15: Sat → Loy	0.574	1.466	0.463	2.699**	S = L
<b>H16: PV → Loy</b>	<b>0.187</b>	<b>2.836*</b>	<b>0.359</b>	<b>2.344*</b>	<b>S &lt; L</b>

a: "S" indicates short stay group.

b: "L" indicates long stay group.

\* $p < 0.05$ , \*\* $p < 0.01$ , \*\*\*  $p < 0.001$ .

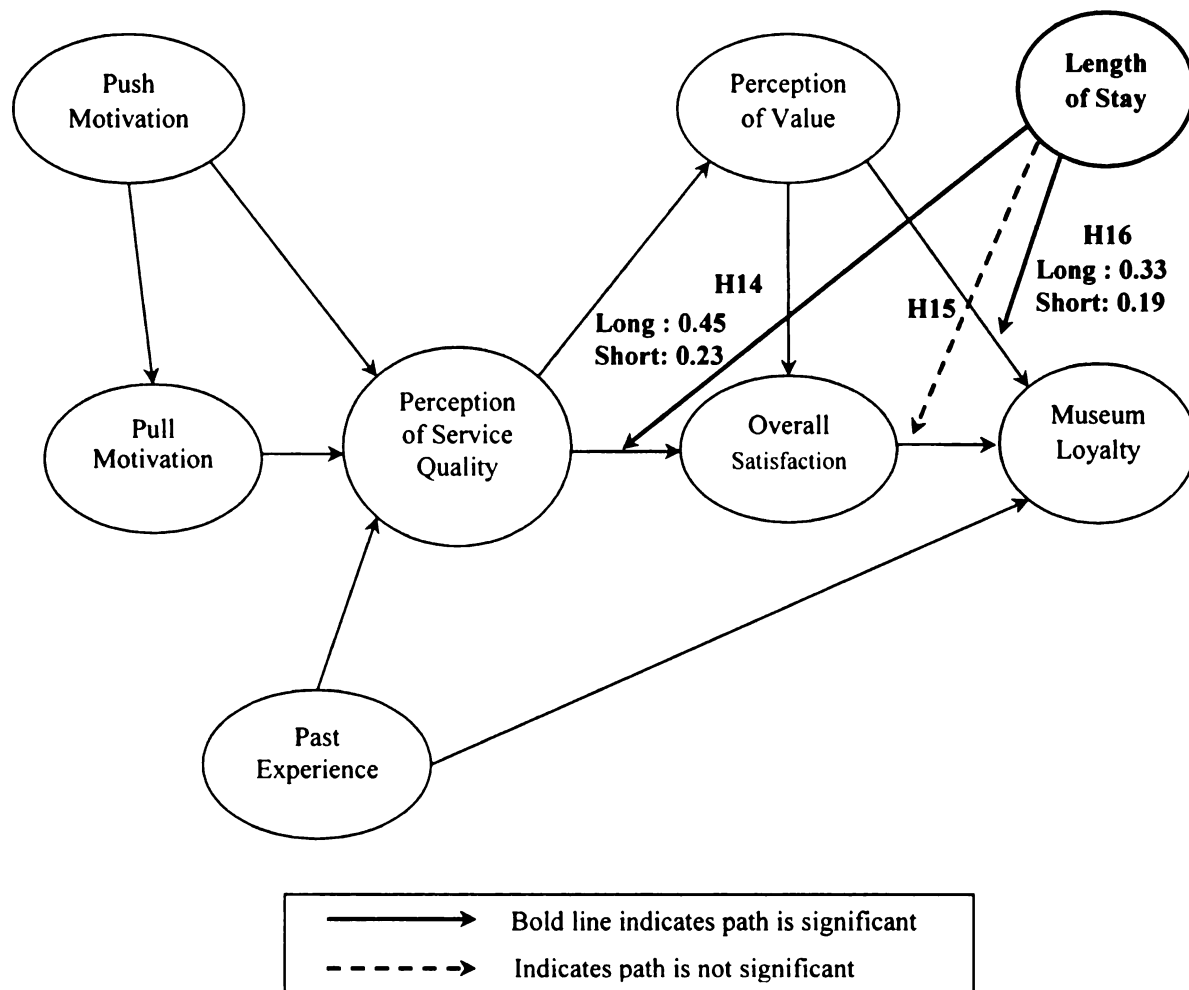


Figure 14. Results of the moderating effects with hypotheses (H14–H16)

## **CHAPTER 5**

### **DISCUSSION AND CONCLUSIONS**

#### **Summary of the Study**

This study theoretically developed and empirically tested a structural model of museum visitor behavior, based on visitors' overall needs, beliefs, perspectives, experiences, values and intentions. The educational and cultural interests of museum visitors, the exhibits they visited, the activities in which they participated, and their interactions with museum collections and interpreters play important roles in museums' long-term sustainability. Thus, visitors' motivations, perceptions, attitudes and behaviors regarding their museum visit experiences were the sources of information for testing the proposed model and hypotheses in this study. The core principle that guided this study was that understanding museum visitors' needs well, and making sufficient provisions for them through the museum's services, were key determinants for increasing visitors' revisit intentions and assuring the museum's continued operation and success.

The first purpose of the study, which was to integrate and test a museum tourist's dynamic behavior, was achieved by successfully integrating two theories (i.e., push and pull motivation theory, destination loyalty theory) and two models (i.e., recreational behavior model, service quality model) into a comprehensive research model of museum visitor behavior across three temporal stages, and by favorably identifying the significant interrelationships among the constructs studied—particularly the antecedents and consequences of MUSEQUAL—as well as the determinants of museum loyalty. The second purpose of this study, which was to assess the moderating effects of important

socio-demographic and travel behavior variables on the hypothesized relationships in the structural model, was partially fulfilled by empirically recognizing that there were five significant (out of nine, total) moderating effects of visitor type (i.e., adult and discount ticket buyer, member and nonmember) and length of stay (i.e., lengthy and short stay) on three paths (i.e., perception of service quality-satisfaction, satisfaction-loyalty, perception of value-loyalty).

Nineteen proposed research hypotheses were addressed in this study, and the principle findings—supported by the data through a series of analyses—suggested that: 1) pull motivation, perception of service quality, perception of value and overall satisfaction played concurrent positive roles in determining museum visitors' loyalty, according to the total path effects (see Table 47, p.172); 2) the visitor type by membership status ("member" and "nonmember") demonstrated moderating effects on the relationships between overall satisfaction and museum loyalty, and between perception of value and museum loyalty; 3) the visitor type by ticket type ("adult ticket" and "discount ticket" buyers) showed a moderating effect on the relationship between perception of service quality and overall satisfaction; and 4) length of stay supported a moderating effect on the relationship between perception of service quality and overall satisfaction. The primary research question for this study was to investigate whether the National Museum of Natural Science in Taiwan delivered the appropriate quality of service to both member and non-members visitors to match their needs and desires, which in turn established their loyalty. The answers obtained for the research question were "yes," in terms of a number of statistically significant findings.

The main focus of this final chapter is to present a summary and discussion of key findings, drawn from the results in Chapter Four. Moreover, this chapter provides theoretical implications for the literature on visitor behavior and museum service quality, and managerial implications for museum staff, researchers and practitioners. Finally, the limitations of the study, along with corresponding recommendations for future research on museum visitors' behavior, are discussed.

### **Summary and Discussion of Key Findings**

This section presents several significant findings and compares them to prior studies, including: 1) characteristics of NMNS visitors; 2) validation of the measurement model; 3) antecedents and consequences of research variables; and 4) significance of moderating effects.

#### ***Characteristics of NMNS Visitors***

With the full support of NMNS supervisors and staff, the researchers represented the NMNS and provided each respondent with one incentive (a museum souvenir) to achieve a high response rate, 83.9%, and collect a sufficient number of responses,  $n = 512$ . Additionally, NMNS staff has continuously supported this study, from sampling to the data analysis, and has provided updated information on visitor statistics so as to allow for a precise analysis of representative respondent for the entire museum population during the survey period.



The profile of NMNS visitors shows that, overall, the visitors were of average age<sup>7</sup> (30-39 years) and income<sup>8</sup> (NT \$30,000-39,999) for the overall Taiwanese population, married (approximately 60%), and well educated (approximately 90% completed college or more); aside from age, this finding was consistent with prior museum studies (Bourdieu, 1991; Burton & Scott, 2003; Colbert, 2002; Falk, 1998; Harrison & Shaw, 2004; Kawashima, 1998; Yucelt, 2000). Museums of different types or attributes attract different age groups (e.g., historical museums attract older people). The above findings imply that the attributes of a natural science museum, such as NMNS, attract visitors who tend to have an average income and age, be married, and be highly educated.

Nearly half (46.7%) of all respondents were local residents living in Taichung City/County (see Table 21, p. 123). Of the 239 residents, 101 were members of the NMNS and had visited the NMNS often in the course of the year. Consistent with Harrison and Shaw (2004), these data emphasized the importance of appealing to both residents and non-residents for the future of a museum. The results also supported previous studies (Chen and Lu, 2006; Chiang, 2002; Huang et al., 1999; Lu, 2003; NPM, 2007), indicating that local residents are the main source of visitors and repeat visitors, due to the significant influences of distance and expense involved in travel, when choosing to visit museums (Black, 2005; Jurowski & Gursoy, 2004).

#### ***Validation of the Measurement Model***

This study used a pre-test (n = 12) of Taiwanese graduate students at MSU, who

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<sup>7</sup> The average age of all Taiwanese in 2009 was 37.42 (Taiwan National Statistics, 2010)

<sup>8</sup> The average monthly regular earning of employees (2005-2009) was approximately NT \$36,000 (Accounting and Statistics, 2010)

completed both the English and Chinese instruments, and a pilot study ( $n = 389$ ) to ensure the measurement scales (and items) were reliable and valid, so as to be appropriate for use in the formal study ( $n = 512$ ). The study results demonstrated that both the pre-test and the pilot study were important steps in developing robust measurement scales that were likely to be supported in a confirmatory factor analysis, and in advancing theory and model in the context of museums.

Twenty observed variables were eliminated, including two variables during item analysis and eighteen variables through the measurement modification stage. Thirty-eight observed variables were further analyzed using confirmatory factor analysis (CFA), path analysis and multiple group analysis. In the first stage of the measurement model, several competing models were tested to find the optimal model. For example, the results of the CFA with five first-order constructs of museum service quality demonstrated a poor fit. This was also confirmed in the structural model stage, in which most of the effects of the relationships between each of the five service-quality constructs were not significant when they were placed as an individual first-order constructs. After making modifications, a second-order five-factor construct structure—which consisted of tangibility, responsiveness, empathy, communication, and consumables—was empirically supported by the collected data. All five of the second-order constructs were verified to be separate but related factors by examining their discriminant validity.

Last, the final modified measurement model, consisting of all first and second order constructs, was found to fit the data well. The results of a series of examinations of the

convergence validity and discriminant validity indicated that the final modified measurement model possessed construct validity and reliability.

### ***Antecedents and Consequences of the Research Variables***

Significant findings among ten of the research hypotheses of cause-effect associations supported the hypothesized structural relationships among “push and pull motivations,” “perceptions of service quality,” “past experience,” “satisfaction,” “perception of value,” and “loyalty.” However, even though ten hypotheses were supported and the research model was fitted at an acceptable level in terms of goodness-of fit tests using the collected data, some gaps and weaknesses were still identified, for instance, the direction of causation in the second hypothesis (H2) and the magnitude of the path coefficient in the sixth hypothesis (H6).

### **Antecedents and Consequences of MUSEQUAL**

The findings showed that museum visitors agreed that both push and pull motivations influenced their perceptions of museum service quality, which was comprised of seventeen items residing in five constructs. Museum visitors rated their experiences with the five constructs from high to low. Two findings are discussed below: the relationships between push motivations and perceptions of service quality, and between pull motivations and perceptions of service quality.

The first findings showed that museum visitors’ push motivations had a negative effect on their perceptions of museum service quality (path coefficient =  $-0.24$ ), indicating that the higher visitors’ push motivations, the lower the level of perception of museum service quality. It seems that visitors with strong internal motivations did not agree strongly that the quality of museum services matched their internal needs. Based

on the visitors' perspectives, the average performance of museum service quality was lower than their average expected desire. The findings can be interpreted in different ways, on the basis of the test results. For instance, museum visitors who wanted to spend quality time with family and relax in the museum might feel that the facilities for children were insufficient. Or visitors who would like to enjoy exhibits in different settings might find that the exhibits and collections were not as abundant or diverse as they expected. Another explanation is that visitors who wanted to expand their knowledge and enjoy new experiences might find that there were few things they could learn or that caught their interests. However, despite the significant effect of push motivations on the perception of service quality, the total effect of push motivations on the outcome variable, museum loyalty, is extremely poor (0.057, see Table 47, p. 172). The poor total effect implies that push motivations were not very relevant in determining their intentions to return, to recommend visiting to others, and to renew or gain a NMNS membership.

Although there are a few studies available in this context, most of those have investigated the effects of push motivation on the expectations of service quality or satisfaction with service quality (expectation score–perception score), rather than the perceptions of service quality. In only one case in the tourism literature (Shen & Tseng, 2006), was push motivations studied in relation to perception of service quality; the findings were inconsistent with the results of the present study in which museum visitors who were strongly motivated to seek internal benefits from visiting NMNS, such as “to spend quality time with family or friends,” “to enjoy exhibits in different settings,” “to relax,” etc., conferred a low perception rating on the services offered.

The second finding showed that pull motivations had a positive effect on perceptions of service quality, demonstrating that the stronger the pull motivations the visitors have for visiting a museum, the higher the level of their perceptions of the museum's service quality. In other words, the average performance of museum service matched or exceeded visitors' expectations, based on the destination's attributes. This finding supported that the visitors' interests in the museum's attributes before a visit can positively influence their perceptions of museum service quality during or after a visit. This could be interpreted as museum visitors who wish to see new exhibits in a comfortable and safe museum might feel satisfied with the exhibit themes in a well-maintained environment. Another explanation is that visitors who preferred enjoyable facilities and/or activities, or who wanted to attend special events, might feel satisfied with those experiences the museums provide for them because of a consistency between their expected activities and museum service offered. In contrast to the push motivations, the total effect of pull motivation on the outcome variable—museum loyalty—was moderate (0.327, see Table 47, p. 172), pointing out that that pull motivations were the primary reasons for why visitors revisited NMNS, recommended visiting to others, and renewed or gained membership. Consistent with the study conducted by Shen and Tseng (2006), museum visitors who were strongly motivated to seek the external sources or benefits provided by a museum, such as “to see new exhibits,” “because museum is safe and secure,” “because museum has a comfortable environment,” etc., gave a high perception rating to the quality of services offered by NMNS.

To conclude this section, two especially interesting findings identified in this study were: push motivation differed from pull motivation in relation to perceptions of service quality in terms of direction of causation; and pull motivation (external sources) had a greater effect than the push motivation (internal sources) on the total effect of museum loyalty. These findings contribute to the literature on applying the effect of push and pull motivations on perceptions of service quality. Also, the findings provide different viewpoints for future research in this field on the relationship between push motivations and perceptions of service quality. To date, there have been no published studies of applying the effect of push and pull motivations on the perceptions of service quality (SERVPERF) in the museum context, according to the extant literature.

With regard to perception of value as the consequence of perception of service quality in the structural model, the findings showed that visitors' perceptions of museum service quality yielded a positive effect on visitors' perceptions of value, consistent with previous studies (Chen, 2008; Chen & Tsai, 2007; Chen & Tsai, 2008; Chen & Chen, 2010; Choi & Chou, 2001; Lai, Hutchinson, Li, Bai, 2007; Cronin, Brady, & Hult, 2000; Oh, 1999; Petrick, 2004; Petrick & Beckman, 2002; Tam, 2004; Zeithaml, 1988). In particular, the magnitude of the positive effect of perceptions of service quality on perception of value was the strongest effect in the structural model. This indicated that the amount the museum visitors paid for their visits was rewarded with valuable exhibits, helpful activities, and useful services by NMNS.

#### Antecedents of Museum Loyalty

First, this study found that museum visitors' past experiences predicted a positive effect on the outcome variable (museum loyalty), with a path coefficient of 0.11,

demonstrating that past experience was an antecedent of museum loyalty. This finding was also consistent with prior studies (Bramwell, 1998; Gomez-Jacinto, Martin-Garcia, & Bertiche-Haud' Huyze, 1999; Huang & Hsu, 2009; Oppermann, 2000; Petrick et al., 2001; Postma & Jenkins, 1997; Sonmez & Graefe, 1998).

Next, the findings indicated that the largest total effect on the outcome variable (museum loyalty) was the perception of value (total effect = 0.56), which means perception of value was the most influential determinant of museum loyalty. Museum visitors perceived good value from reasonable entrance fees, worthwhile exhibits, helpful activities and useful services, then displayed their loyalty through their intentions to revisit, join as a member and recommend the museum to others. The findings supported the idea that perception of value was a better predictor of destination loyalty than other constructs, which was consistent with earlier studies (Chang & Wildt, 1994; Cronin, Brady, Brand, Hightower, & Shemwell, 1997; Dodds et al., 1991; McDougall & Levesque, 2000; Oh, 2000; Parasuraman, 1997; Tam, 2000; Petrick & Beckman, 2002; Reicheld, 1996).

In addition, the findings that push and pull motivations, and overall satisfaction were antecedents of museum loyalty, were consistent with previously mentioned studies (Chen & Chen, 2010; Chen & Tsai, 2008; Petrick, 2004; Shen & Tseng, 2006; Wu, Huan, & Chiu, 2004; Yoon & Uysal, 2005).

To conclude, this study demonstrated that, except for push motivation, the five antecedents considered (pull motivation, past experiences, perception of service quality, perception of value, overall satisfaction) were key determinants of the outcome variable, museum loyalty, in a positive causation, with a fair total magnitude of direct and indirect

effects in the structural model. In particular, perception of value, perception of service quality and overall satisfaction were good predictors of intentions to revisit, to recommend visiting to others, and to renew or purchase a membership.

### ***Significance of the Moderating Effects***

With a suitable sample size (N= 512), this study enabled separate analyses across different groups, representing visitor type and length of stay. This study further explored the moderating role of visitor type and length of stay on three relationships. Five of nine hypotheses, which examined the moderating effect of visitor type (i.e., adult and discount ticket buyer, member and nonmember) and length of stay on the relationships, were significant in this study. Consistent with the prior studies mentioned earlier, the findings showed that visitor type and length of stay had significant moderating effects between perceptions of service quality and overall satisfaction, and between perceptions of value and loyalty (Chen & Tsai, 2008; Evanschitzky & Wunderlich, 2006; Harrison & Shaw, 2004; Matzler et al., 2008; Matzler et al., 2005; Matzler et al., 2006; Kozak, 2001; Wang & Wu, 2009; Wu, DeSarbo, Chen, & Fu, 2006).

### **Theoretical Implications**

Travel and tourism literature has paid a great deal of attention to important variables related to tourist behavior. Very few works, however, have proposed and supported the idea that a causal relationship exists concurrently among these seven studied constructs across three temporal phases. Several significant findings identified from this study have potential theoretical implications for future researchers who study tourist behavior integrating or using the recreational behavior model, push and pull motivation theory,



museum service quality (MUSEQUAL) using SERVPERF, and the destination loyalty theory. Theoretical implications and potential interpretations drawn from these significant findings are provided below.

First, this study adapted Clawson and Knestch's (1966) recreational behavior model as a temporal framework for examining visitors' needs, experiences and behavioral intentions in a museum context. With this holistic and systematic approach, this study utilized pre-visit, on-site, post-visit, and future intention phases to investigate important factors that happen concurrently in the museum tourist behavior process by using a two-stage survey (before and after visit). The significant results of the research constructs, at three different stages, contribute to the theoretical evidence of this model by viewing visitors' travel or visit behavior to museums, over time. Specifically, it would be useful for future researchers or academicians to increase their knowledge about overall visitor behavior in a museum context, in terms of temporal modes and changes.

Second, push and pull motivation theory (Dann, 1977) was used in this study as a theoretical basis for determining the decision-making process people use in choosing to visit a museum. This study identified five push and six pull motivations of visitors as the primary driving forces in choosing to visit a museum. As the findings in this study indicated, push motivations had a positive effect on pull motivations. Specifically, five push motivations linked to visitors' social-psychological characteristics encouraged those visitors to visit museums, including (from the highest and lowest levels of agreement): "to spend quality time with family or friends," "to enjoy exhibits in different settings," "to relax," "to expand knowledge," and "to enjoy new experiences." These five important push motivations positively influenced the pull motivation construct,

which consisted of six pull motivations linked to attractive characteristics of the museum itself, including “to see new exhibits,” “because museum is safe and secure,” “because museum has comfortable environment,” “to attend special events,” “because museum has enjoyable activities,” and “because museum has enjoyable facilities.”

The positive relationship between push and pull motivations could be explained by the idea that most of those museum visitors who preferred spending quality time with their companions (e.g., family or friends), and to have mental and physical relaxation, were likely to visit a comfortable and safe museum that provided enjoyable facilities. Another potential explanation for the relationship seen here is that visitors who preferred enjoying various exhibits in order to expand their knowledge and experiences were likely to decide on a particular museum to see new exhibits, attend special events, and participate in enjoyable activities provided by a museum. This finding, that push motivations positively affected pull motivations, was consistent with prior studies (Kim, 2008; Kim & Lee, 2002; Uysal & Jurowski, 1994), indicating theoretical evidence for push and pull motivation theory.

Third, this study utilized the Service Quality Model (Parasuraman, et al., 1988) and SERVPERF (Cronin & Taylor, 1992) as the basis for developing the measurement scales of service quality in a museum context, named MUSEQUAL, for the central portion of this study. This study identified and validated the nature of the multidimensionality of museum service quality (MUSEQUAL), indicating that the existence of a second-order five construct model within the research model. Supported by empirical evidence, five sub-dimensions, which were labeled as tangibility, responsiveness, empathy communication, and consumables, were referred to as the five first-order constructs.

In addition, assessing a service quality scale requires examining the model's component structure, which comprises the associations between overall service quality (i.e., dimension) and the five sub-dimensions. This was confirmed in this study—the sub-dimensions were highly correlated within the dimensions—demonstrating five constructs pertaining to the construct of perception of service quality. Next, the finding that MUSEQUAL, with five sub-dimensional constructs, was appropriate for measuring service quality in a museum context, provided the theoretical evidence for the application of the service quality model and SERVPERF in this study, consistent with prior studies (Bagozzi & Dholakia, 2006; Bauer, Falk, & Hammerschmidt, 2006; Dholakia, & Bagozzi, 2004; Kaul, 2007; Parasuraman, Zeithaml, & Malhotra, 2005; Park, & Baek, 2007; Raajpoot, 2004; Ramsden, 1991). Additionally, the findings revealed that museum service quality, using SERVPERF, can serve as a principal construct for mediating the relationships between these identified antecedents (push and pull motivations, past experience) and consequences (perception of value and overall satisfaction), and the outcome variable (museum loyalty). Based on above findings, this study provides supporting evidence for the use of the theoretical modeling of SERVPERF.

Finally, destination loyalty theory (Baker & Crompton, 2000; Bitner, 1990; Dick & Basu, 1994) was employed in this study to predict visitors' intentions to return, to recommend visiting the museum to others, and to renew or purchase a membership in the future, based on their level of satisfaction with the quality of museum service. This study supported the idea that pull motivations, past experiences, perceptions of service quality, perceptions of value, service quality, and satisfaction were good predictors of the

outcome variable (customer loyalty), consistent with other studies (Baker & Crompton, 2000; Davidow, 2003; Kozak, 2001; Oliver, 1999; Oppermann, 2000; Yuksel, 2001). Nevertheless, this study did not support that push motivations were a predictor of museum loyalty. In addition to the significant effect of overall satisfaction on museum loyalty, the findings also provided strong evidence of respondents' profiles to support destination loyalty theory in terms of revisit frequency and WOM recommendation, including: a high revisit frequency (twice or more per year) among revisit visitors (approximately fifty percent) or members (approximately ninety percent); word-of-mouth as a primary information source among first-time visitors (approximately sixty percent) and revisit visitors (approximately forty percent).

In sum, this research study could be a pioneer in the study of developing and testing an integrated museum visitor behavior model, composed of the antecedents and the consequences of museum service quality, using SERVPERF across three temporal stages in a museum context, resulting in a number of statistically significant findings. Additionally, this is one of a few studies that have empirically investigated the moderating effect of visitor type and length of stay on the relationship between perceptions of service quality and overall satisfaction, perceptions of value and museum loyalty, and overall satisfaction and museum loyalty, in a museum context. The described theoretical implications identified in this study should contribute to reducing the gap in the literature.

### **Managerial Implications**

The test results of this study provide sufficient evidence for accepting significant causal relationships among seven constructs. Therefore, this study is capable of providing museum managers with appropriate practical recommendations drawn from the findings, as their guidance for understanding museum visitors' motivations, preferred museum services, values, satisfaction, and behavioral intentions in the future.

First, examining both visitors' push motivations (internal needs) and pull motivations (museum attributes) simultaneously can facilitate: an analysis of market demand for visiting museums in Taiwan; market segmentation of museum visitors; design, planning and promotion of museum exhibits, activities and events; and museum management and development of all of its important aspects. In this study, five main push motivations as well as six important pull motivations for visiting NMNS were extracted and identified through a series of assessments of confirmatory factor analysis, reliability, and validity. Museum managers and marketers should be aware of visitors' needs, wants and interests, as these can be fundamental factors for increasing visitors' satisfaction with a museum's service offerings. Based on the findings, they should pay special attention to people who visited the museum for: 1) personal needs and growth (i.e., "to relax," "to expand knowledge," and "to enjoy new experiences); 2) professional purposes (i.e., "to enjoy exhibits in different settings," "to see new exhibits," "to attend special events," and "because museum has enjoyable activities); and 3) an enjoyable gathering with family and friends ("to spend quality time with family or friends," "because museum is safe and secure," "because museum has comfortable environment," and "because museum has enjoyable facilities"). As a result, museum managers and

marketers can better understand the demands of their primary segments, so as to tailor existing museum products and services to their visitors, and then advertise these attributes to pull their visits. Museums are expected to accommodate visitors' expectations by matching visitors' internal push motivations with the museums' external attributes, which in turn reinforces the visitors' experiences, and builds visitor loyalty toward museums.

Second, this study found that the five sub-dimensional structures of MUSEQUAL were appropriate for measuring the service quality as experienced by NMNS visitors in Taiwan. Museum managers are able to identify service quality areas that require improvement using this five-dimension MUSEQUAL measurement scale, and are then able to track improvements in specific areas of service. In this study, four constructs with high scores in the perceptions of service quality were identified, including responsiveness, tangibility, communications, and empathy. The results can guide museum managers with regard to which aspects of service offerings should be highlighted to attract or maintain visitors. Consequently, NMNS managers should place importance on maintaining or improving these four aspects regarding the provision of museum service quality. The first aspect, responsiveness, was emphasized through the significance of the professional training and development programs attended by museum staff members, especially for "friendly with visitors," "willing to spend time helping visitors," "respond to visitors' requests promptly," and "professional, such as accessible, knowledgeable about the subjects." The second aspect, tangibility, was stressed by the importance of physical facilities and equipment, especially for "diverse exhibit themes," "well maintained exhibits," and "available parking lot." The third aspect, communication,

was highlighted by the necessity of the museum's providing understandable and sufficient information, especially for "understandable exhibit descriptions," "good communication skills by interpreters," "well-provided physical display of exhibits," and "clear directional signs." The fourth aspect, empathy, was emphasized by the importance of caring and individualized attention, especially for "needs of the disabled," "sufficient facilities for children," and "acceptable noise in the museum." On the other hand, the quality of consumables was identified as having the lowest score in the perceptions of museum service quality in MUSEQUAL. Museum managers should pay special attention to improving the quality of service offerings in this aspect, specifically for "efficient service provided by the restaurants," "diverse choice of sales items in shops," and "multiple choices of food/drink offered in the restaurants." Visitors who attempt to stay for several hours may need a quality dining experience and enjoyable shopping to reenergize themselves before continuing their visit in the museum. To monitor the effectiveness of service delivery and the improvement of service quality, as mentioned above, it is recommended that museum managers might conduct an evaluation of customer satisfaction on an annual or seasonal basis, using an online survey on the museum's website or an on-site survey inside the museum.

Third, another important practical implication drawn from the test results is that the role of museum membership positively increases the effect of the perceptions of value on museum loyalty. This study found that members and nonmembers had significantly different opinions about their experiences when visiting NMNS. The significance of this moderating effect highlights why NMNS managers need to pay special attention to the members group; members perceived a higher value (i.e., reasonable price, valuable

exhibits, helpful activities, and useful services) than other groups (adult and discount ticket buyers). In 1993, NMNS issued its first family member card as well as individual member card, named Dinosaur card, in 2002. This initiative, which was the first museum membership launched in Taiwan, has successfully attracted visitors to join and maintain NMNS memberships each year, achieving a total of 47,331 members (both Family and Dinosaur cards) and a high visit frequency (11.49 times for the Family card, 6 times for the Dinosaur card) to date (NMNS, 2008). However, the proportion (1.63%) of members (47,331<sup>9</sup> in 2008) to total visitors (2,904,557 in 2008) can be increased. Museum managers and promoters could consider expanding the membership through agreements that would encompass other museums at different sites, providing members with diverse choices to encourage membership purchases.

Fourth, the test results showed that the relationship between perceptions of museum service quality and satisfaction was stronger for visitors who stayed at the museum longer than for those whose stay was shorter. The relationship between perceptions of the value of the museum experience and museum loyalty was also stronger for “long-stay” visitors than for “short-stay” visitors. These findings were deemed true because visitors who remain in a large-scale museum such as NMNS for a longer period may spend additional time resting, rejuvenating, and engaging in exhibits and activities they enjoy than those who only stay for a short visit, as supported by Neal et al. (2007). Thus, long-stay visitors are prone to deriving more satisfaction from various aspects of service and to establishing museum-brand loyalty through the values they perceive from

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<sup>9</sup> This is taken from the “2008 Annual Report of National Museum of Natural Science.”



their experiences with exhibits, activities and services. Museum managers and marketers should meet the needs of long-stay visitors by providing well-chosen and high quality museum products and services, and provide incentives for short-stay visitors to extend their stay (e.g., a ticket package for visiting other areas in the museum), in an effort to increase the probability of their returning to the destination in the future. Other suggestions include the development of creative and enjoyable museum exhibits and activities (special exhibits and collections, events, interactive workshops) designed to cater to visitors' needs and encourage a lengthy stay.

Finally, public museums such as NMNS should also pay attention to non-visitors or potential visitors and spread social, cultural, and educational influences. There are still many people living in Taiwan, and other corners of the world, who rarely or never visit museums. One key factor explaining why non-visitors did not visit Taiwanese museums was a "lack of interest in visiting museum" (Lin, 2006). Other factors included "no time," "prefer to spend time on other activities," "do not usually think to visit such attractions," "can always go in the future," "attractions thought to be unreflective of personality," and "admission prices too expensive" (Prentice et al., 1997).

After realizing above interferences that prevent those non-visitors or potential visitors from visiting a museum, museum professionals should also try and identify what motivates these people to visit a museum by investigating their push and pull motivations. Subsequently, suitable advertising and promotions of exhibits and activities, which are geared toward these non-visitors or potential visitors by tailoring existing products and services, should be implemented. For instance, museum planners could design a tour package providing interesting, uplifting, and memorable activities to

address non-visitors or potential visitors who “prefer to spend time on other activities.” Another suggestion for museum managers would be to customize rewarding and worthwhile exhibits and activities, or encourage a purchase of economic tour package covering additional costs (i.e., parking fee, 3D movie ticket, lunch meal, souvenir at discount price) for those who feel that “admission prices are too expensive.” For repeat visitors, it is believed that maintaining their interest is the primary objective of most museums. Thus, the optimal strategy for a museum (e.g., NMNS) is to continuously improve the quality of the museum’s services, which would increase the likelihood of visitors and members having high satisfaction and/or loyalty spreading positive word-of-mouth recommendations about the museum. It would also promote the advantages of becoming a member of the museum, thus attracting new and returning visitors, and new members.

### **Study Limitations and Recommendations for Future Research**

This study has several limitations that need to be addressed, although the study makes several theoretical and managerial contributions to the field of museum visitor behavior and museum service quality. Accordingly, recommendations and suggestions are provided for future, related study in this field.

The first limitation concerns the scope and boundaries of this research, which only focused only on visitors to the National Museum of Natural Science in Taichung during a four-week period (June 16 to July 12), targeting paid-admissions and Taiwanese citizens aged 20 to 64 as a study population. The limitations of the museum type (natural science only), the time span (four weeks in the summer season), the geographical

location (Taichung in central Taiwan), and the visitor type (exclusion of visitors under 20 years and older than 64 years, as well as groups) may affect different test results relative to a broader population or other types of museums, in terms of the magnitude and direction of the relationships among the seven constructs studied. Visitors' characteristics, travel behavior and motives for visiting a museum may vary from site to site. In addition, people visiting different types of museums may have differing perceptions and attitudes toward service quality, regarding various exhibits and collections. Thus, it is recommended that future studies expand the time period, look at a different season(s), and include different kinds of participants. Future researchers may also wish to study visitors from a wider scope of cultural tourism services (e.g., galleries, aquariums, heritage sites, historical sites, performing arts or similar institutes).

The second limitation is the selection and adaptation of the constructs and their observed variables (indicators). In this study, most of the observed variables were selected based on the literature review and scholars' opinions. However, most of the literature relevant to motivations for visiting a museum did not provide evidence of either reliability or validity of the item measured. The majority of items (48 items) considered in three constructs (push motivations, pull motivations, and perception of service quality)—including nine push motivations, eleven pull motivations and twenty-eight museum service quality variables—were adapted from prior studies in a non-museum context or from museums having different attributes (e.g., heritage and historical sites focusing on the preservation of history, heritage and culture; museums of industry focusing on the development of technology and industry). Twenty items were eliminated (four push motivations, five pull motivations, and eleven service quality

variables) due to insufficient testing of the measurement scales in prior studies, with regard to museum motivations and service quality. This study achieved a better fit of the measurement model, in part, by deleting both low factor loading and high modification index items, and, in part, because not all of the selected items were relevant or important to museum visitors. In consequence, therefore, only 38 items (65 percent of the original 58 items) were refined and retained for assessing all of the constructs.

The third limitation is the adaptation of the museum service quality measurement scale (MUSEQUAL). Prior studies have debated whether or not an adaptation of a measurement scale on service quality can account for a contextual difference, in terms of the industry being studied and the region, given distinct social, cultural and environmental factors (Kaul, 2007). Consequently, even though the significant interrelationships between MUSEQUAL construct and its antecedents or consequences have been addressed in this study, the use of MUSEQUAL scale itself was restricted to the NMNS in Taiwan, restricting the extent to which these results can be applied to other museum contexts. Future researchers should pay attention to the selection or development of a well-established scale, the examination of a wider respondent base across other museums, and the assessment of the reliability and validity of the measurement items, particularly if they employ the constructs of MUSEQUAL developed in this study to other museums.

Another suggestion for future research is to use a qualitative approach (e.g., focus group) to understand and identify the important attributes or components of museum service quality, based on visitors' perspectives and open-ended comments, to generate scale items of content validity, with a means of providing detailed information regarding

specific perceptions of museum service. After items are identified, a quantitative approach could be used to validate the data as the second part of a study employing mixed methods. MUSEQUAL requires further refinement to be effectively generalized and applied to different types of museums—with a variety of settings (exhibits, collections, etc.) in other geographic locations, but with a similar large scale (e.g., the National Palace Museum in northern Taiwan and the National Science & Technology Museum in southern Taiwan)—to test the generalizability of this research model or make a comparison between NMNS and others, based on a need for improving service quality. Through this, MUSEQUAL can become an effective measurement scale for monitoring visitors' perceptions of service quality, regarding aspects of important services in the museum industry.

The fourth limitation is that this study identified a weak magnitude in the relationship between past experiences and museum loyalty, although the relationship was significant. One potential reason is that insufficient consideration was given to the consequential order of the temporal stage in developing this hypothesized path, based on limited identified results in the literature. More specifically, the construct of past experiences happened in the pre-visit phase, making it appropriate to be used as antecedent of the construct of perception of service quality. However, it was not appropriate to directly predict the effect of past experiences on museum loyalty in the future intention stage, without a mediator at the post-visit stage to unite past experiences at the pre-visit stage and museum loyalty at the future intention stage. The temporal sequence between past experiences and their consequences should be: pre-visit → post-visit, but should not be the current sequence: pre-visit → future intention.

This study demonstrated a weak path effect under the situation in which past experience skipped overall satisfaction or perceptions of value at the post-visit stage and proceeded directly to influence museum loyalty. A future study should investigate the effect of past experiences at the pre-visit phase on the visitors' overall satisfaction at the post-visit stage, in addition to the mediating effect of perceptions of service quality in the relationship between past experience and overall satisfaction.

The fifth limitation is that this study assessed the level of the visitors' overall satisfaction with a single item, in accordance with previous studies (Baloglu et al., 2003; Burns et al., 2003; Severt et al., 2007; Shen & Tseng, 2006; Shonk, 2006; Wu et al., 2004). Although the test results provided sufficient evidence to accept the interrelationships among the antecedents and consequences of overall satisfaction, the moderating effects of visitor type and length of stay on the three specific paths (quality-satisfaction, satisfaction- loyalty and value-loyalty) were not all significant. This may be because one single observed variable for one latent variable carries some amount of measurement error, resulting in biased estimates of direct effects (Kline, 2004). However, this study demonstrated that overall satisfaction with the perceptions of museum service, in conjunction with visitors' motivations and past experiences, played a significant role in predicting future intentions to return, recommending visiting to others and renewing or purchasing membership. Thus, future studies should replicate these results in different contexts to reduce the concern about using one observed variable to represent the construct of overall satisfaction, which is an aggregation of five constructs of museum service.

The sixth limitation is the selection of the moderator variable and its affected path between two constructs. This study utilized only two variables (i.e., visitor type and length of stay) to assess the moderating effects on three specific hypothesized paths (i.e.,  $PSQ \rightarrow Sat$ ,  $Sat \rightarrow Loy$ , and  $PV \rightarrow Loy$ ), based on a review of the literature. Future studies may select other potential moderator variables from socio-demographic characteristics and travel behavior other than these two variables, and investigate the moderating effects on other potential hypothesized paths, besides the three paths in this study. For instance, number of people accompanying a visitor could be used as a moderator variable, to see whether the relationship between push (pull) motivations and perceptions of service quality is likely to be positively stronger for large groups (with 4 or more accompanying visitors) in the museum than for small groups (with 3 or fewer accompanying visitors). In another example, the moderating effect of visit frequency could be manipulated to see whether the relationship between perceptions of values and museum loyalty is likely to be positively stronger for the high frequency group (visiting two or more times in one year) than for the low frequency group (visiting one time in two years ). Other potential moderator variables, such as residence (resident or nonresident), marital status (single vs. married) or educational level (completed college vs. completed senior high school or less) are suggested for assessment in future studies.

Finally, the above-mentioned suggestions can be regarded as a means of producing more valid and comprehensive results, if the future studies in a relevant field can consider the identified limitations or weaknesses found during the period in which a study was developed and conducted.

## **APPENDICES**



## **Appendix A: Consent Form for Survey**

### **MUSEUM VISITOR SURVEY INFORMATION AND CONSENT**

Dear Museum Visitor:

#### **Overview:**

I am a PhD student in Michigan State University's tourism program in the USA who is conducting a doctoral dissertation study about museum visitor experiences and how they affect your intention to visit again in the future. You are invited to participate in this study (all participants must be between 20 and 64 years of age). The purpose of this study is to understand the reasons you visit the museum, your level of satisfaction with facilities and services, the overall value of your visit relative to the money you spent during your visit, and your future intentions to revisit, recommend, and renew or become a member of the museum. Your experiences and comments are important for improving museum services and facilities to better serve visitors in the future.

#### **What the survey involves:**

The two-part survey takes approximately 20 minutes to complete, or about 10 minutes for each part. The first half of the questionnaire will be completed and returned to investigators before you visit the museum. You will take the second half of the questionnaire with you. After you have completed your museum visit, you will fill out the second part of the survey and return it to a designated place near the main exit as you leave. You should feel free to ask the two researchers any questions you may have.

#### **Incentive gift:**

If you complete and return both parts of the survey, you are eligible for a drawing to receive one of 20 museum souvenir gifts as our way to say thank you for your time and comments. When you turn in the second part of the survey at the end of your visit, you will draw a card from a box to determine if you are a gift recipient.

#### **Voluntary participation:**

Participation in this study is voluntary. Your taking and completion of the survey indicates your voluntary consent. You may choose not to answer questions with which you may feel uncomfortable and are free to change your mind and withdraw at any time, or choose not to turn in any part of the survey without consequence or penalty. However, because only a small number of visitors are receiving the survey, your comments are important to us for understanding what you think about your experience.

#### **Confidentiality:**

Your participation in this study is completely anonymous to ensure confidentiality. You will be unidentifiable in terms of the responses. Any information provided will not be linked to any individual during the survey, data analysis or reporting of results. Only the primary and secondary investigators will have access to the data. All completed questionnaires will be stored in a locked file cabinet and then destroyed after completion of analysis after two years. Also, digital data files will be stored on the researcher's password-protected computer.

#### **Questions?**

If you have any questions about this study, please contact the researcher Chi-Ming Hsieh at [hsiehch9@msu.edu](mailto:hsiehch9@msu.edu), phone (04) 2292-0613 (Taiwan) and (517) 599-3009 (USA) or Dr. Gail A. Vander Stoep at [vanders1@msu.edu](mailto:vanders1@msu.edu), phone: (517) 353-5190, Department of Community, Agriculture, Recreation & Resource Studies (CARRS), 136 Natural Resources Building at Michigan State University. (The second researcher will not be available to respond until late July due to international travel. You will receive quicker response contacting the first researcher.) If you have questions or concerns about your role and rights as a research participant, would like to obtain information or offer input, or would like to register a complaint about this study, you may contact, anonymously if you wish, the Michigan State University's Human Research Protection Program at 517-355-2180, Fax 517-432-4503, or e-mail [irb@msu.edu](mailto:irb@msu.edu) or regular mail at 202 Olds Hall, MSU, East Lansing, MI 48824.

**Thanks** for your time, opinions and help.

Sincerely,

Chi-Ming Hsieh

## Appendix B: English Survey Instruments

### PLEASE COMPLETE PARTS I – III BEFORE YOUR VISIT

Please record the time now: \_\_\_\_\_ am/pm \_\_\_\_\_ / \_\_\_\_\_ /2009 Survey Code: \_\_\_\_\_

#### **Part I: Visitor Demographic Information (Please check one)**

1. Which of the following ticket type did you purchase? *(check one)*  
☐ Adult (regular)    ☐ Discount (student aged 20 years or more, government employee)  
☐ Member: (    ) Dinosaur card ; (    ) Family card
2. What is your age? *(check one)*  
☐ 20-29 years    ☐ 30-39 years    ☐ 40-49 years    ☐ 50-59 years    ☐ 60-64 years
3. What is your gender? *(check one)*  
☐ Male    ☐ Female
4. What is your current residence? *(check one)*  
☐ Local (Taichung City/County)  
If not local, where is your residence?  
☐ Northern Taiwan (Keelung, Taipei, Taoyuan, Hsinchu)  
☐ Central Taiwan (Miaoli, Taichung, Changhua, Nantou, Yunlin)  
☐ Southern Taiwan (Chiayi, Tainan, Kaohsiung, Pingtung)  
☐ Eastern Taiwan (Yialn, Hualien, Taitung)  
☐ Island County (Penghu, Kinmen, MaZu)
5. What is your marital status? *(check one)*  
☐ Single, never married    ☐ Married with no children    ☐ Other: \_\_\_\_\_  
☐ Married with children
6. What is your highest level of education? *(check one)*  
☐ Completed junior high school or less    ☐ Completed college  
☐ Completed senior high school    ☐ Completed graduate school or more
7. What is your **monthly** income? *(check one)*  
☐ No income    ☐ NT \$30,000-39,999    ☐ NT \$50,000 or more  
☐ Less than NT \$20,000    ☐ NT \$40,000-49,999  
☐ NT \$20,000-29,999
8. What is your current occupation? *(check one)*  
☐ Government employee    ☐ Private sector employee    ☐ Self-employed  
☐ Unemployed    ☐ Teacher    ☐ Student  
☐ Retired    ☐ Housewife    ☐ Other : \_\_\_\_\_

## Part II: Museum Visit Behavior

1. How often, on average, do you visit this museum? (*check one*)

- ☐ Two or more times per year    ☐ Once in two years    ☐ Once in three years or more  
☐ One time per year

2. How many times have you visited this museum in your life (including this time)? (*check one*)

- ☐ 1 time    ☐ 2-3 times    ☐ 4-5 times    ☐ 6-7 times    ☐ 8 times or more

3. How many people accompanied you on your visit today to this museum (total number of people in your group)? (*check one*)

- ☐ Only myself    ☐ 2 people    ☐ 3 people    ☐ 4 people    ☐ 5 people or more

4. Who is accompanying you on this visit?

- ☐ Family without children    ☐ Family with children    ☐ Colleague(s) from work  
☐ Friend(s)    ☐ Only myself

5. Are you staying overnight away from your permanent home on this trip?

- ☐ Yes, overnight trip    ☐ No, day trip

6. When planning your trip to this museum, what was your primary source of information? (*check one*)

- ☐ Family word-of-mouth (WOM)    ☐ Friend or Colleague WOM    ☐ Internet  
☐ Radio station or TV program    ☐ Brochure/flyer    ☐ Newspaper or magazines

7. Please indicate how satisfied you have been, generally, with your overall experiences at this museum and other museums in the past. *Please circle one number.*

Items	No experience	Strongly dissatisfied	Dissatisfied	Somewhat dissatisfied	Neutral	Somewhat satisfied	Satisfied	Strongly satisfied
Overall past experiences with <b>this</b> museum	0	1	2	3	4	5	6	7
Overall past experiences with other museums	0	1	2	3	4	5	6	7

8. Are you currently a member of this museum? (*check one*)

- ☐ Yes    ☐ No

9. Are you currently a member of any other museums? (*check one*)

- ☐ Yes    ☐ No

**Part III: Motivations for Visiting Museum**

Please indicate how much you agree or disagree with each of the following motivations for visiting this museum. *Please circle one number.*

Items	Strongly disagree	Disagree	Somewhat disagree	Neutral	Somewhat agree	Agree	Strongly agree
To relax	1	2	3	4	5	6	7
To spend quality time with family or friends	1	2	3	4	5	6	7
To expand my knowledge	1	2	3	4	5	6	7
To have a change from routine	1	2	3	4	5	6	7
To enjoy social interaction with new people	1	2	3	4	5	6	7
To enjoy new experiences	1	2	3	4	5	6	7
To recover from stress and tension	1	2	3	4	5	6	7
To be with people who enjoy the same things I do	1	2	3	4	5	6	7
To enjoy exhibits in different settings	1	2	3	4	5	6	7
To hear a famous guest speaker	1	2	3	4	5	6	7
Because museum has enjoyable facilities	1	2	3	4	5	6	7
Because museum has standards of hygiene and cleanliness	1	2	3	4	5	6	7
To see new exhibits	1	2	3	4	5	6	7
Because museum has good souvenir stores	1	2	3	4	5	6	7
Because museum has comfortable environment	1	2	3	4	5	6	7
Because museum has enjoyable activities	1	2	3	4	5	6	7
Because museum has good restaurants	1	2	3	4	5	6	7
Because museum has safety and security	1	2	3	4	5	6	7
To attend special events	1	2	3	4	5	6	7
Because museum has friendly people	1	2	3	4	5	6	7

**PLEASE COMPLETE PARTS IV – VII AFTER YOUR VISIT**

**Part IV: Perception of Service Quality**

Please indicate how much you agree or disagree with each of the following statement. *Please circle one number*

Items	Strongly disagree	Disagree	Somewhat disagree	Neutral	Somewhat agree	Agree	Strongly agree
The parking lot is available	1	2	3	4	5	6	7
Directional signs in the museum make it easy to navigate	1	2	3	4	5	6	7
Toilet facilities are available	1	2	3	4	5	6	7
Staff is well dressed	1	2	3	4	5	6	7
The atmosphere in the museum is in keeping with the exhibits	1	2	3	4	5	6	7
The level of crowding is acceptable	1	2	3	4	5	6	7
Overall, physical display of the interpretation/exhibits (e.g. size of signs, layout of design, brightness of light) is well provided	1	2	3	4	5	6	7
The restaurants' staff provides efficient service	1	2	3	4	5	6	7
Road and street signs make it easy to find the museum	1	2	3	4	5	6	7
The exhibits are well maintained	1	2	3	4	5	6	7
Staff responds to visitors' requests promptly	1	2	3	4	5	6	7
The level of noise is acceptable	1	2	3	4	5	6	7
Interpreters have good communication skills (e.g., clarity, speed, fluency, interaction with audience, time control, etc)	1	2	3	4	5	6	7
The restaurants offer quality food/drink	1	2	3	4	5	6	7
The museum is clean	1	2	3	4	5	6	7
The shops offer diverse choices of items	1	2	3	4	5	6	7
The written leaflets and/or website provide enough information	1	2	3	4	5	6	7
The museum caters to the needs of less able visitors	1	2	3	4	5	6	7
There are adequate seats in the museum	1	2	3	4	5	6	7
Interpreters are professional (e.g., accessible, knowledgeable of the subjects)	1	2	3	4	5	6	7
Staff is willing to spend time helping visitors	1	2	3	4	5	6	7
Exhibit descriptions are understandable (texts and graphs)	1	2	3	4	5	6	7
The exhibit themes are diverse	1	2	3	4	5	6	7
Staff is available in a sufficient number when needed	1	2	3	4	5	6	7
The restaurant offers multiple choices of food/drink	1	2	3	4	5	6	7
Staff is friendly	1	2	3	4	5	6	7

The shop offers quality items	1	2	3	4	5	6	7
The facilities for children are sufficient	1	2	3	4	5	6	7

**Part V: Perception of Value**

Please indicate how much you agree or disagree with each of the following statement.

*Please circle one number.*

	Strongly disagree	Disagree	Somewhat disagree	Neutral	Somewhat agree	Agree	Strongly agree
The overall price I paid for this visit was reasonable	1	2	3	4	5	6	7
Considering the price I paid for the visit, overall the exhibits were valuable	1	2	3	4	5	6	7
Considering the price I paid for the visit, overall the activities were helpful	1	2	3	4	5	6	7
Considering the price I paid for the visit, overall the services were useful	1	2	3	4	5	6	7

**Part VI: Overall Satisfaction**

Please indicate your overall satisfaction with all facilities and services.

*Please circle one number.*

Items	Strongly dissatisfied	Dissatisfied	Somewhat dissatisfied	Neutral	Somewhat satisfied	Satisfied	Strongly satisfied
Overall satisfaction with all facilities and services	1	2	3	4	5	6	7

**Part VII: Future Intention**

In the next **12 months**, how likely are you to do the following statement.

*Please circle one number.*

	Very unlikely	Unlikely	Somewhat unlikely	Neutral	Somewhat likely	Likely	Very likely
Revisit this museum	1	2	3	4	5	6	7
Recommend this museum to others	1	2	3	4	5	6	7
Renew membership or become a member	1	2	3	4	5	6	7

**THANK YOU FOR YOUR TIME**

**PLEASE TURN IN YOUR COMPLETED SURVEY AND RECEIVE A GIFT**

## Appendix C: Chinese Survey Instruments

### 請您於參觀科博館前，回答下列第一 ~ 第三部分之問卷

#### 第一部份：遊客資料(以下皆為單選題)

1. 您所購買的票別：

- ☐ 全票                      ☐ 優待票(學生滿20歲，或軍警人員)  
☐ 卡友: ( ) 恐龍卡; ( ) 家庭卡

2. 您的年齡為：

- ☐ 20-29歲      ☐ 30-39歲      ☐ 40-49歲      ☐ 50-59歲      ☐ 60-64歲

3. 您的性別為：

- ☐ 男                      ☐ 女

4. 您的居住地為：

- ☐ 台中縣市

假如您不是住在台中縣市，您是來自於：

- ☐ 北台灣(基隆市，台北縣市，桃園縣，新竹縣市)  
☐ 中台灣(苗栗縣，彰化縣，南投縣，雲林縣)  
☐ 南台灣(嘉義縣市，台南縣市，高雄縣市，屏東縣)  
☐ 東部(宜蘭縣，花蓮縣，台東縣)  
☐ 離島(澎湖縣，金門縣，馬祖)

5. 您的婚姻狀況為：

- ☐ 未婚      ☐ 已婚---無小孩      ☐ 已婚---有小孩      ☐ 其他：\_\_\_\_\_

6. 您的教育程度為：

- ☐ 國中(含以下)                      ☐ 高中職                      ☐ 大學(含專科)  
☐ 研究所(含以上)

7. 您的月收入大約為：

- ☐ 無收入                      ☐ 20,000 元及以下                      ☐ 20,000-29,999 元  
☐ 30,000-39,999 元                      ☐ 40,000-49,999 元                      ☐ 50,000 元及以上

8. 您的職業為：

- ☐ 公職人員(含軍警)                      ☐ 私人企業雇員                      ☐ 自營企業  
☐ 待業中                      ☐ 教師                      ☐ 學生  
☐ 退休                      ☐ 家管                      ☐ 其他：\_\_\_\_\_



## 第二部份: 博物館參觀行為

1. 您參觀科博館的頻率為：(單選)

☐一年兩次(含以內) ☐一年一次 ☐兩年一次 ☐三年(含以上)一次

2. 過去五年來，您大約參觀過科博館幾次(包含這次)：(單選)

☐1次 ☐2-3次 ☐4-5次 ☐6-7次 ☐8次及以上

3. 您此次參觀的同行者有幾位：(單選)

☐自己 ☐2人 ☐3人 ☐4人 ☐5人及以上

4. 您此次參觀的同行者主要為：(單複選)

☐家人(皆成人) ☐家人(包括未成年小孩) ☐同事  
☐朋友 ☐自己

5. 你此次的參觀是：☐在外過夜 ☐當天來回

6. 您參訪科博館的主要資訊來源是：(單選)

☐家人親戚推薦 ☐朋友或同事推薦 ☐網路  
☐廣播或電視 ☐宣傳單或海報 ☐報章雜誌  
☐其他：\_\_\_\_\_

7. 您對之前參考觀科博館或其他博物館的滿意程度為：

	沒去過	很不滿意	不滿意	稍微不滿意	普通	稍微滿意	滿意	很滿意
參觀科博館的經驗	0	1	2	3	4	5	6	7
參觀其他博物館的經驗	0	1	2	3	4	5	6	7

8. 您現在是否為科博館的會員(持有恐龍卡或家庭卡)：

☐是 ☐否

9. 您現在是否為任何博物館的會員：

☐是 ☐否

### 第三部份：參觀博物館的動機

請您就此次參觀科博館的動機，對下列敘述選擇同意或不同意程度：

	很不同意	不同意	稍微不同意	普通	稍微同意	同意	很同意
可以放鬆身心	1	2	3	4	5	6	7
可以花時間和家人及朋友相聚	1	2	3	4	5	6	7
可以增加知識	1	2	3	4	5	6	7
可以遠離一成不變的生活	1	2	3	4	5	6	7
可以認識新朋友	1	2	3	4	5	6	7
可以嘗試不同的新事物	1	2	3	4	5	6	7
可以紓解壓力和緊繃	1	2	3	4	5	6	7
可以和興趣相同的人一起來欣賞喜愛的事物	1	2	3	4	5	6	7
可以參觀各式各樣的展覽	1	2	3	4	5	6	7
可以聆聽名人的演講	1	2	3	4	5	6	7
因為博物館的設備有趣	1	2	3	4	5	6	7
因為博物館的環境整潔有序	1	2	3	4	5	6	7
為了看新展覽	1	2	3	4	5	6	7
可以逛逛博物館的紀念品店	1	2	3	4	5	6	7
因為博物館的環境令人舒服自在	1	2	3	4	5	6	7
因為博物館安排的活動愉快有趣	1	2	3	4	5	6	7
可在館內餐廳享用飲食(例:麥當勞、中式餐廳、咖啡、茶點)	1	2	3	4	5	6	7
因為博物館的空間和設備安全無虞	1	2	3	4	5	6	7
為了參加博物館舉辦的特別活動 例:戶外體驗、研習活動等	1	2	3	4	5	6	7
因為博物館的環境親切友善	1	2	3	4	5	6	7

**請您於參觀科博館後，回答下列第四 ~ 第七部分問題**

現在時間為：\_\_\_\_\_：\_\_\_\_\_早上/下午

**第四部份服務品質知覺度**

請您指出對下列項目的滿意或不滿意程度：

	很不滿意	不滿意	稍微不滿意	普通	稍微滿意	滿意	很滿意
博物館停車是否方便	1	2	3	4	5	6	7
館內各處方向標示清楚，可以找到想去的地方	1	2	3	4	5	6	7
館內如廁是否方便	1	2	3	4	5	6	7
館員穿著是否得體	1	2	3	4	5	6	7
館內整體氣氛和展覽場氣氛是否一致	1	2	3	4	5	6	7
館內是否擁擠	1	2	3	4	5	6	7
館內解說或展覽呈現是否得宜(例：字體大小，設計編排，燈光亮度)	1	2	3	4	5	6	7
餐廳內提供的服務	1	2	3	4	5	6	7
抵達科博館的道路指標是否清楚	1	2	3	4	5	6	7
展覽品是否維護妥善	1	2	3	4	5	6	7
館員是否迅速回答遊客詢問	1	2	3	4	5	6	7
館內噪音是否在可接受程度	1	2	3	4	5	6	7
導覽教育人員是否有充分的溝通技巧(例：口齒清晰度，說話速度等)	1	2	3	4	5	6	7
餐廳內所提供的食物/飲料品質	1	2	3	4	5	6	7
博物館是否整潔有序	1	2	3	4	5	6	7
館內商店是否提供多樣性的商品	1	2	3	4	5	6	7
文字宣傳或科博館網站是否提供遊客足夠的資訊	1	2	3	4	5	6	7
館內是否考慮行動不便的遊客	1	2	3	4	5	6	7
館內是否有足夠的座椅供乘坐和休息	1	2	3	4	5	6	7
導覽教育人員是否專業(例：講解內容淺顯易懂，專業知識豐富等)	1	2	3	4	5	6	7
館員是否願意解答遊客的問題	1	2	3	4	5	6	7
展覽輔助的介紹(文字、圖片)是否容易理解	1	2	3	4	5	6	7
展覽主題是否多樣化	1	2	3	4	5	6	7
當遊客有需要時，是否可以找得到館員的協助	1	2	3	4	5	6	7
餐廳是否提供多樣性的食物/飲料	1	2	3	4	5	6	7

館員是否親切友善	1	2	3	4	5	6	7
館內商店是否提供高品質的商品	1	2	3	4	5	6	7
館內孩童專用設備是否足夠	1	2	3	4	5	6	7

### 第五部份：認知價值

請您指出對下列敘述的同意或不同意程度：

	很不同意	不同意	稍微不同意	沒意見	稍微同意	同意	很同意
對於此次參觀，我付出的價錢是合理的	1	2	3	4	5	6	7
相較於此次參觀所付出的金錢，整體的展覽對我是有價值的	1	2	3	4	5	6	7
相較於此次參觀所付出的金錢，整體的活動對我是有幫助的	1	2	3	4	5	6	7
相較於此次參觀所付出的金錢，整體的服務對我是有幫助的	1	2	3	4	5	6	7

### 第六部份：總體滿意程度

請您指出對科博館設備和服務的總體滿意或不滿意程度：

	很不滿意	不滿意	稍微不滿意	沒意見	稍微滿意	滿意	很滿意
整體而言，我對於科博館的設備和服務	1	2	3	4	5	6	7

### 第七部份：未來意願

請您指出未來一年內，您會選擇下列事情的可能性：

	很不可能	不可能	稍微不可能	沒意見	稍微可能	可能	很可能
重遊科博館	1	2	3	4	5	6	7
向別人推薦到科博館一遊	1	2	3	4	5	6	7
更新會員資格或加入會員	1	2	3	4	5	6	7

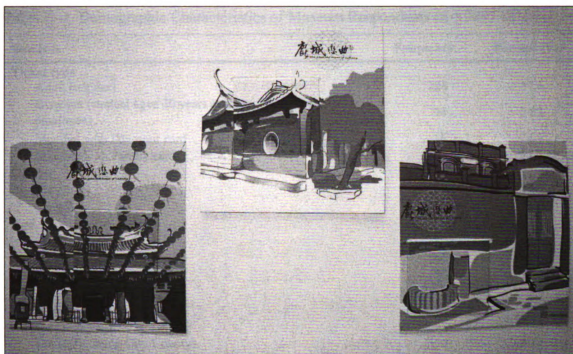
本問卷到此結束，十分感謝您的填答。

填畢後請交給觀眾服務台服務人員，並領取贈品，敬祝參觀愉快！

國立自然科學博物館 暨 密西根州立大學公園遊憩暨觀光資源管理研究所 敬啓



## Appendix D: Photos of Incentives



Museum souvenir 1: Magnetic bookmarks designed for one special exhibit during survey



Museum souvenir 2: A collapsible flying disc (also used for a hand fan)

## Appendix E: Results of Pilot Study

Table E-1. Demographic Characteristics of Museum Respondents (n = 389)

Variable	Frequency	Percent (%)
<b>Ticket type</b>		
Adult (regular)	224	57.6
Discount (student aged 20 years or more, government employee)	94	24.2
Member with Dinosaur card	16	4.1
Member with Family card	55	14.1
<b>Gender</b>		
Male	164	42.2
Female	225	57.8
<b>Age</b>		
20-29	189	48.6
30-39	146	37.5
40-49	50	12.9
50-59	3	0.8
60-64	1	0.3
<b>Current residence</b>		
Local(Taichung City/County)	156	40.1
Northern Taiwan (Keelung, Taipei, Taoyuan, Hsinchu)	132	33.9
Central Taiwan (Miaoli, Changhua, Nantou, Yunlin)	54	13.9
Southern Taiwan (Chiayi, Tainan, Kaohsiung, Pingtung)	39	10.0
Eastern Taiwan (Yialn, Hualien, Taitung)	5	1.3
Island County (Penghu, Kinmen, MaZu)	3	0.8
<b>Marital status</b>		
Single, never married	179	46.0
Married with no children	22	5.7
Married with children	187	48.1
Other	1	0.3
<b>Education level</b>		
Completed junior high school or less	5	1.3
Completed senior high school	31	8.0
Completed College	287	73.8
Completed graduate school or more	66	17.0
Missing value	0	0
<b>Monthly income</b>		
No income	87	22.4
≤ NT \$20,000	68	17.5
NT \$20,000-29,999	62	15.9
NT \$30,000-39,999	60	15.4
NT \$40,000-49,999	51	13.1
NT \$50,000 or more	61	15.7
Missing value	0	0



Table E-1. (cont'd)

Variable	Frequency	Percent (%)
<b>Occupation</b>		
Government employee	25	6.4
Private sector employee	107	27.5
Self-employed	52	13.4
Unemployed	13	3.3
Teacher	30	7.7
Student	82	21.1
Retired	1	0.3
Housewife	27	6.9
Other	52	13.4

Table

Var

Fre

N

Table E-2. Museum Visit Behavior (n = 389)

Variable	Frequency	Percent (%)
<b>Frequency</b>		
Two or more times per year	182	46.8
One time per year	82	21.1
Once in two years	20	5.1
Once in three years or more	105	27.0
Missing value	0	0.0
<b>Number of visits per year</b>		
1 time	105	27.0
2-3 times	118	30.3
4-5 times	61	15.7
6-7 times	20	5.1
8 times or more	84	21.6
Missing value	1	0.3
<b>Accompanying number</b>		
Only myself	13	3.3
2 people	215	55.3
3 people	71	18.3
4 people	55	14.1
5 people or more	34	8.7
Missing value	1	0.3
<b>Companion (multiple choice)</b>		
Family without children	82	20.9
Family with children	131	33.4
Colleague(s) from work	13	3.3
Friend(s)	157	40.1
Only myself	9	2.3
<b>Overnight staying</b>		
Yes, overnight trip	111	28.5
No, day trip	275	70.7
Missing value	3	0.8
<b>Length of stay</b>		
Less than 1 hour	94	24.4
1 to less than 2 hours	125	33.1
2 to less than 3 hours	95	24.4
3 to less than 4 hours	42	10.8
4 to less than 5 hours	28	7.2
More than 5 hours	5	1.3

Table E-2. (cont'd)

<b>Variable</b>	<b>Frequency</b>	<b>Percent (%)</b>
<b>Information</b>		
Family Word-of-Mouth	101	26.0
Friend or Colleague WOM	93	23.9
Internet	78	20.1
Radio station or TV program	12	3.1
Brochure/flyer	45	11.6
Newspaper or magazines	27	6.9
Other	26	6.7
Missing value	7	1.8
<b>NMNS member</b>		
Yes	71	18.3
No	318	81.7
<b>Membership in other museum(s)</b>		
Yes	23	5.9
No	365	93.8
Missing value	1	0.3

Table E-3. Summary of Item Analysis of Motivations for Visiting Museum

Item	Critical ratio	Pearson correlation	Skewness	Kurtosis	Cronbach's alpha if item deleted	Factor loading	Item accepted or deleted
Pus1	11.62***	0.538	-0.79	0.30	0.875	0.599	Accepted
Pus2	8.55***	0.333	-1.14	1.64	0.882	<b>0.394</b>	Accepted
Pus3	10.09***	0.512	-1.29	2.72	0.876	0.596	Accepted
Pus4	13.17***	0.604	-1.24	2.48	0.872	0.667	Accepted
Pus5	12.48***	0.519	-.139	-0.15	0.876	0.566	Accepted
Pus6	11.24***	0.579	-1.22	2.50	0.874	0.646	Accepted
Pus7	13.02***	0.559	-1.22	2.50	0.874	0.618	Accepted
Pus8	8.88***	0.404	-1.22	2.50	0.879	0.477	Accepted
Pus9	7.64***	<b>0.382</b>	-0.83	0.73	0.880	<b>0.408</b>	Accepted
Pusl1	12.12***	0.525	-0.30	-0.07	0.876	0.571	Accepted
Pul2	11.83***	0.521	-0.80	0.49	0.875	0.589	Accepted
Pul3	13.13***	0.520	-0.77	1.20	0.877	0.575	Accepted
Pul4	12.45***	0.532	-1.14	1.45	0.875	0.601	Accepted
Pul5	10.70***	0.469	-0.64	0.52	0.877	0.522	Accepted
Pul6	10.79***	0.488	-0.66	0.84	0.878	0.559	Accepted
Pul7	13.97***	0.588	-0.75	0.37	0.873	0.653	Accepted
Pul8	9.66***	0.397	-0.53	0.43	0.881	0.454	Accepted
Pul9	10.00***	0.463	-1.154	2.32	0.878	0.531	Accepted
Pul10	13.02***	0.547	-0.54	-0.04	0.874	0.612	Accepted
Pul11	13.17***	0.526	-0.55	0.05	0.875	0.596	Accepted
Criteria	$\geq 3.0$	$\geq 0.400$	$-3 < s^a < 3$	$-8 < k^b < 8$	$\geq 0.880^c$	$\geq 0.450$	Accepted

Note. All values of Critical Ratio are significant at  $\alpha = 0.001$  level. All values of Pearson correlation are significant at  $\alpha = 0.01$  level. The bold numbers are below the criteria.

a: "s" indicates skewness.

b: "k" indicates kurtosis.

c: Cronbach's alpha of overall motivation construct.

\*\*p < 0.01, \*\*\* p < 0.001.

Table E-4. Summary of Item Analysis of Past Experience

Item	Critical ratio	Pearson correlation	Skewness	Kurtosis	Cronbach's alpha if item deleted	Factor loading	Item accepted or deleted
PE1 <sup>a</sup>	15.954***	0.734**	-1.235	2.164	0.743	0.821	Accepted
PE2	18.150***	0.859**	-1.686	3.474	0.743	0.821	Accepted
Criteria	≥ 3.0	≥ 0.400	-3 < s < 3	-8 < k < 8	≥ 0.886 <sup>b</sup>	≥ 0.450	

a: "PE" indicates past experience.

b: Cronbach's alpha of Perception of Value construct.

\*\*p < 0.01, \*\*\* p < 0.001.

Table E-5. Summary of Item Analysis of Perception of Service Quality

Item	Critical ratio	Pearson correlation	Skewness	Kurtosis	Cronbach's alpha if item deleted	Factor loading	Item accepted or deleted
Tan1	11.92***	0.502	-0.590	-0.206	0.944	0.527	Accepted
Tan2	13.20***	0.593	-0.893	0.651	0.942	0.623	Accepted
Tan3	11.51***	0.544	-0.709	0.194	0.943	0.572	Accepted
Tan4	13.43***	0.655	-0.960	1.120	0.942	0.698	Accepted
Tan5	11.38***	0.629	-0.928	1.274	0.942	0.665	Accepted
Tan6	8.95***	0.412	-0.797	0.461	0.945	0.445	Accepted
Res1	14.31***	0.633	-0.718	0.328	.0942	0.669	Accepted
Res2	11.73***	0.512	-0.398	0.232	0.943	0.530	Accepted
Res3	14.79***	0.630	-0.431	-0.340	0.942	0.661	Accepted
Res4	12.97***	0.590	-1.161	1.966	0.942	0.633	Accepted
Res5	14.64***	0.605	-1.143	2.476	0.942	0.653	Accepted
Emp1	14.28***	0.576	-0.904	0.956	0.943	0.611	Accepted
Emp2	18.26***	0.686	-0.662	0.424	0.942	0.727	Accepted
Emp3	13.57***	0.587	-0.231	-0.048	0.943	0.608	Accepted
Emp4	12.95***	0.622	-0.853	0.864	0.942	0.664	Accepted
Emp5	16.16***	0.674	-0.519	-0.025	0.942	0.708	Accepted
Emp6	16.37***	0.700	-0.627	0.058	0.941	0.734	Accepted
Com1	15.98***	0.623	-0.498	-0.329	0.942	0.655	Accepted
Com2	13.38***	0.536	-0.327	-0.813	0.943	0.566	Accepted
Com3	19.20***	0.700	-0.802	1.101	0.941	0.738	Accepted
Com4	15.67***	0.650	-0.726	0.197	0.942	0.703	Accepted
Com5	15.41***	0.658	-0.726	0.197	0.942	0.706	Accepted
Com6	12.24***	0.596	-0.627	-0.130	0.942	0.642	Accepted
Con1	13.63***	0.626	-0.411	0.305	0.942	0.671	Accepted
Con2	11.54***	0.511	-0.631	0.090	0.944	0.527	Accepted
Con3	15.26***	0.662	-0.141	-0.822	0.942	0.708	Accepted
Con4	17.66***	0.661	-0.504	0.302	0.942	0.690	Accepted
Con5	15.15***	0.608	-0.590	-0.206	0.942	0.631	Accepted
Criteria	≥ 3.0	≥ 0.400	-3 < s < 3	-8 < k < 8	≥ 0.944 <sup>a</sup>	≥ 0.450	

a: Cronbach's alpha of Perception of Service Quality construct.

\*\*p < 0.01, \*\*\* p < 0.001.

Table E–6. Summary of Item Analysis of Perception of Value

Item	Critical ratio	Pearson correlation	Skewness	Kurtosis	Cronbach's alpha if item deleted	Factor loading	Item accepted or deleted
PV1 <sup>a</sup>	24.411***	0.782	-0.747	0.100	0.924	0.875	Accepted
PV2	24.078***	0.875	-0.923	0.776	0.890	0.934	Accepted
PV3	25.710***	0.870	-0.892	0.769	0.892	0.933	Accepted
PV4	23.604***	0.804	-0.794	0.448	0.913	0.891	Accepted
Criteria	≥ 3.0	≥ 0.400	-3 < s < 3	-8 < k < 8	≥ 0.927 <sup>b</sup>	≥ 0.450	Accepted

a: "PV" indicates Perception of Value.

b: Cronbach's alpha of Perception of Value construct.

\*\*p < 0.01, \*\*\* p < 0.001.

Table E–7. Summary of Item Analysis of Loyalty

Item	Critical ratio	Pearson correlation	Skewness	Kurtosis	Cronbach's alpha if item deleted	Factor loading	Item accepted or deleted
Loy1 <sup>a</sup>	22.851***	0.753	-1.238	1.637	0.642	0.910	Accepted
Loy2	23.053***	0.668	-0.961	0.449	0.750	0.864	Accepted
Loy3	24.120***	0.609	-0.240	-0.532	0.831	0.810	Accepted
Criteria	≥ 3.0	≥ 0.400	-3 < s < 3	-8 < k < 8	≥ 0.809 <sup>b</sup>	≥ 0.450	Accepted

a: "Loy" indicates Loyalty.

b: Cronbach's alpha of Loyalty construct.

\*\*p < 0.01, \*\*\* p < 0.001.

Table E–8. Summary of the Measurement Reliability (Cronbach's alpha)

Measurement Scale	Number of Items	Cronbach's alpha (α )
Motivations	20	0.880
Past Experience	2	0.886
Perception of Service Quality	28	0.944
Perception of Value	4	0.927
Loyalty	3	0.809



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