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Realizing the Value of Mobile Services — The Verification of “Limit-to-Value” Framework

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ABSTRACT

The development of mobile services in the exhibition industry has become a popular issue in a mature internet environment. To successfully implement mobile services in the exhibition industry, exhibitors must be adequately involved in the unprecedented innovation activities. However, for exhibitors to buy into the service, it is essential for them to perceive the value of the service and actually achieve that level of value. With this in mind, this research aims to explore the value of mobile service investment and related value barriers from the perspective of exhibitors. We use the limit-to-value framework to examine the valuation process for mobile services in the context of the exhibition industry and focus on exhibitors in particular. This study can help us to understand the critical value-discounting factors and the valuation process for exhibitors as they consider adopting and using innovative mobile services in the exhibition industry.

Keywords: Mobile Service, Potential Value, Realized Value, Valuation Barriers, Conversion Barriers

CONTENT

TABLES & FIGURES

CHAPTER 1: INTRODUCTION

Advances in computing and wireless telecommunications networks have enabled anytime, anywhere access to mobile services on a grand scale through a multitude of mobile devices (e.g., cellular phones, hand-held or palm-sized computers, or vehicle-mounted interfaces) (Lyytinen and Yoo, 2002; Wang et al., 2006). The potential for mobile services to create business value has been widely recognized by researchers and practitioners. For example, Siau (2001) has pointed out that mobile services provide users with the ability to access the internet from any location at any time, pinpoint an individual mobile terminal user's location, access information at the point of need, and update data/information as needed. The Wireless World Research Forum (WWRF), in its "Book of Visions" on the future of wireless networks, has stated that a champion mobile service should be one that can create and maintain emotional impact and pleasant experiences for users (WWRF, 2000, p. 9) (Pedersen et al., 2002). Thus, mobile services such as banking, content downloads, emergency/roadside assistance, and wireless coupons are potential winners in the mobile marketplace that reinforce relationships with key customers through their delivery of value-added, interactive, and location-based services (Wang et al., 2006). However, mobile services and mobile devices are not equally popular, just as the popularity of wired e-commerce cannot be assessed according to the popularity of computers, as has previously been proven (Anckar and D'Incau, 2002). Gartner did a large-scale global survey of several thousand subscribers in 2007, asking what mobile services they used and the results show that fewer than 10 percent of people in Western Europe have used mobile services and that the number of people planning to try these services in the next year (2008) is only a few percent.

The low adoption rate reflects that users may not fully understand the value of mobile services. Brand-new mobile services have features such as ubiquity, personalization, flexibility, and dissemination, challenging people's old habits, which are difficult to break (Jessup and Robey, 2002). Thus, as use patterns change, new demands and expectations emerge that cause uncertainty about what people value and are willing to pay for (Tilson et al., 2004). In addition, value cannot be realized without mass adoption; even the best-designed mobile service business model will soon be defeated if it is not widely successful (Anckar and D'Incau, 2002; Pedersen et al., 2002; Pedersen and Ling, 2003). Some researchers have isolated important factors in the adoption of mobile services. For example, Kleijnen et al. (2004) indicate that complexity, ease of use, and compatibility are positively related to the adoption of mobile services. Bouwman and Carlsson (2007) suggest that physical, cognitive, and

economic barriers have a negative effect on the actual use of mobile services. These findings remind us that notwithstanding the many efforts aimed at developing better and more efficient mobile service systems, these systems either have been ignored by consumers or are seriously underused if firms do not take into consideration crucial barriers that can diminish or erode the value of mobile services (Wang et al., 2006). Therefore, understanding how the value of mobile service can be communicated and identifying the value-discounting factors that affect consumer intention to use mobile services are indeed pressing issues.

Past researchers have attempted to resolve similar issues in the field of IT in general. Firms are always considering how to improve their efficiency and effectiveness and even gain competitive advantage via the mobile services that they introduce, but few firms actually have the time or the motivation to reflect on innovative technologies. If firms today can evaluate the value of mobile services more accurately, they can make better decisions. Given this information, how can firms determine the 'right' value on IT investment to focus? In 2000, Davern and Kauffman (2000) distinguished between two types of IT value, potential value and realized value, by analyzing decision support systems. Potential value represents the maximum value opportunity available to the investor if IT is implemented successfully, and realized value is the measurable value that can be identified after implementation. The model was extended by Chircu and Kauffman (2000) to show that each factor is subject to different influences that diminish the benefits of the investment. They have defined the "limit-to-value" framework as the valuation and conversion processes that are affected by a series of specific value-discounting factors called valuation barriers and conversion barriers. That is to say, there are a number of value flow barriers that affect the assessment of the potential value of IT and its conversion into realized value. This framework enables subsequent researchers to explain why not all value flows can be realized after the implementation of IT.

While the past literature on the performance of mobile services has focused on either adoption or post-adoption issues, few studies address the value flow through both stages, and therefore, the research that has been done has been unsuccessful in capturing the real value of the service. Although the limit-to-value framework provides a useful methodology for assessing value, there have been no empirical studies done so far. Therefore, our research goal is to use a limit-to-value framework to evaluate the value of mobile services. The framework will be further validated using an empirical study of an innovative mobile service in the Taiwanese exhibition industry.

To be more specific, our research questions are as follows：

1. What critical factors will alter the perceived value of mobile service for exhibitors? What type of factors will decrease the realized value?
2. What are the valuation barriers and conversion barriers that influence mobile service value before and after the introduction of such services?

CHAPTER 2: LITERATURE REVIEW

To prevent incorrect estimates of IT investment value, Chircu and Kauffman (2000) have suggested that managers need to identify from the start the maximum value that they can obtain and what factors can diminish or erode that value. They propose the limit-to-value framework to explain how the general value flows to become realized value.

According to the Limit to Value Framework (Figure 2-1), for any type of IT investment, there are a number of sources of value that are general and can be applied to any company in any industry.

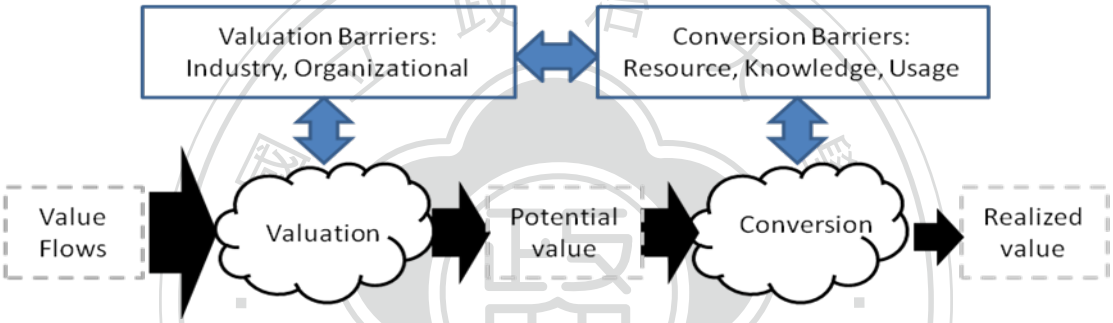

Figure2-1 The Limits to Value for IT Investments Framework
(Source: Chircu and Kauffman, 2000)

IT value flows include all general value. Firms must realize that not all value can be captured and identify what value barriers limit this realized value. Firms have to know the valuation barriers and conversion barriers to avoid losing expectation value. Valuation barriers emerge from the assessment of the potential benefits of the IT investment. After implementation, the firm must ascertain what factors make up conversion barriers that decrease the maximum value to the realized value. There is a two-step process required to sort out how best to think about this problem. The two components involved are the valuation process and the conversion process.

2.1 Valuation Process

This is the process that the general value flow be applied by a specific industry and a specific organization to generate potential value. Potential value represents the maximum value opportunity available to the investor if IT is implemented successfully. During the IT valuation process, managers need to consider how specific organizational and industry characteristics generate barriers to altering the full general value potential. If firms ignore these features, as the following researchers have

pointed out, the potential value might be narrow during the initial stage.

Numerous researchers have discussed organizational and industrial factors that affect firms' adoption of new technologies. Thong and Yap (1995) suggest that CEO and organizational characteristics are important factors affecting IT adoption in small businesses. Flanagin (2000) proposes that social pressures are significant in innovation adoption; organizational features and perceived benefits are reasonable predictors of adopters and non-adopters and effective predictors of the likelihood of adoption for non-adopters. Chwelos, Benbasat, and Dexter (2001) point out three factors as determinants of the adoption of electronic data interchange (EDI): readiness, perceived benefits, and external pressure. Pae and Hyun (2002) find that compatibility, upgradability, and preannouncement affect network externalities and switching costs and thus have a significant effect on consumer adoption of new technologies. Patterson, Grimm, and Corsi (2003) stress that organizational and environmental factors, including organization size, decentralized organizational structure, organizational performance, supply chain strategy integration, inter-organizational factors, and environmental uncertainty, have a significant impact on the adoption of new supply chain technology. Zhu, Kraemer, and Xu (2003) believe that the TOE (technological context, organizational context, and environmental context) framework is appropriate for studying e-business adoption and technological innovations. The critical factors in their framework include technology competence, firm scope, firm size, consumer readiness, competitive pressure, and lack of trading partner readiness. Moreover, Zhu, Kraemer, Gurbaxani, and Xu (2006) develop a conceptual model and point out that open-standard IOS adoption will be positively influenced by network effects, expected benefits, and adoption costs; they find that network effects are a determinant of network adoption. Their paper also points out that adoption costs are the significant barrier to open-standard IOS adoption. Furthermore, Menor and Roth (2007) suggest that the adoption of a new service is affected by process focus, market acuity, strategy, culture, and information technology experience. Based on this past work on IT or e-business adoption, our constructs for the valuation process include 1) industry barriers such as network externalities, industry characteristics of adopting new service innovation, and competitive pressures; and 2) organizational barriers such as organization features (organization size and organization age), organizational culture, and business alignment.

2.2 Conversion Process

The conversion process parallels the implementation phase. This process changes potential value into realized value, which is defined as the measurable value that can be identified after implementation. The amount of value is often diminished during

this process. Frequently, managers only give consideration to the potential value estimate for a system and ignore the difficulties of IT implementation that create conversion barriers (Chircu et al., 2001). Based on Chircu and Kauffman (2000), it would seem that resource barriers, knowledge barriers, and usage barriers are the major conversion barriers as discussed below.

2.2.1 Resource barriers

Based on the resource-based theory (Porter, 1981; Grant, 1991; Barney, 1991; Teece et al., 1997, Bharadwaj, 2000; Chircu and Kauffman, 2000), it emerges that resource barriers are generated by a lack of co-specialized resources such as human capital and new organizational processes. Chircu et al. (2001) also state that IT investments are often stalled by insufficient resources in areas like user training, system usability engineering, and organizational awareness of how to obtain value. Tippins and Sohi (2003) summarize these IT co-specialized resources and separate them into three types: IT knowledge, IT operations, and IT objects. We discuss them below:

(1) IT knowledge

IT knowledge, like other specific domains of knowledge, is distinguishable as a subset of the more general concept of knowledge (Capon and Glazer, 1987). Tippins and Sohi (2003) conceptualize IT knowledge as the extent to which a firm possesses a body of technical knowledge about objects such as computer-based systems. Leonard-Barton (1995) also argues that IT knowledge not only represents a deep understanding of a particular knowledge domain but also reflects an ability to export that knowledge to other dissimilar operations. Taylor (1971) defines technical knowledge as a set of principles and techniques useful in bringing about changes toward a desired end.

IT knowledge is comprised of technical and managerial IT skills (Mata et al., 1995; Bharadwaj, 2000). The former refer to the know-how needed to build IT applications using the available technology and operate them to make products or provide services, while the latter is defined as the management's ability to conceive of, develop, and exploit IT applications to support and enhance other business functions. Some researchers suggest that technical and business knowledge among senior leaders is essential to innovation success (McKenney et al., 1995). In addition to IT skills, another aspect of IT knowledge is IT business expertise. Clark et al. (1997) note that IT groups' business expertise, in combination with their IT skills, directly determines a firm's ability to rapidly develop and deploy critical systems to create long-term competitive advantage. Even physical assets and tangible resources can easily be replicated by competitors, and the IT business expertise of the people in an

organization can enhance long-term advantage on the market (Bhatt and Grover, 2005). Moreover, firms that have IT groups with superior knowledge about business strategy, competition, and opportunities can continue to leverage them based on their absorptive capability (Clemons and Row, 1991).

Based on the above literature, our research defines IT knowledge as a firm's ability or know-how in the realm of technical knowledge, which can be combined with IT skills to support and enhance other business functions and improve the success of IT investment and adoption. IT knowledge is also a source of core knowledge that can increase the value of IT. Without IT knowledge, a firm cannot process the external information comprehensively to create the useful knowledge that it needs and to help form a nucleus of IT value and competitive advantage.

(2) IT operations

IT operations can be considered the methods, skills, and processes required to complete a focal task. Tippins and Sohi (2003) conceptualize IT operations as the extent to which a firm utilizes IT to manage market and customer information and also think of it as a manifestation of technical knowledge because the implementation of technical knowledge results can bring out technical operations or skills. IT operations need to consider the issue of governance, which determines how organizations are structured to establish objectives, allocate resources, and make decisions (Spanos and Lioukas, 2001). Governance has become a priority within the adoption and implementation of e-commerce (Feeny and Ives, 1990) because governance affects how well an organization manages the transition to e-commerce, the integration of e-commerce with business, and the progress of e-commerce beyond entry-level adoption (Molla and Licker, 2005).

We synthesize the above research to define IT operations as the manifestation of technical knowledge and as the processes that utilize IT to accomplish a particular assignment. If a firm does not have mature IT operations, IT knowledge will become useless, and the value of IT investments will be cut down.

(3) IT objects

IT objects represent computer-based hardware, software, and support personnel (Tippins and Sohi, 2003). Glazer (1991) sees IT objects as enablers that are largely responsible for the current increases in information production and dissemination. As tools, technical objects are artifacts that assist in the acquisition, processing, storage, dissemination, and use of information. In addition, IT objects is equal to IT infrastructures, which are the shared information delivery base for firms and sustain

IT-based innovation. Thus, they are a critical firm resource (Duncan, 1995; Allen and Boynton, 1991; Hanseth et al., 1996), enabling firms to sustain IT assimilation in business activities and exploit emerging opportunities better than their competitors (Weill and Broadbent, 1998). As firms develop IT infrastructures that span entire organizations, linking key suppliers and customers, they develop elaborate rules regarding the distribution and management of hardware, software, and other support services (Ross et al., 1996). Furthermore, using these components of IT infrastructure will reduce the time and cost of building the system (Weill and Broadbent, 1998). The rich IT infrastructure will enable firms to implement the right applications at the right time, rendering the cost and value of technological innovation different for different firms (Bharadwaj, 2000). A quality IT infrastructure can provide firms with the ability to share information across different functions, innovate, and exploit business opportunities and the flexibility to respond to changes in business strategy (Weill, 2002). IT infrastructure has been described as an important organizational capability that can be an effective source of value (Bharadwaj, 2000; Weill and Broadbent, 1998; Ross et al., 1996).

In summary, according to the above literature, IT objects, like IT infrastructure, form the shared information delivery base for firms and help them to develop and sustain business activities and IT innovations. A dearth of IT objects will decrease the adoption of IT innovations and the IT value that an organization anticipates.

Some scholars focus on organizational resources as their foundation, proposing resources related to IT and competitive advantage. Ross et al. (1996) point out that if a firm has a reusable technology base and foster a great cooperative relationship between its IT department and other inner units, it can develop powerful capabilities that will help it to operate IT and achieve its goals. When these resources are valuable, rare, and durable and protect against imitation, transferability, or substitution, they become the capabilities that will create sustained competitive advantage and thereby provide long-term advantage that will not be easily duplicated or imitated by other firms. However, while some firms achieve successful outcomes with regard to their IT endeavors, others continue to fall victim to the technology productivity paradox (Lucas, 1999). Thus, managers have to recognize the need to adopt and integrate IT competency resources; they must understand the best way to strategically position resources to ensure the greatest benefit.

2.2.2 Knowledge barriers

Knowledge barriers can be affected by many factors, including absorptive capacity, organization learning mechanisms, awareness, knowledge assets, strategic IT vision,

and so on. Awareness is one of the knowledge barriers that may affect the decision to adopt or reject innovations in firms. Awareness refers to an organization's perception, comprehension, and projection of the benefits and risks of e-commerce (Molla and Licker, 2005), and it affects both initial e-commerce adoption and subsequent level-of-utilization decisions (Rogers, 1995; Mirchandani and Motwani, 2001; Molla and Licker, 2005). In other words, a firm with high awareness is willing to pay more attention to IT-related issues, and the firm's absorptive capacity and learning capabilities will be plentiful enough to evaluate IT innovative investments.

Likewise, IT-enabled intangibles such as knowledge assets also relate to knowledge barriers. Knowledge assets are embedded in databases and decision support systems that determine its ability to respond to environmental changes (Sabherwal and King, 1991). The relationship between organizational knowledge assets and competitive advantage is moderated by the firm management's ability to integrate, transfer, and apply knowledge (Matusik and Hill, 1998), and absorptive capacity and organizational learning can be used to effectively manage knowledge assets to make other organizational resources more easily accessible and shareable. That is to say, knowledge barriers, meaning ineffectual efforts to use organizational co-specialized resources, can be diminished via greater absorptive capacity and organizational learning ability in dynamic environments.

Some scholars also propose that greater absorptive capacity and organization learning can reduce knowledge barriers (Cohen and Levinthal, 1990; Attewell, 1992; Levinson and Asahi, 1995; Zahra and George, 2002). A IT investment requires employees to learn and develop know-how regarding new skills and new organizational routines as part of organizational learning (Attewell, 1992). Knowledge barriers can be addressed by acquiring and retaining related knowledge and expertise in business environments that help a firm to gain competitive success (Cohen and Levinthal, 1990; Armstrong and Sambamurthy, 1999). Furthermore, Tippins and Sohi (2003) suggest that organization learning plays a significant role in enhancing a firm's capabilities and competitive advantage. Furthermore, Bhatt and Grover (2005) argue that the intensity of organizational learning is critical because it enhances the absorptive capacity of the firm and helps it to reassess and renew its current level of competence. Moreover, the absorptive capacity that the senior leadership teams own is also quite vital because they can recognize valuable IT information, developing and applying learning as they guide IT innovation activities at their firm (Cohen and Levinthal, 1990). Thus, organization learning and absorptive capacity are both significant for a learning organization hoping to gain more critical knowledge in a dynamic environment.

In addition, different strategic IT visions can affect the absorption of IT and business knowledge and thus reduce knowledge barriers. Schein (1992) identifies four major categories of strategic IT visions: automate, informate up, informate down, and transform. What is more, firms that possess a transformative IT vision can enhance their IT assimilation ability (Feeny et al., 1992) and view IT as a key driver or an integral element of their value proposition (Armstrong and Sambamurthy, 1999). That is to say, those firms that espouse a transformative strategic IT vision always take IT absorptive capacity and organizational learning more seriously (Armstrong and Sambamurthy, 1999). In 2002, Zahra and George (2002) summarized the work of past researchers (Lane and Lubatkin, 1998; Nahapiet and Ghoshal, 1998; Schilling, 1998; Kedia and Bhagat, 1988) who use absorptive capacity in their analyses and offered a reconceptualization of this construct, defining constructs related to absorptive capacity that show a firm's acquisition, assimilation, transformation, and exploitation capabilities, helping to explain firm potential and realized capacity and thus facilitating the creation of differential competitive advantage based on the latter. Similarly, Ulrich (2009) also suggests that absorptive capacity involves exploratory, transformative, and exploitative learning capabilities, explaining interfirm discrepancies in profiting from external knowledge.

Overall, absorptive capacity, which involves different organizational learning capabilities, involves utilizing knowledge to resolve knowledge barriers and create an innovative organizational environment or learning mechanisms that enhances a firm's ability to gain and sustain competitive advantage (Tsai, 2001; Zahra and George, 2002).

2.2.3 Usage barriers

Even if an organization can conquer resource barriers and knowledge barriers in IT implementation, the overall success of its investment is still highly dependent on how well IT is embraced by potential adaptors (Chircu and Kauffman, 2000). The past literature also concludes that certain factors can cause a user to feel different about IT. These factors include personal characteristics, user experience, user voluntariness, relative advantage, compatibility, complexity, trialability, observability and convenience, and so on (Roger 1985, Davis et al. 1989, Moore and Benbasat 1991, Parasuraman et al., 1985; Chircu et al., 2000). Chircu et al. (2001) suggest that usage barriers are due to the usefulness and the usability of the system and the responsibilities associated with its use, which may result in hesitation on the part of users regarding the adoption of IT. Usage barriers are related to adopter perceptions, and unfavorable perceptions will result in users' not adopting a technology (Roger 1985, Davis et al., 1989, Moore and Benbasat, 1991, Chircu and Kauffman, 2000),

even though they are capable of acquiring the knowledge essential to use it.

Based on the previous literature, we know that there are many factors that can alter the intention to use an innovative technology. Devaraj and Kohli (2003) argue that the driver of IT impact is not the investment in the technology but instead the actual usage of that technology. Zhu and Kraemer (2005) describe value creation through use rather than simple adoption and penetration. Moving away from the typical focus on adoption, Zhu and Kraemer (2005) focus on the post-adoption stages and consider actual usage as a critical stage in the value creation process. Massetti and Zmud (1996) argue that EDI usage measurement consists of four facets: the volume, diversity, breadth, and depth of a firm's EDI initiatives. Zhu and Kraemer (2005) define e-business use as the extent to which e-business is being used to conduct value chain activities measured by the breadth of its use for different value chain activities and the depth of use percentage for each activity that has been transferred to the internet platform. Lee and Lee (2009) define different types of IT usage using three items: support for administrative, managerial, and training purposes. Overall, we can see that actual usage has often been identified as a key construct influencing the business value generated from IT (Devaraj and Kohli, 2003; Bhattacherjee and Hikmet, 2008). Therefore, our core research on usage barriers is intended to explore the degree of use of innovative IT. Thus, we focus on the usage factor itself to be our constructs of usage barriers.

Table 2-1 The Literatures of Valuation Barriers

Literatures \ Research Model		Industry Barriers			Organizational Barriers		
		Network externalities	Industry characteristics of adopting new service innovation	Competitive pressures	Organizational Features	Organizational culture	Business Alignment
Thong and Yap 1995	CEO characteristics					◎	◎
	Organizational characteristics			◎	◎		◎
Flanagin 2000	Social pressures	◎		◎			
	Organizational features				◎		
	Perceived benefits						
Chwelos et al. 2001	External Pressure	◎		◎			
	Readiness				◎		◎
	Perceived Benefits						
Pae and Hyun 2002	Compatibility	◎					
	Upgradability	◎					
	Preannounce	◎					
Patterson et al. 2003	Organizational Size				◎		
	Decentralized Organizational Structure				◎	◎	
	Organizational Performance				◎		
	Supply Chain Strategy Integration		◎				
	Inter-Organizational Factors	◎		◎			
	Environmental Uncertainty		◎	◎			

Table 2-1 The Literatures of Valuation Barriers (Cont.)

Literatures \ Research Model		Industry Barriers			Organizational Barriers		
		Network externalities	Industry characteristics of adopting new service innovation	Competitive pressures	Organizational Features	Organizational culture	Business Alignment
Zhu et al. 2003	Technology competence						
	Firm Scope				◎		
	Firm size				◎		
	Consumer readiness						
	Competitive pressure			◎			
	Lack of trading partner readiness		◎				
Zhu et al.2006	Network effects	◎		◎			
	Expected benefits						
	Adoption costs				◎		
Menor and Roth 2007	NSD process focus				◎	◎	
	Market acuity						
	NSD strategy						◎

Table 2-2 The Literatures of Conversion Barriers

Literatures \ Research Model		Resource Barriers			Knowledge Barriers	Usage Barriers
		IT knowledge	IT operations	IT objects	Absorptive Capacity	Actual Usage
Armstrong and Sambamurthy 1999	Senior Leadership Knowledge	◎				
	IT Infrastructure Sophistication			◎		
	Strategic IT visions				◎	
Massetti and Zmud 1996	volume					◎
	diversity					◎
	breadth					◎
	depth					◎
Bharadwaj 2000	Human IT resources	◎				
	IT infrastructure			◎		
	IT-enabled intangibles				◎	
Tippins and Sohi 2003	IT Competency	◎	◎	◎		
	Organizational learning				◎	
Zhu and Kraemer 2005	E-business Use					◎
	Technology Competence	◎				

Table 2-2 The Literatures of Conversion Barriers (Cont.)

Literatures \ Research Model		Resource Barriers			Knowledge Barriers	Usage Barriers
		IT knowledge	IT operations	IT objects	Absorptive Capacity	Actual Usage
Bhatt and Grover 2005	IT business expertise	◎				
	IT infrastructure quality			◎		
	Intensity of organizational learning				◎	
Molla and Licker 2005	Human/business resources	◎				
	Governance		◎			
	Technological resources			◎		
	Awareness				◎	
Lee and Lee 2009	supporting administrative purposes					◎
	Managerial purposes					◎
	training purposes					◎
Ulrich 2009	Exploratory learning				◎	
	Transformative learning				◎	
	Exploitative learning				◎	

CHAPTER 3: RESEARCH MODEL AND HYPOTHESES

New and improved computing and telecom technology enables anytime, anywhere access to mobile services on a grand scale through a multitude of mobile devices (Mallat et al., 2008). However, there are many value uncertainty factors related to mobile service (Siau, 2003; Frolick and Chen, 2004; Tilson et al., 2004; Akesson, 2007), such as the relative novelty of mobile commerce, the complexity of mobile transactions, the perceived lack of security, a lack of user-friendly mobile portals, and the different perceptions of mobile service value held by different demand sides. Therefore, it is difficult to estimate how people act to a new mobile service (Carlsson et al., 2006; Constantinou et al., 2005; Akesson, 2007). Due to the variety of obstacles between new mobile service and people adopting behaviors, outcomes for mobile services often do not meet expectations. Thus, it is indeed important to understand value propositions and related value barriers in the context of mobile service. As a result, our research aims to explore the various aspects of value barriers for mobile service.

According to the previous research, our research framework is developed from the limit-to-value framework and works to dissect the valuation process for mobile services and the barriers that can diminish value realization, as Figure 3-1 shows. The details of this framework are described below.

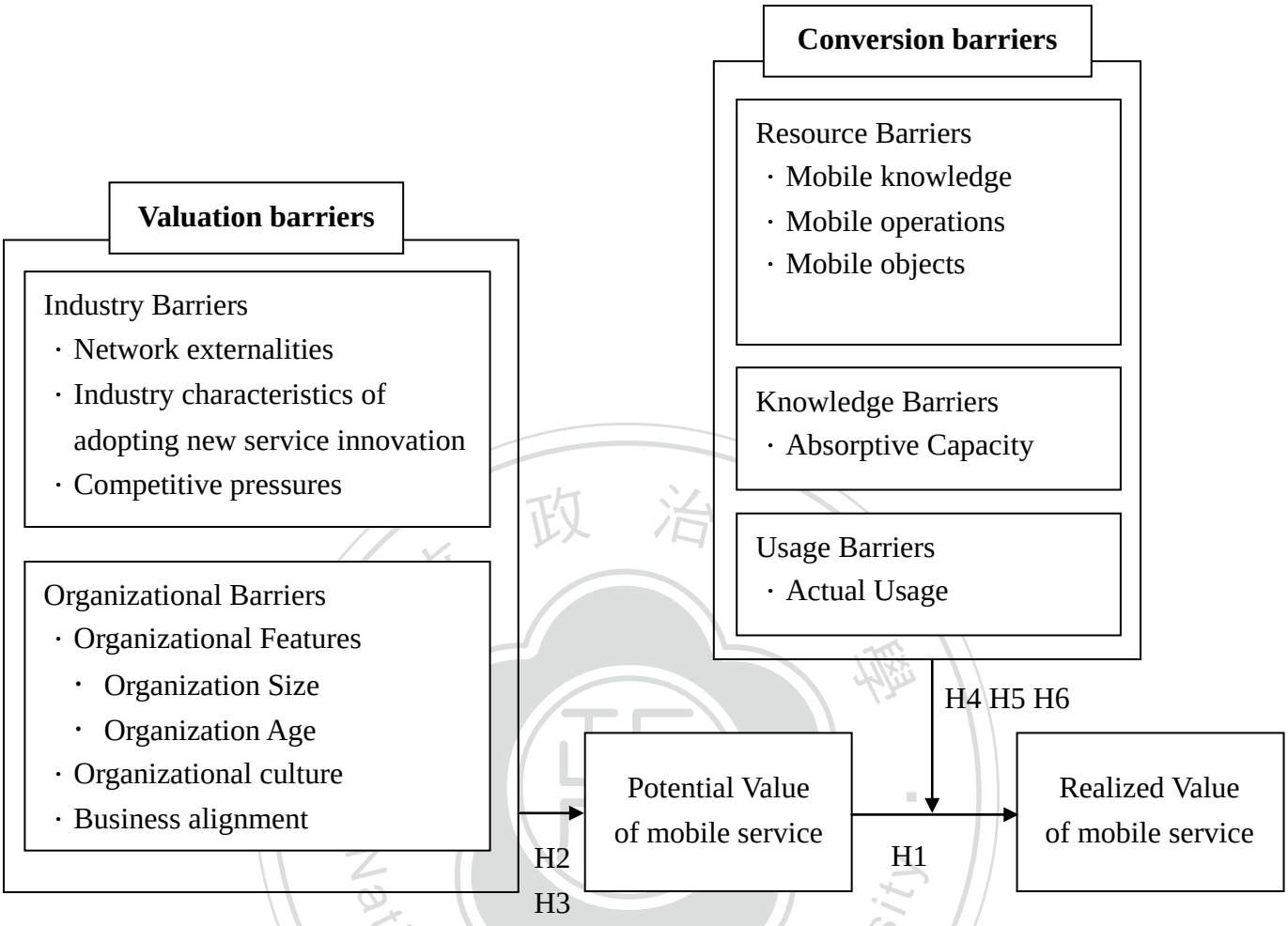

Figure3-1 Research Framework

3.1 Value of Mobile Services

Chircu and Kauffman (2000) indicate that the IT value flows are general in the beginning and can be applied to any company in any industry. The general IT value flows during the valuation process can generate potential value but are always being cut down to suit a specific industry and a specific firm. That is to say, the general IT value flow is a vague and universal concept, while the potential value of IT is the expected value that the firm concerns. Based on their definition, we define the potential value of mobile services as the expected value opportunity available to the investor if the implementation process is one hundred percent successful.

Numerous studies recognize the potential value of mobile service. For example, Siau et al. (2001) argue that mobile service can provide elements of value such as ubiquity, personalization, flexibility, and dissemination. Wang et al. (2006) also

consider the potential of mobile service to deliver value-added, interactive, and location-based services to customers and thus to provide a competitive edge in the mobile marketplace. However, not all of the mobile services can proceed smoothly without a hitch. Barriers may arise after implementation and thus reduce the degree of implementation success. Some scholars mention that without mass use, mobile services will quickly fail, even under the best-designed business model (cf. Anckar and D'Incau, 2002; Pedersen et al., 2002; Pedersen and Ling, 2003). Wang et al. (2006) argue that firms should take crucial barriers into consideration during the operation of mobile services, such as consumer acceptance. Bouwman and Carlsson (2007) also suggest three obstacles that have negative effects on the actual use of mobile services. Based on the above literature, the value of mobile services that can ultimately be realized by the firm may be different from the expected value because of the barriers that arise after mobile service has been implemented. The realized value of mobile services has significant implications for a firm to truly understand the mobile service they feel and perceive. Therefore, we define the realized value of mobile services as the real value that can be identified after mobile service implementation. According to Chircu and Kauffman (2000), this will be the result of a conversion process in which the transformation of potential value occurs.

Based on both values and the mobile service literature, we argue that high potential value means high expected value in combination with a high level of intention to use mobile services. The firms have features that facilitate the adoption of new mobile technologies and believe that such services can provide them with benefits. With a high level of support and a strong belief in mobile services, it is expected that conversion barriers will be proactively eliminated, thus leading to high levels of realized value. We develop the hypothesis H1 on this basis:

H1: Potential value is positively related to the realized value of a mobile service.

3.2 Valuation Barriers with Mobile Services

3.2.1 Industry barriers

As we discussed earlier, the potential value of mobile services is the expected value that a firm creates when it has the demand to use the service to gain benefits. This value will diminish during the valuation process because of different barriers. The industry barrier is one kind of barrier. Based on the past literature, three industrial barriers are discussed in this study: network externalities, industry characteristics of adopting new service innovation and competitive pressures.

For some products or services, benefits to consumers depend on the number of other consumers who have purchased compatible devices (Katz and Shapiro, 1986). As Katz and Shapiro (1986) have argued, network externalities are based on the assumption that the perceived benefits often depend on the number of other consumers who purchase identical or compatible items. In the mobile market, Wang et al. (2008) consider network externalities as well-verified concepts that can significantly explain the acceptance of new technologies; they confirm the effectiveness of network externalities in bolstering the acceptance of multimedia messaging services (MMS), an innovation in the field of mobile telecommunications. Hence, we argue that network externalities affect potential users' acceptance of new mobile service innovations before they actually use them. Once the number of other adopters who have used such mobile services on the market grows up, the potential adopters will expect a high level of value from the service. Therefore, we develop hypothesis H2a:

H2a: A lack of network externality has a negative effect on the potential value of mobile services.

At the same time, having such characteristics in adopting new service innovations is necessary to keep a firm growing. The world is moving ahead in terms of mobility, and mobile innovative investment is growing, too. Datamonitor (2009) provides an analysis of the global mobile industry, and this report shows that the global mobile phone market, which consists of all analog and digital handsets used associated with mobile telephones, generated total revenues of $101 billion in 2008, representing a compound annual growth rate (CAGR) of 12.2% for the period spanning 2004-2008. The global mobile phone market has been growing at a healthy rate over the past five years and will continue to do so during the forecast period (Datamonitor, 2009). Therefore, it seems that the widespread mobile market around the world will sustain mobile investment very well. Firms should take these innovative trends into account and work to create more powerful mobile services to facilitate market growth. Because the industry generally expects a bright future for new mobile services, such positive attitudes will help a specific firm to preserve a similar attitude and thus create high potential value for mobile services. Thus, we develop hypothesis H2b:

H2b: A lack of industrial positive attitude toward adopting new service innovation has a negative effect on the potential value of mobile services.

Moreover, competitive pressure has a significant influence on mobile service. Many firms mention that they will consider investing in mobile applications when their competitors and strategic partners, the source of competitive pressure, begin to experiment with new service practices (Wang and Cheung, 2004). Thus, competitive pressure can drive firms to seek the benefits of new mobile services. In other words, a lack of competitive pressure causes firms not to be able to see the value of mobile services and keeps them from moving into the realm of mobile business (Wang and Cheung, 2004). Thus, we developed hypothesis H2c:

H2c: A lack of competitive pressure has a negative effect on the potential value of mobile services.

3.2.2 Organizational barriers

In this study, we discuss three different kinds of organizational barriers: organizational features (organization size and organization age), organizational culture, and business alignment.

Firm size is one of the most important structural factors that affects a firm's speed and pattern of adopting innovations (Damanpour, 1991; Damanpour, 1992; Yao et al., 2003). Wang and Cheung (2004) have argued that firm size has an interaction effect on the use of mobile technologies in daily firm business and that larger firms demonstrate a significantly stronger intention to adopt e-business than do smaller firms. We can derive that large firms expect that mobile innovations can preserve organizational growth, attract more customers, and increase exposure rates. Thus, hypothesis H3a is as follows:

H3a: Organization size has a positive effect on the potential value of mobile services.

The past literature has indicated that organization age is negatively related to the adoption of innovations (Flanagin et al., 2000). Newer organizations are born into an environment saturated with advanced communication and information technologies, and thus, they naturally rely on technologies to achieve competitive advantage (Porter, 1985). Anthony et al. (2007) also argue that new organizations must create structures involving costly learning and other set-up costs, and older organizations are less like to react to environmental change due to bureaucratization and other time-dependent processes. Because mobile services are often perceived as a new technological trend, a new channel, and a new opportunity to gain competitive advantage in the specific industry to which a particular firm belongs, we argue that the newer organizations

may be more inclined to use mobile services, and they may expect higher value from those mobile services than older organizations. Hypothesis H3b is as follows:

H3b: Organization age has a negative effect on the potential value of mobile services.

Organizational culture is also a key factor that affects a firm's decision to invest in an innovation. Today, the new innovative market tendency is toward mobility and service orientation. Additionally, if senior managers in an organization such as the CEO recognize these market trends, they are more likely to adopt mobile services and perceive that the benefits of the service outweigh the risks. Then, the firm will be more likely to adopt the mobile service. Consequently, our hypothesis here is as follows:

H3c: Organizational culture has a positive effect on the potential value of a mobile service.

IT-business alignment can aid stakeholders in developing a clearer understanding of the goals and objectives of the project at the outset and can maximize the potential return on IT investment (Huang and Hu, 2007). Particularly now, in the information explosion age, firms take customer service seriously. If they aim to increase the productivity and efficiency of customer service representatives and enhance customer service value, the firms that want to gain competitive advantage will recognize the value of new IT innovations such as mobile service technology: they may help the firm to fulfill their need to transform an enormous amount of data into a reliable source, correct related customer information, access real-time customer information, and more. Because mobile service technology allows these firms to fulfill their business needs, the technology is more aligned with their business goals. Thus, hypothesis H3d is as follows:

H3d: A lack of business alignment has a negative effect on the potential value of a mobile service.

3.3 Conversion Barriers with Mobile Service

The conversion process includes resource barriers, knowledge barriers, and usage barriers. Based on the literature review in Chapter 2, three co-specialized resources related to mobile services are mobile knowledge, mobile operations, and mobile objects. We use absorptive capacity (Zahra and George, 2002) to discuss how firms

can use their acquisition, assimilation, transformation, and exploitation capabilities to digest external knowledge through new mobile technology. Last, we use the perspective of actual usage to determine the usage barriers of mobile services.

3.3.1 Resource barriers

3.3.1.1 Mobile knowledge

We define mobile knowledge as the firm's ability or know-how as necessary to improve the success of mobile service investment. Mobile knowledge is also the source of core knowledge that can increase the value of mobile technology. Mobile knowledge assets are managed by mobile knowledge management (mKM) in mobile corporate environments with the support of appropriate mobile information technologies (Zuopeng and Sajjad, 2008). The increasing mobility of the workforce and knowledge pose new challenges for organizations as they seek to effectively manage knowledge and develop more flexible modes of communication, collaboration, and information-sharing.

Thus, a firm that has mobile knowledge can access and analyze external information comprehensively on mobile devices in both knowledge-intensive and mobile environments and thereby obtain useful knowledge and mobile value anytime and anywhere. In other words, a lack of mobile knowledge means that the firm does not have the ability or know-how to handle mobile information, and this will negatively affect the realized value of a mobile service after use, even if the firm expects a high level of value from that mobile service. Therefore, we work from hypothesis H4a:

H4a: A lack of mobile knowledge has a negative moderating effect on the relationship between the potential and realized value of mobile services.

3.3.1.2 Mobile operations

In addition to mobile knowledge to show the mobile type of IT knowledge resources, mobile operations are critical for IT operations with mobile issues. Slilva and Gray (2008) argue that the current mobile environment and the organizational structure as necessary to push mobility forward and achieve the benefits of mobile services will require more centralized strategy and be controlled by mobile operations today. Thus, when mobility increases in complexity, multiplying the mobile hardware, software, and services in which an organization regularly invests and that it must support, the role of mobile operations — as a subset of IT operations — will emerge as a central point of expertise and control many aspects of organizational mobility. Therefore,

firms have mobile operations to align all elements that are critical to ensuring that mobility continues to benefit the organization and to manage outside mobile networks. Because mobile operations can be viewed as a process controller for mobility, companies cannot realize the value of mobile services without them. Hence, we develop hypothesis H4b:

H4b: A lack of mobile operations has a negative moderating effect on the relationship between the potential and realized value of mobile services.

3.3.1.3 Mobile objects

Mobile objects are made up of important IT objects that facilitate and support mobile applications, including mobile technological infrastructure, mobile handheld devices, and mobile technical support for human resources. Mobile technological infrastructure (e.g., Wireless Application Protocol (WAP), Bluetooth, 3G, and General Packet Radio Service (GPRS)) provides connectivity in the mobile world (Varshney and Vetter, 2000; Perry et al., 2001; Nah et al., 2005). Mobile handheld devices such as mobile phones and personal digital assistants (PDAs) have increased the sophistication and popularity of mobile technology and drive organizations to change the way they support mobile and remote workers (Technology Computer Weekly, 2005). Besides, mobile services cannot succeed without the mobile technical support for human resources. Therefore, even if companies expect a high level of value from mobile services, they will not be able to realize that level of value if they lack essential IT objects. Thus, hypothesis H4c is as follows:

H4c: A lack of mobile objects has a negative moderating effect on the relationship between the potential and realized value of mobile services.

3.3.2 Knowledge barriers

Knowledge barriers spring from limited information processing capabilities on the part of employees and lacks of absorptive capacity and organization learning over time, as the related knowledge and expertise are not acquired (Cohen and Levinthal, 1990; Attewell, 1992; Asahi, 1995; Chircu and Kauffman, 2000; Zahra and George, 2002). The same principle applies to the newly mobile service market. If a firm possesses both organizational learning and innovation capabilities in this mobile era, it can decrease the knowledge barriers based on information-sharing, training and learning, facilitate the absorption of external innovative knowledge, and make organizational resources more accessible, shareable and valuable through new mobile

innovations. On the other hand, a firm without the above capabilities will encounter knowledge barriers that inhibit the realization of a higher value of mobile service after use and thus will have difficulty creating competitive edge in the mobile economy. That is to say, although the high potential value of mobile services can lead to a high level of realized value, a lack of organizational learning and absorptive capacity will reduce the extent to which value can be realized. Therefore, we develop hypothesis H5:

H5: Knowledge barriers negatively moderate the relationship between the potential and realized value of mobile services.

3.3.3 Usage barriers

According to the previous discussion of usage, we know that actual usage has often been identified as a key construct influencing the business value generated from IT, even in mobile services. Vrechoupoulos et al. (2003) suggest that complicated use affects the realization of mobile service value. Sinisalo and Karjaluoto (2009) assert that the degree of mobile service usage is related to mobile phone capabilities including SMS, WAP, MMS, XHTML and HTML. Moreover, smartphone users exhibit more actual usage of mobile data communication. With this in mind, we argue that firms may not realize the value of mobile services if they are not appropriate for use. Thus, we develop hypothesis H6:

H6: A lack of actual usage has a negative moderating effect on the relationship between the potential and realized value of mobile services.

CHAPTER 4: RESEARCH METHODOLOGY

4.1 Research Method

The beginning of our research involved studying the relevant literature about IT investment and mobile services to identify lesser-known but interesting and provocative studies. The review of the related literature has helped us to identify research questions, build a research framework, and operationalize constructs. To examine the value process for mobile services, we conduct a two-step survey before and during the exhibition and develop two questionnaires to collect the data. We conduct a statistical analysis to verify our framework and draw research conclusions and suggestions.

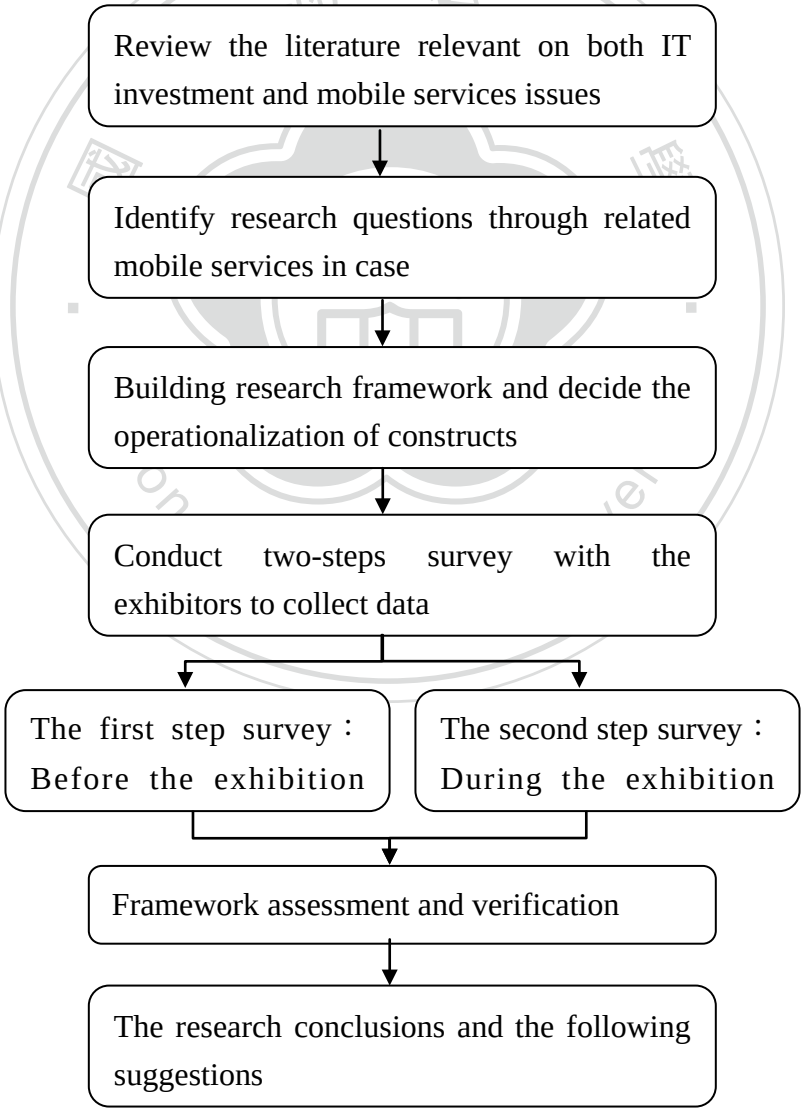

Figure 4-1 The research road map

4.2 Industry and Case Background: Orbi Service

4.2.1 The MICE Industry

The MICE (Meetings, incentives, Conventions and Exhibitions) industry and mobile commerce services have recently become a more widely discussed issue in what is known as the mature internet environment. Making use of mobile services on handheld devices can offer MICE participants with real-time, relevant customer information that can create higher levels of business value and benefits for participants in the MICE industry.

4.2.2 Orbi service

Orbi is an integrated service platform that aims to offer delicate service and an intimate experience for the three participants in the MICE industry: organizers, exhibitors, and buyers. This service was developed by the Service Science Research Center at National Chengchi University and sponsored by the Taiwan External Trade Development Council (TAITRA) and the Sayling Wen Education Foundation.

In our research, we aimed to determine what value exhibitors expect to gain from Orbi and what facilitators/barriers may affect the value realization process. Exhibitors' purpose is to join a specific exhibition, build relationships with new customers, maintain relationships with old customers, collect the latest industry and competitor information, introduce new products and test customer responses, build brand awareness and firm image, and so on. The services required to fulfill exhibitor demands as provided by Orbi are summarized in Table 4-1.

Table 4-1 The Orbi service

Condition	The description of Orbi service
Before the exhibition	The Orbi platform enables exhibitors to upload information regarding marketing, including enterprise logos, introduction of exhibitors, new products, booth activities, mobile advertisements (e.g., banners, e-DM) and product introduction videos.
During the exhibition	The Orbi service automatically sends out messages regarding products and services to increase exposure to new production and business brands. The service provider lends visitors the exhibition service

	intelligence device, Orbi. Accordingly, when visitors use the Orbi device during the exhibition, they can directly identify the location of a specific booth either using the electrical map or by clicking on the enterprise logo in Orbi to get information on exhibitors, products, and activities.
After the exhibition	Exhibitors can choose to gain daily reports on exhibitions that include daily buyer analysis during the exhibition and get a comprehensive report of exhibition analysis after the exhibition.

When exhibitors use these services, they may discover the gap between their expectations and their perceptions. The potential value of the service is the maximum value that exhibitors expect before using the service, which may be affected by where and what the exhibitors are. When the exhibitors are using the service, they may not realize the expected value because there are not enough salespeople at the exhibition to handle the stream of buyers, they may lack the knowledge necessary to absorb the information that Orbi provides, or they may not have sufficient skill to use Orbi properly.

4.3 Measurement

The operationalization of the independent, moderating and dependent variables is shown in Table 4-2.

Table 4-2 Measurement of constructs

Independent Variables		
Components	**Items**	**Measures of Industry Barriers**
Network Externalities	**NE1**	The degree to which the number of participants who adopt new services can affect the value of services. (Pae and Hyun 2002)
	NE2	
Industry Characteristics of Adopting New Service Innovation	**IC1**	The degree of industrial innovative characteristics to adopt a new service. (Patterson 2003)
	IC2	
	IC3	
Competitive Pressures	**CP1**	The degree of competitive pressure that affects the willingness to adopt a new innovative service. (Zhu 2006)
	CP2	The degree of attention from other companies to customer service innovations. (Flanagin 2000)
Components	**Items**	**Measures of Organizational Barriers**

Organizational Features	**Size**	The number of employees in the company necessary to develop mobile innovations. (Patterson et al. 2003)
	Age	The age of the company to develop mobile innovations. (Patterson et al. 2003)
Organizational Culture	**OC1**	The degree of consistency of a company's culture in terms of customer service innovation as necessary to maintain the customer relationship. (Ruppel 2001)
	OC2	The degree to which a company's culture in terms of customer service innovation improves sales growth. (Ruppel 2001)
Business Alignment	**BA1**	The degree of transformation of customer information to be reliable, relevant and accurate based on customer service innovation. (Thong and Yap 1995)
	BA2	The speed of access to customer information based on customer service innovation. (Reinartz 2004)
Moderating Variables		
Components	**Items**	**Measures of Resource Barriers**
Mobile knowledge	**MK1**	The degree of technical knowledge used to develop and maintain relationship with customers via a mobile device. (Tippins and Sohi 2003)
	MK2	
	MK3	
Mobile Operations	**MOP1**	The degree of procedures used to collect existing customer information via mobile device. (Tippins and Sohi 2003)
	MOP2	The degree of the procedures used to collect new customer information. (Tippins and Sohi 2003)
Mobile Objects	**MOB1**	The extent of mobile IT infrastructure development as used to support market needs. (Tippins and Sohi 2003)
	MOB2	The degree of mobile IT investment in human resource as used to support market needs. (Tippins and Sohi 2003)
Components	**Items**	**Measures of Knowledge Barriers**
Absorptive Capacity	**AC1**	The degree to which information acquisition is used to collect industry information. (Ulrich 2009)
	AC2	The degree to which information acquisition is used to keep in contact with customers and determine customer needs. (Tippins and Sohi 2003)
	AC3	The degree of knowledge transformation used to maintain and develop customer knowledge. (Ulrich 2009)

	AC4	The degree of inner information exchange. (Ulrich 2009)
	AC5	The degree of exploitive capacity used to develop new business. (Ulrich 2009)
Components	**Items**	**Measures of Usage Barriers**
Actual Usage	AU1	The usefulness of the underlying mobile technology.
	AU2	The intention to reuse the underlying mobile technology in the future.
Dependent Variables		
Components	**Items**	**Measures of Potential Value**
Potential Value	**PV 1**	Improved business image
	PV 2	Increased number of buyer visits
	PV 3	Improved product matching
	PV 4	Reduced marketing cost
	PV 5	Improved image propagation
	PV 6	Business revenue
	PV 7	Awareness of market trends
	PV 8	Improved exhibition service quality
Components	**Items**	**Measures of Realized Value**
Realized Value	**PV 1**	Improved business image.
	PV 2	Increased number of buyer visits.
	PV 3	Improved product matching
	PV 4	Reduced marketing cost
	PV 5	Improved image propagation
	PV 6	Business revenue
	PV 7	Awareness of market trends
	PV 8	Improved exhibition service quality

4.4 Data Collection

We began our research by distributing the survey using a two-step process as part of the Orbi project, working to determine how the exhibitors were evaluating the new mobile IT service. Our sample source was the exhibitors who were taking part in the Taipei International Sporting Goods Show (TaiSPO 2010) at the Nangang Exhibition Hall from April 29 to May 2, 2010. TaiSPO 2010 had 385 exhibitors, 1,715 booths, and 1,865 foreign buyers. TaiSPO 2010 was comprised of 8 categories, and the main focus was fitness equipment, including sporting goods such as skating and skiing

equipment, sports balls and rackets, golfing products, sports apparel, and more.

We sent out the questionnaires in two stages to collect the data. During the first stage, we aimed to determine the exhibitors' expectations surrounding the Orbi service prior to the users' (including both exhibitors' and buyers') exposure to the actual service. We used a web questionnaire to distribute our questions and sent out 297 questionnaires, ultimately collecting 132 questionnaires (including 8 invalid questionnaires) for a response rate of 41.41%. Basing on the first step, we focus on the exhibitors who had finished the web questionnaire and try to evaluate the Orbi service based on the exhibitors' perceptions after the visitors had used the mobile service. As the result, we collected 124 paper questionnaires, including 11 invalid questionnaires, for a response rate of 91.1%. We use partial least squares (PLS) as our basic statistic tool to analyze the two-step questionnaires data with the aim of ascertaining the barriers that influence value.

Table 4-3 Characteristics of the Study Sample

Characteristics of Companies					
Number of employees	1-10	11-100	101-500	501-1000	>=1000
	32	50	23	6	2
Company Age	<=3	4-6	7-10	11-20	>=21
	14	10	15	35	39
Sporting Good Categories					
fitness equipment area					42.00%
Sportswear and Accessories					11.71%
Outdoor Sports Products					6.00%
Sporting Balls					5.71%
Diving and Water Sport Equipment					4.29%
Skating and Skiing Equipment					2.57%
Message Products					2.29%
Miscellaneous Products					25.43%
Position of Exhibition Staffs					
Sales					72.57%
Marketing					5.75%
Managing Director					11.95%
Secretary					0.88%
Merchandiser					1.77%
Accounting					3.10%
Others					3.98%

4.5 Measurement Model Analysis and Results

We used partial least squares (PLS), a second-generation statistical technique, to analyze the data. We chose PLS because it is the only model that can simultaneously evaluate formative and reflective constructs and because it is better for use with small samples (Chin, 1998a; Chin, 1998b). Moreover, according to Jarvis et al. (2003), the decision to model a construct as formative or reflective should be based on four major criteria: (1) the direction of causality from construct to indicators, (2) the interchangeability of the indicators, (3) co-variation among the indicators, and (4) a nomological net of construct indicators. On this basis, the constructs in our research can be considered to be reflective. The first step in our research was to evaluate the measurement properties at play. We used the loading criteria proposed by Hulland (1999). A loading of 0.707 or higher was considered desirable, whereas a loading of 0.5 or below was dropped. As one can see from Table 4-4, the loadings for all of the items were higher than 0.709.

The next step is to evaluate the convergent and discriminant validity of the data. Fornell and Larcker (1981) argue that convergent validity can be examined using Cronbach's alpha, composite reliability, and average variance extracted (AVE), and they indicate that the AVE cannot be less than 0.5. According to George and Mallery (1999), the following rule of thumb applies in most situations: $a > 0.9$ as excellent, $a > 0.8$ as good, $a > 0.7$ as acceptable, $a > 0.6$ as questionable, $a > 0.5$ as poor, and $a < 0.5$ as unacceptable. Furthermore, based on Nunnally's (1978) guidelines, a composite reliability score of 0.70 or above is acceptable for exploratory research, and our findings met this requirement. Our findings as introduced in Table 4-4 have AVE and composite reliability that are all above these thresholds, and the Cronbach's alpha of all of the items except for Network Externality and IT Objects is larger than 0.8. We still chose to include these items to preserve content validity (Bollen and Leenox 1991).

Table 4-4 Item Reliability Analysis

Item Reliability Analysis (n=113)							
Independent Variables		Items	Mean	SD	Loadings	Reliability (α)[1]	AVE
Industry Barriers	Network Externality	NE1	3.732	0.947	0.879	0.853(α=0.648)	0.744
		NE2	4.089	0.780	0.846		
	Industry Characteristic of Adopting New Service	IC1	3.089	0.901	0.866	0.918(α=0.867)	0.789
		IC2	3.143	0.934	0.927		
		IC3	3.143	0.924	0.870		

	Innovation						
	Competitive Pressures	CP1	3.688	0.916	0.915	0.926 (α=0.842)	0.862
		CP2	3.589	0.903	0.942		
Organizational Barriers	Organizational Features	SIZE	2.178	0.927	1.000	1(n/a)	1
		AGE	3.759	1.360	1.000	1(n/a)	1
	Organizational Culture	OC1	3.652	0.894	0.927	0.917 (α=0.819)	0.847
		OC2	3.580	0.903	0.913		
	Business Alignment	BA1	3.786	0.820	0.927	0.925 (α=0.838)	0.847
		BA2	3.893	0.848	0.929		
Moderating Variables		Items	Mean	SD	Loadings	Reliability (α)[1]	AVE
Resource barriers	Mobile Knowledge	MK1	3.212	1.129	0.960	0.955 (α=0.929)	0.875
		MK2	3.194	1.124	0.952		
		MK3	3.168	1.187	0.893		
	Mobile Operations	MOP1	2.849	1.344	0.977	0.979 (α=0.958)	0.960
		MOP2	2.805	1.348	0.982		
	Mobile Objects	MOB1	2.778	1.107	0.920	0.803 (α=0.545)	0.679
		MOB2	3.079	1.119	0.709		
Knowledge Barriers	Absorptive Capacity	AC1	3.752	1.048	0.719	0.890 (α=0.844)	0.618
		AC2	3.725	0.993	0.721		
		AC3	3.717	1.081	0.828		
		AC4	3.611	0.976	0.839		
		AC5	3.664	0.969	0.817		
Usage Barriers	Actual Usage	AU1	3.205	1.091	0.930	0.930 (α=0.849)	0.869
		AU2	3.152	1.032	0.935		
Dependent Variables		Items	Mean	SD	Loadings	Reliability (α)[1]	AVE
Potential Value		PV1	4.088	0.940	0.783	0.944 (α=0.933)	0.679
		PV2	3.973	0.986	0.872		
		PV3	4.009	0.920	0.868		
		PV4	3.912	1.022	0.875		
		PV5	3.912	0.911	0.846		
		PV6	3.973	0.910	0.774		
		PV7	3.876	0.927	0.752		
		PV8	4.000	0.906	0.813		
Realized Value		RV1	3.867	1.129	0.866	0.967 (α=0.961)	0.786
		RV2	3.619	1.219	0.866		
		RV3	3.681	1.143	0.924		
		RV4	3.575	1.163	0.892		

	RV5	3.655	1.124	0.901		
	RV6	3.752	1.138	0.893		
	RV7	4.088	0.940	0.865		
	RV8	3.973	0.986	0.885		
Note: [1]Cronbach's alpha						

The correlation pattern listed in Table 4-5 shows that each item's correlation with its own construct is greater than its correlation with the other constructs, which provides evidence of discriminant validity. Table 4-6 also confirms that the square root of the AVE for the defined construct is greater than its correlations with other latent constructs. The overall evidence suggests that the constructs demonstrate good measurement properties.

Table 4-5 Factor Structure Matrix of Loadings and Cross-Loadings

Factor Structure Matrix of Loadings and Cross-Loadings									
Scale Items	Network Externality (NE)	Industry Characteristic of Adopting New Service Innovation (IC)	Competitive Pressures (CP)	Organizational Features (SIZE)	Organizational Features (AGE)	Organizational Culture (OC)	Business Alignment (BA)	Potential Value (PV)	Realized Value (RV)
NE1	0.8786	0.4643	0.5412	0.0556	0.0376	0.4978	0.5225	0.3902	0.1142
NE2	0.8460	0.2073	0.4849	-0.0582	-0.0675	0.4678	0.4135	0.3495	0.1282
IC1	0.2383	0.8659	0.3527	-0.0085	0.0046	0.4147	0.4232	0.5154	0.0979
IC2	0.4003	0.9273	0.5317	0.1106	-0.0308	0.6148	0.4520	0.4748	0.1046
IC3	0.4424	0.8697	0.6389	0.0805	-0.0737	0.6384	0.4692	0.4053	0.1014
CP1	0.5918	0.5413	0.9154	0.0188	-0.0088	0.6456	0.4683	0.3991	0.1816
CP2	0.5229	0.5025	0.9418	-0.0027	-0.0087	0.7015	0.5204	0.4782	0.1095
SIZE	0.0021	0.0651	0.0076	1.0000	-0.4108	-0.0279	-0.0688	-0.0635	0.0086
AGE	-0.0140	-0.0340	-0.0094	-0.4108	1.0000	0.0644	0.0060	-0.1275	0.0322
OC1	0.5037	0.6180	0.7024	0.0119	0.0816	0.9272	0.5043	0.4845	0.2585
OC2	0.5288	0.5131	0.6331	-0.0667	0.0349	0.9130	0.5783	0.4448	0.2257
BA1	0.5461	0.4724	0.4841	-0.0705	-0.0047	0.5693	0.9270	0.5235	0.2092
BA2	0.4670	0.4606	0.5071	-0.0572	0.0157	0.5192	0.9287	0.5294	0.1321
PV1	0.3954	0.3678	0.3700	-0.0184	-0.1421	0.3894	0.4248	0.7829	0.2820
PV2	0.3959	0.4978	0.4323	-0.0465	-0.2129	0.4807	0.4965	0.8719	0.2891
PV3	0.4025	0.4697	0.4495	-0.074	-0.0665	0.4906	0.5338	0.8683	0.3938
PV4	0.4021	0.5374	0.4766	-0.0867	-0.1453	0.5110	0.5110	0.8751	0.2671
PV5	0.3661	0.4363	0.4187	-0.0972	-0.0478	0.4530	0.5478	0.8457	0.2177

PV6	0.2793	0.3422	0.2983	-0.0503	-0.0071	0.2896	0.3928	0.7744	0.2069
PV7	0.2470	0.4511	0.3171	-0.0196	-0.0445	0.3059	0.3695	0.7520	0.1129
PV8	0.2907	0.3409	0.3104	0.000	-0.1376	0.3267	0.4131	0.8134	0.1995
RV1	0.0953	0.1134	0.1437	-0.0069	0.0409	0.1982	0.1796	0.2415	0.8657
RV2	0.1253	0.1639	0.2187	0.0428	-0.0083	0.2634	0.2171	0.3151	0.8656
RV3	0.1886	0.1670	0.2031	0.0241	0.0465	0.2879	0.1983	0.3366	0.9241
RV4	0.0966	0.0632	0.1374	0.0151	0.0346	0.2391	0.1405	0.2901	0.8922
RV5	0.0672	0.0370	0.0418	-0.0505	0.0766	0.2171	0.1296	0.2449	0.9006
RV6	0.1250	0.0842	0.0729	-0.0488	-0.0034	0.2368	0.1713	0.2723	0.8926
RV7	0.1191	0.0198	0.0794	0.0153	0.0686	0.1595	0.1004	0.1665	0.8649
RV8	0.1547	0.1019	0.1306	0.0577	-0.0055	0.2195	0.1254	0.2588	0.8845

Table 4-6 Correlation Matrix

Correlation Matrix									
Scale Items	Network Externality (NE)	Industry Characteristic of Adopting New Service Innovation (IC)	Competitive Pressures (CP)	Organiza-tional Features (SIZE)	Organiza-tional Features (AGE)	Organiza-tional Culture (OC)	Business Alignment (BA)	Potential Value (PV)	Realized Value (RV)
NE	0.862								
IC	0.397	0.888							
CP	0.596	0.559	0.928						
SIZE	0.002	0.065	-0.008	1.000					
AGE	-0.014	-0.034	0.009	-0.411	1.000				
OC	0.560	0.617	-0.727	-0.028	0.064	0.931			
BA	0.546	0.503	-0.534	-0.069	0.006	0.586	0.928		
PV	0.430	0.529	-0.476	-0.064	-0.128	0.506	0.567	0.824	
RV	0.140	0.114	-0.153	0.009	0.032	0.264	0.184	0.309	0.887

CHAPTER 5: RESULTS AND DISCUSSION

5.1 Structure Model Analysis

We first assess the loadings and t-values of the valuation barriers based on the first survey (Table 5-1), which includes industry and organizational barriers as independent variables and potential value as a dependent variable. The results are shown in Table 5-1. We find that the loadings of IC and BA are significant at the $p < 0.01$ level, supporting H2b and H3d. NE, CP, and OC are found to be insignificant, thereby leading us to reject H2a, H2c, and H3c. Size and Age (H3a and H3b) are found to be significant at the opposite demonstration.

In addition, R-square (R^2) values are the major measurement used to judge whether the model is good (Chin 1998b). PLS apply the resample procedure to analyze the data, and our study uses a bootstrap analysis of 500 subsamples and re-estimates of the path coefficients using each of these samples. We find the R^2 of independent variables and dependent variable is 0.447 in Table 5-1(the first step survey), and assess the samples using the second step survey to calculate the R^2 value for the basic model (Model 1), which includes the potential value (PV) and dependent variable (RV) (Table 5-2). The path coefficient is found to be significant, thus suggesting support for H1. Then we follow Chin et al. (2003) PLS product-indicator approach as we seek to detect the moderating effects at play. We obtain the R^2 of the moderating effect models by including the independent variable (PV), moderators (MK, MOP, MOB, AC and AU), interaction terms (PV x MK, PV x MOP, PV x MOB, PV x AC and PV x AU), and the dependent variable (RV) in the model. Then we compare the R^2 of the moderating effect models with the R^2 of Model 1 to derive the f^2 statistics and the pseudo-F statistics.

In Table 5-2, for $p = 0.01$, $F(0.99, 1, 111) = 6.635$. Because the pseudo-F statistic for all models > 6.635, the differenced R^2 are all significant in Model 2, Model 3, Model 4, Model 5 and Model 6. Because all of the interaction terms are significant, H4a, H4b, H4c, H5 and H6 are supported. The findings show that PV not only interacts with the predictor variables (PV x MK, PV x MOP, PV x MOB, PV x AC and PV x AU are significant in Model 2, Model 3, Model 4, Model 5 and Model 6) but also that the predictor variables themselves are significant (MK is significant at the 0.01 level in Model 2, MOP is significant at the 0.01 level in Model 3, MOB is significant at the 0.01 level in Model 4, AC is significant at the 0.01 level in Model 5 and AU is significant at the 0.01 level in Model 6); thus, they increase the model's explanatory ability.

Table 5-1 Valuation Barriers' Item, loadings and t-value Analysis

Valuation Barriers' Item, Loadings and t-value Analysis (n=113)				
Independent Variables		Items	Loadings	t-value
Industry Barriers	Network Externality (NE)	NE1	0.879	0.896
		NE2	0.846	
	Industry Characteristic of Adopting New Service Innovation (IC)	IC1	0.866	2.451***
		IC2	0.927	
		IC3	0.870	
	Competitive Pressures (CP)	CP1	0.915	0.722
		CP2	0.942	
Organizational Barriers	Organizational Features	SIZE	1.000	-1.907**
		AGE	1.000	-2.328***
	Organizational Culture (OC)	OC1	0.927	0.932
		OC2	0.913	
	Business Alignment (BA)	BA1	0.927	2.582***
		BA2	0.929	
Dependent Variables		R^2		
Potential Value (PV)		0.447		
Note: *p<0.1; **p<0.05; ***p<0.01				

Table 5-2 Testing of Hypotheses

Testing of Hypotheses						
	Dependent Variable: Realized Value					
Independent Variables	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Potential Value (PV)	0.309 (3.521***)	0.227 (2.403***)	0.292 (2.586***)	0.266 (2.699***)	0.269 (3.068***)	0.234 (2.711***)
Mobile Knowledge (MK)		0.387 (4.969***)				
Mobile Operations (MOP)			0.237 (2.720***)			
Mobile Objects (MOB)				0.301 (3.732***)		
Absorptive Capacity (AC)					0.477 (6.108***)	
Actual Usage (AU)						0.568 (8.032***)

PV x MK		0.207 (2.107**)				
PV x MOP			0.114 (1.336*)			
PV x MOB				0.195 (2.623***)		
PV x AC					0.211 (2.555***)	
PV x AU						0.112 (1.457*)
RV R^2	0.096	0.287	0.171	0.233	0.433	0.447
Differenced R^2		0.191	0.075	0.137	0.337	0.351
f^2		0.268	0.091	0.179	0.594	0.541
Pseudo F-value		30.273	10.227	20.182	67.167	61.110
Note: *p<0.1; **p<0.05; ***p<0.01						

5.2 Findings

Finding 1

High potential value can lead to relatively high realized value for a mobile service.

As we argued before, the potential value of a mobile service is the expected value available to the investor if the implementation process is completely successful. However, the true value of the Orbi service as these exhibitors ultimately experienced it was different from the expected value because of the barriers that arose after the mobile service had been implemented. In this case, we can see that the exhibitors who had high expectations and intentions surrounding their use of the Orbi service proactively eliminated the conversion barriers and achieved high levels of realized value at the exhibition. Therefore, **H1** is supported.

Finding 2

2.1 The number of participants adopting Orbi services does not increase the value of mobile services.

For some products or services, benefits to consumers depend on the number of other consumers who have purchased compatible devices (Katz and Shapiro, 1986), but this finding does not apply to the Orbi service as introduced at this exhibition. The Orbi service is a brand-new service in Taiwan. Even though many exhibitors have expressed their interest in this service, almost none of them have used the service before. In addition, most of the functions are designed for buyers, not exhibitors, and thus, the latter have difficulty judging the value of the service. Moreover, the number of Orbi users (e.g., buyers, mass media, VIP) is not as high as was originally anticipated, and they do not have a channel through which to share their opinions about Orbi. Thus, network externality was not a factor at this exhibition, and **H2a** cannot be supported.

2.2 A positive attitude toward the adoption of new service innovations in the industry has a significant effect on the potential value of a mobile service.

According to analyses of the global mobile industry (Datamonitor 2009), the widespread mobile market can sustain mobile investment entirely, and those exhibitors who hold a similar attitude noted relevant innovative trends. Thus, a positive attitude toward the adoption of new service innovations in the industry is proven to have a positive effect on the potential value of a mobile service (**H2b**).

2.3 Competitive pressure does not have a significant effect on the potential value of mobile services.

The past literature has posited that companies will consider investing in mobile applications when their competitors and strategic partners, the source of competitive pressure, begin to experiment with these new service practices (Wang and Cheung, 2004). Although their willingness to adopt an innovative service may be greatly affected by their competitors, competitive pressure does not play the leading role in this case. One possible reason may be that most of the exhibitors how participated in this exhibition are small and medium-size exhibitors. Most of them focus on a niche market, and their product categories seldom overlap. The competitive pressure to adopt the Orbi service was thus relatively small. It is also very possible that exhibitors do not see the Orbi service as a competitive weapon. If this is the case, the potential value of the mobile service may not be perceived as notable. In any event, **H2c** is not supported.

Finding 3

3.1 Organization size has a negative effect on the potential value of a mobile service.

Based on the past literature, we argue that the larger exhibitors expect mobile innovations to help them to maintain organizational growth, gain more customers, and increase their exposure rate. However, the data analysis shows the opposite result: smaller companies perceive a higher value as being associated with the mobile service. One of the reasons for this may be that most of participants in this exhibition were small companies. Indeed, this figure was 72.5% (with 28.3% employing 1-10 people and 44.2% employing 11-100 people). The data thus cannot objectively demonstrate the perceptions of large companies. Another potential reason for this unexpected result might be that smaller companies are more active and flexible in adopting new services. Because they are under pressure to grow to enhance competitive advantage, the motivation to accept a new market and new technologies such as the Orbi service and thus to maintain an innovative work environment will more intensive. Moreover, if large companies are slow, ponderous, consumed with internal politics and bureaucracy, and staffed with dissatisfied and poorly motivated employees, then the relationship between organization size and the potential value of mobile services may be negated and become irrelevant. On this basis, **H3a** is not supported.

3.2 Organization age has a positive effect on the potential value of a mobile service.

Some researchers argue that newer organizations have been born into an environment

saturated with advanced communication and information technologies and that they therefore naturally rely on technologies to achieve competitive advantage (Porter, 1985). Our data analysis shows the opposite result. This may be because old companies constitute the majority of the exhibition firms, as a result of which fact; we cannot observe the intentions of new companies based on the data. However, even though only 20.3% of the firms are newer (with 11.5% that have been in existence for less than 3 years and 8.8% that have been in existence for 4-6 years), those companies did still exhibit significantly stronger intentions to adopt mobile services than did older companies. Another reason may be that older companies might be more experienced in adopting new technologies. The older companies generally possess complete, experienced investment teams ready to face the constantly changing market, and they tend to have employee training systems and rich resources, including appropriate mechanisms for adopting whatever new technologies the market demands. All in all, organization age does not have a negative effect on the potential value of the Orbi service. Thus, **H3b** cannot be supported.

3.3 Organizational culture does not have a significant effect on the potential value of a mobile service.

Past studies have found that organizational culture is a key factor in whether a firm decides to invest in an innovation or not. Our data analysis yields inconsistent results. Most exhibitors may be relatively conservative in adopting new technologies. It may also be possible that many organizations are small companies and do not have sufficient resources to innovate. Therefore, **H3c** cannot be supported.

3.4 Business alignment has a positive effect on the potential value of mobile service.

In the information explosion age, companies take customer service seriously, and IT-business alignment is becoming a more important way to gain competitive advantage. In this context, the Orbi service, a new mobile service technology that is aligned with companies' business goals, meets exhibitors' need to transform an enormous amount of information into a reliable data source, to ensure access to relevant and accurate customer information and to ensure that they can access that information quickly whenever they need to. Thus, the potential value of the Orbi service can be positive affected by business alignment and **H3d** is supported.

Finding 4

4.1 Mobile knowledge has a positively moderating effect on the relationship between the potential and realized value of a mobile service.

We define mobile knowledge as a firm's ability or know-how related to improving the success of mobile service investments. In this case, some exhibitors knowledgeably and rapidly made their exhibition information accessible via the Orbi platform, providing an introduction to their company, product and service information, mobile advertisements and stall activity information to exploit and maintain communication links with their customers. Most exhibitors expressed that they could perceive the value of the mobile service after the participant used it. That means that exhibitors who own the relevant mobile knowledge can positive moderate the value of the Orbi service. Therefore, **H4a** is supported.

4.2 Mobile operations have a positive moderating effect on the relationship between the potential and realized value of a mobile service.

The current mobile environment, the organizational structure needed to push mobility forward, and the benefits of mobile services can be controlled by mobile operations today (Slilva and Gray 2008). If exhibitors send a message about product and service information to their customers as a routine procedure, this means that they pay significant attention to organizational mobility. The results from this exhibition show that those exhibitors who place importance on mobile operations can realize more value from the Orbi service. Thus, **H4b** is supported.

4.3 Mobile objects has a positively moderation on the relationship between the potential and the realized value of mobile service.

Even if exhibitors expect high value from the Orbi service, they will not able to achieve that level of value without the support of mobile infrastructure. The results of the survey show that those exhibitors who have developed a great mobile infrastructure as necessary to support market needs and those who have abundant human resources to support such mobile marketing can perceive the Orbi service as providing them with a higher level of value. Thus, **H4c** is supported.

Finding 5

Knowledge barriers can positively moderate the relationship between the potential and the realized value of mobile service.

Our results show that the exhibitors who have the absorptive capacity and learning ability to collect industry information, make contact with customers and detect customer needs, maintain and develop customer knowledge, exchange inner information and develop new business can create high realized value from the Orbi

service. Therefore, **H5** is supported.

Finding 6

H6: Actual usage positively moderates the relationship between the potential and realized value of a mobile service.

According to the previous literature, we know that actual usage will affect the realization of mobile service value. In this case, the exhibitors indicated that the mobile marketing provided by the Orbi service was useful for them, and they exhibited a high level of intention to use this mobile service in the future. We can say that appropriate use can improve the value of a mobile service. Thus, **H6** is supported.

CHAPTER 6: CONCLUSION

6.1 Summary

Nowadays, mobile services have become a popular tool for retaining customers. The peculiarities of mobile service in terms of creating business value, which include ubiquity, personalization, flexibility, and dissemination, have been widely noted by researchers and the world market. Although the exhibition industry has grown rapidly in recent years, exhibitors and organizers are just starting to consider the development of mobile services as potentially increasing their economic and non-economic benefits.

Applying the limits-to-value framework proposed by Chircu and Kauffman (2000), we have aimed to study the value and related valuation barriers of mobile services in the exhibition industry. We validated the model using a two-step survey to investigate how the exhibitors evaluated the value of the new mobile service. Our sample source was the exhibitors who had taken part in the Taipei International Sporting Goods Show (TaiSPO 2010). We use web questionnaires during the first step and paper questionnaires during the second step. The total data set is a representative sample of n=447. In the first step, we sent out 297 questionnaires and collected 132 questionnaires, including 9 invalid questionnaires; the response rate was 41.41%. In the second step, we distributed 150 paper questionnaires and collected 124 questionnaires, including 11 invalid questionnaires; the response rate was 75.3%. Afterwards, we used Partial Least Squares (PLS) to evaluate the relationship between the value of the mobile service and the barriers to the valuation process (industry and organizational barriers) and the conversion process (resource, knowledge, and usage barriers).

The results show that the factors “industry characteristics of adopting new service innovation” and “business alignment” appear to be effective in determining the potential value of mobile services. They also indicate that all of the conversion barriers have a significant influence on the realized value of mobile services. Therefore, we can conclude that truly understanding the barriers to mobile service makes exhibitors understand how to realize the value of a mobile service.

6.2 Contribution

First, the proposed framework assists practitioners and researchers in realizing the key barriers and the value of a mobile service. In addition, we use the framework in the context of real business practice (in the Taiwanese exhibition industry), considering

an innovative mobile service, the Orbi service. This enables us to validate the "limit-to-value" model in the context of mobile services. Furthermore, the results show that two critical valuation barriers can alter the assessment of the potential value of mobile services and that all conversion barriers can alter the perceived value of the mobile service to exhibitors. Mobile service researchers can fully utilize this framework through further examination of the factors that we have isolated.

6.3 Limitations and Implications of Future Research

Providing a mobile service to exhibitors and buyers in the exhibition industry is still a new challenge and an opportunity. Although we suggest that factors related to both general IT and mobile areas create two-stage barriers to judgments by exhibitors regarding the true value of mobile services, there may be other important barriers that we have not discovered. In the future, we can extend the proposed framework to include other factors, making this model a useful standard that can help mobile service providers to evaluate other mobile service systems or processes in the exhibition industry.

REFERENCE

Åkesson M. “Value Proposition in M-commerce: Exploring Service Provider and User Perceptions”, *Proceedings of the L.A. Global Mobility Round Table Conference*, 2007.

Allen B. R. and Boynton A. C. “Information Architecture: In Search of Efficient Flexibility”, *MIS Quarterly*, 1991, Vol. 15, No. 4, pp. 435-445.

Anckar B. and D'Incau D. "Value Creation in Mobile Commerce: Findings from a Consumer Survey", *Journal of Information Technology Theory and Application*, 2002, Vol. 4, No.1, pp. 43-64.

Armstrong C. P. and Sambamurthy V. “Information Technology Assimilation in Firms: The Influence of Senior Leadership and IT Infrastructures”, *Information Systems Research*, 1999, Vol. 10, No. 4, pp. 304-327.

Attewell P. “Technology Diffusion and Organizational Learning: The case of business computing”, Organization Science, 1992, Vol. 3, No. 1, pp. 1-19.

Barney J. “Firm Resources and Sustained Competitive Advantage”, *Journal of Management*, 1991, Vol. 17, No. 1, pp. 99-120.

Bharadwaj A. S. “A Resource-Based Perspective on Information Technology Capability and Firm Performance: An Empirical Investigation”, *MIS Quarterly*, 2000, Vol. 24, No. 1, pp. 169-196.

Bhatt G. D. and Grover V. “Types of Information Technology Capabilities and Their Role in Competitive Advantage: An Empirical Study”, *Journal of Management Information Systems*, 2005, Vol. 22, No. 2, pp. 253-277.

Blery E., Batistatos N., Papastratou E., Perifanos I., Remoundaki G., and Retsina M. “Service Quality and Customer Retention in Mobile Telephony”, *Journal of Targeting, Measurement and Analysis for Marketing*, 2009, Vol. 17, No. 1, pp. 27-37.

Bollen K. and Leenox R. “Conventional wisdom on measurement: A structural equation perspective”, *Psychological Bulletin*, 1991, Vol. 110, No. 2, pp. 305–314.

Bouwman H., Carlsson C., Molina-Castillo F. J., and Walden P. “Barriers and Drivers in the Adoption of Current and Future Mobile Services in Finland”, *Telematics and Informatics*, 2007, Vol. 24, pp. 145-160.

Capon N. and Glazer R. “Marketing and Technology: a Strategic Coalignment”,

Journal of Marketing, 1987, Vol. 51, pp. 1-14.

Carlsson C., Carlsson J., Hyvönen K., Puhakainen J., and Walden P. "Adoption of Mobile Devices/Services – Searching for Answers with the UTAUT", *Proceedings of the 39th Hawaii International Conference on System Sciences*, IEEE Computer Society Press, 2006.

Chae M., Kim J., Kim H., and Ryu H. "Information Quality for Mobile Internet Services: A Theoretical Model with Empirical Validation", *Electronic Markets*, 2002, Vol. 12, No. 1, pp. 38-46.

Chin, W.W. "Issues and opinion on structural equation modeling", *MIS Quarterly*, 1998, Vol.22, No. 1, pp. 7-16.

Chin W.W., Marcolin B.L., and Newstead P.R. "A partial least squares latent variable modeling approach for measuring interaction effects: Results from a Monte Carlo simulation study and an electronic-mail emotion/adoption study", *Information Systems Research*, 2003, Vol.14, No. 2, pp. 189-217.

Chin, W.W. "The partial least squares approach to structural equation modeling", In G.A. Marcoulieds (ed.), Modern Methods for Business Research. Mahwah: Lawrence Erlbaum, 1998, pp. 295-336.

Chircu A. M. and Kauffman R. J. "Limits to Value in Electronic Commerce-Related IT Investments", *Journal of Management Information Systems*, 2000, Vol. 17, No. 2, pp. 59-80.

Chircu A. M., Kauffman R. J., and Keskey Doug "Maximizing the Value of Internet-based Corporate Travel Reservation Systems", *Communications of the ACM*, 2001, Vol. 44, No. 11, pp.57-63.

Chwelos P., Benbasat I., and Dexter A. S. "Research Report: Empirical Test of an EDI Adoption Model", *Information Systems Research*, Vol. 12, No. 3, 2001, pp. 304-321.

Clark C. E., Cavanaugh N. C., Brown C. V., and Sambamurthy V. "Building Change-readiness Capabilities in the IS Organization: Insights from the Bell Atlantic Experience", *MIS Quarterly*, 1997, Vol. 21, No. 4, pp. 425-455.

Clemons E. K. and Row M. C. "Sustaining IT Advantage: The Role of Structural Differences", *MIS Quarterly*, 1991, Vol. 15, No. 3, pp. 275-292.

Cohen W. M. and Levinthal D. A. "Absorptive Capacity: A New Perspective on Learning and Innovation", *Administrative Science Quarterly*, 1990, Vol. 35, No. 1, pp. 128-152.

Constantinou I. D., Damsgaard J. and Knutsen L. A. “Beware of Danegeld: Even if Paid, M-Service Adoption Can be Slow”, *Proceedings of European Conference on Information Systems*, 2005.

Damanpour F. “Organizational Innovation: a Meta-analysis of Effects of Determinants and Moderators”, *Academy of Management journal*, 1991, Vol. 34, No. 3, pp. 555-590.

Damanpour F. “Organizational Size and Innovation”, *Organization Studies*, 1992, Vol. 13, No. 3, pp.375-402.

Datamonitor “Global Mobile Phones: Industry Profile”, 2009.

Davern M. J. and Kauffman R. J. "Discovering Potential and Realizing Value from Information Technology Investments", *Journal of Management Information Systems*, 2000, Vol. 16, No.4, pp. 121-143.

Davis F. D. “Perceived Usefulness, Perceived Ease of Use, and User Acceptance of Information Technology”, *MIS Quarterly*, 1989, Vol. 3, No. 3, pp. 319-340.

Devaraj S. and Kohli R. “Performance Impacts of Information Technology: Is Actual Usage the Missing Link?”, *Management Science*, 2003, Vol. 49, No. 3, pp. 273-289.

Dos S. B. L. and Peffers K. “Rewards to Investors in Innovative Information Technology Applications: First Movers and Early Followers in ATMs”, *Organization science*, 1995, Vol. 6, No. 3, pp. 241-259.

Duncan N. B. “Capturing Flexibility of Information Technology Infrastructure: A Study of Resource Characteristics and Their Measure", *Journal of Management Information Systems*, 1995, Vol. 12, No. 2, pp. 37-57.

Feeny D. F. and Ives B. “In Search of Sustainability: Reaping Long-term Advantage from Investments in Information Technology”, *Journal of Management Information Systems*, 1990, Vol. 7, No. 1, pp. 27-46.

Feeny D. F., Edwards B. R., and Simpson K. M. “Understanding the CEO/CIO relationship”, *MIS Quarterly*, 1992, Vol. 16, No. 4, pp. 435-448.

Flanagin A. J. “Social Pressures on Organizational Website Adoption”, *Human Communication Research*, 2000, Vol.26, No.4, pp. 618-646.

Fornell C. and Larcker D. F. “Evaluating Structural Equation Models with Unobservable Variables and Measurement Error”, *Journal of Marketing Research*, 1981, Vol. 18, No.1, pp. 39-50.

George G. and Mallery P. “SPSS for windows step by step: A simple guide and

reference, 11.0 update", Boston, MA: Allyn and Bacon, 2003.

Glazer R. "Marketing in an Information-intensive Environment: Strategic Implications of Knowledge as an Asset", *Journal of Marketing*, 1991, Vol. 55, No. 4, pp. 1-19.

Grant R. M. "The Resource-Based Theory of Competitive Advantage: Implications for Strategy Formulation", *California Management Review*, 1991, Vol. 33, No. 3, pp. 114-135.

Hanseth O., Monteiro E., and Hatling M. "Developing Information Infrastructure: The Tension between Standardization and Flexibility", *Science, Technology & Human Values*, 1996, Vol. 21, No. 4, pp. 407-426.

Huang C. D. and Hu Q. "Achieving IT-Business Strategic Alignment via Enterprise-wide Implementation of Balanced Scorecards", *Information Systems Management*, 2007, Vol. 24, No. 2, pp. 173-184.

Hulland, J. "Use of partial least squares in strategic management research: A review of four recent studies", *Strategic Management Journal*, 1999, Vol.20, No. 2, pp. 195-204.

Irvine C. III "Emerging Value Propositions for M-commerce", *Journal of Business Strategies*, 2001, Vol. 25, No. 2, pp. 41-57.

Jessup L. M. and Robey D. "The Relevance of Social Issues in Ubiquitous Computing Environments", *Communications of the ACM*, 2002, Vol. 45, No.12, pp. 88-91.

Katz M. L. and Shapiro C. "Product Compatibility Choice in a Market with Technological Progress", Oxford Economic Papers, Oxford University Press. 1986, Vol. 38, pp. 146-165.

Kedia B. L. and Bhagat R. S. "Cultural Constraints on Transfer of Technology Across Nations: Implications for Research in International and Comparative Management", *Academy of Management Review*, 1988, Vol. 13, No. 4, pp. 559-571.

Kleijnen M., Ruyter K., and Wetzels M. "Consumer Adoption of Wireless Services: Discovering the Rules, while Playing the Game", *Journal of interactive marketing*, 2004, Vol. 18, No. 2, pp. 51-61.

Lane P. J. and Lubatkin M. "Relative Absorptive Capacity and Interorganizational Learning", *Strategic Management Journal*, 1998, Vol. 19, pp. 461-477.

Lee C. S. and Lee C. H. "Effects of HRM Practices on IT Usage", *Journal of Computer Information Systems*, 2009, pp.83-94.

Leonard-Barton D. “Wellsprings of knowledge: Building and Sustaining the Sources of Innovation”, Harvard Business School Press: Boston, MA, 1995.

Levinson N. S. and Asahi M. “Cross-national Alliances and Interorganizational learning”, *Organizational Dynamics*, 1995, Vol. 24, pp.50-63.

Lu J., Liu C., Yu C. S., and Wang K. “Determinants of Accepting Wireless Mobile Data Services in China”, *Information and Management*, 2008, Vol. 45, pp. 52-64.

Lucas H. C. “Information Technology and the Productivity Paradox”, Oxford University Press: New York, 1999.

Lyytinen K. and Yoo Y. "Research Commentary: The Next Wave of Nomadic Computing", *Information Systems Research*, 2002, Vol. 13, No. 4, pp. 377-388

Mallat N., Rossi M., Tuunainen V. K., Oorni A. “An Empirical Investigation of Mobile Ticketing Service Adoption in Public Transportation”, *Personal and Ubiquitous Computing*, 2008, Vol. 12, No. 1, pp. 57-65.

Mata F. J., Fuerst W. L., and Barney J. B. “Information Technology and Sustained Competitive Advantage: A Resource-Based Analysis”, *MIS Quarterly*, 1995, Vol. 19, No. 4, pp. 487-505.

Matusik S. F. and Hill C. W. L. “The Utilization of Contingent Work, Knowledge Creation, and Competitive Advantage”, *the Academy of Management Review*, 1998, Vol. 23, No. 4, pp. 680-697.

Massetti B. and Zmud R. W. “Measuring the Extent of EDI Usage in Complex Organizations: Strategies and illustrative Examples”, *MIS Quarterly*, 1996, Vol. 20, No. 3, pp. 331-345.

McKenney J. L., Copeland D. C., and Mason Richard O. “Waves of Change: Business Evolution through Information Technology”, Harvard Business School Press, Cambridge, MA, 1995.

Menor L. J. and Roth A. V. “New Service Development Competence in Retail Banking: Construct development and measurement validation”, *Journal of Operations Management*, 2007, Vol. 25, pp. 825-846.

Mirchandani D. A. and Motwani J. “Understanding Small Business Electronic Commerce Adoption: An Empirical Analysis”, *Journal of Computer Information Systems*, 2001, Vol. 41, No. 3, pp. 70-74.

Mohamed, A. “Choosing the Right Software Infrastructure to Support Your Operation's Mobile Needs”, *Technology Computer Weekly*, 2005, pp. 24-26.

Molla A. and Licker P. S. “Perceived E-Readiness Factors in E-Commerce Adoption: An Empirical Investigation in a Developing Country”, *International Journal of Electronic Commerce*, 2005, Vol. 10, No. 1, pp. 83-110.

Moore G. C. and Benbasat I. “Development of an Instrument to Measure the Perceptions of Adopting an Information Technology Innovation”, *Information Systems Research*, 1991, Vol. 2, No. 3, pp. 192-222.

Nah, F., Siau, K., and Sheng, H. “The Value of Mobile Applications: a Study on a Public Utility Company”, *Communications of the ACM*, 2005, Vol. 48, No. 2, pp. 85-90.

Nunnally, J.C. “Psychometric Theory”, New York: McGraw-Hill, 1978.

Nysveen H., Pedersen P. E., and Thorbjørnsen H. “Intentions to Use Mobile Services: Antecedents and Cross-Service Comparisons”, *Journal of the Academy of Marketing Science*, 2005, Vol. 33, No. 3, pp. 330-346.

Pae J. H. and Hyun J. S. “The Impact of Technology Advancement Strategies on Consumers’ Patronage Decisions”, *The Journal of Product Innovation Management*, Vol.19, 2002, pp.375-383.

Parasuraman A., ZelthamI V. A., and Berry L. L. “A Conceptual Model of Service Quality and Its Implications for Future Research” *Journal of Marketing*, 1985, Vol. 49, pp. 41-50.

Parasuraman A., ZelthamI V. A., and Berry L. L. “SERVQUAL: A Multiple-Item Scale for Measuring Consumer Perceptions of Service Quality”, *Journal of Retailing*, 1988, Vol. 64, No. 1, pp. 12-37.

Patterson K. A., Grimm C. M., and Corsi T. M. “Adopting New Technologies for Supply Chain Management”, *Transportation Research Part E*, 2003, Vol. 39, pp.95-121.

Pecotich A., Biljana C. K., and Nataša R. “The Effects of Executive Marketing Orientation, Organizational Structure, Size and Age on Performance”, *Proceedings of the 7th International Conference on Enterprise in Transition*, 2007.

Pedersen P. E. and Ling R. "Modifying Adoption Research for Mobile Internet Service Adoption: Cross-disciplinary Interactions", *Proceedings of the 36th Hawaii International Conference on System Sciences*, 2002.

Pedersen P. E., Methlie L. B., Thorbjørnsen H. “Understanding Mobile Commerce End-user Adoption: a Triangulation Perspective and Suggestions for an Exploratory Service Evaluation Framework”, *Proceedings of the 35th Hawaii*

International Conference on System Sciences, 2002.

Perry M., O'hara K., Sellen A., Brown B., and Harper R. "Dealing with Mobility: Understanding Access Anytime, Anywhere", *ACM Transaction on Computer-Human Interaction*, 2001, Vol. 8, No. 4, pp. 323-347.

Porter M. E. "The Contributions of Industrial Organization to Strategic Management", *Academy of Management Review*, 1981, Vol. 6, pp. 609-620.

Rogers E. M. "Diffusions of Innovations", 4th ed, New York: Free Press, 1995.

Ross J. W., Beath C. M., and Goodhue D. L. "Develop Long-term Competitiveness through IT Assets", *Sloan Management Review*, 1996, Vol. 38, No. 1, pp. 31-45.

Sabherwal R. and King William R. "Towards a Theory of Strategic Use of Information Resources", *Information & Management*, 1991, Vol. 20, No. 3, pp. 191-212.

Schein E. H. "The Role of the CEO in the Management of Change: The Case of Information Technology", *Transforming Organizations*, Oxford University Press: Oxford, 1992.

Schilling M. A. "Technological Lockout: An Integrative Model of the Economic and Strategic Factors Driving Technology", *the Academy of Management Review*, 1998, Vol. 23, No. 2, pp. 267-284.

Sheng H., Nah F. F. H., and Siau K. "An Experimental Study on Ubiquitous Commerce Adoption: Impact of Personalization and Privacy Concerns", *Journal of the Association for Information Systems*, 2008, Vol. 9, No. 6, pp. 344-376.

Siau K., Lim E. P., and Shen Z. "Mobile Commerce: Promises, Challenges, and Research Agenda", *Journal of Database Management*, 2001, Vol. 12, No. 3, pp. 4-13.

Silva C. and Gray B. "Mobile, operations: A critical consideration for IT", *Network World*, 2008, Vol. 25 No. 21, pp. 32-34.

Sinisalo J. and Karjaluoto H. "The Impact of Mobile Phone Capabilities on Mobile Service Usage: Empirical Evidence from Finland", *International Journal of Mobile Marketing*, 2009, Vol. 4, No. 1, pp.4-11.

Sohn C. and Tadisina S. K. "Development of E-service Quality Measure for Internet-based Financial Institutions", *Total Quality Management*, 2008, Vol. 19, No. 9, pp. 903-918.

Spanos Y. E. and Lioukas S. "An Examination into the Causal Logic of Rent Generation: Contrasting Porter's Competitive Strategy Framework and the

Resource-based Perspective", *Strategic Management Journal*, 2001, Vol. 22, No. 10, pp. 907-934.

Taylor J. C. "Technology and Planned Organizational Change", Braun-Brumfield: Ann Arbor, Ml, 1971.

Teece D. J., Pisano G., and Shuen A. "Dynamic Capabilities and Strategic Management", *Strategic Management Journal*, 1997, Vol. 18, No. 7, pp. 509-533.

Thong J. Y. L. and Yap C. S. "CEO Characteristics, Organizational Characteristics and Information Technology Adoption in Small Businesses", *Omega*, 1995, Vol.23, No.4, pp. 429-442.

Tilson D., Lyytinen K., and Baxter R. "A Framework for Selecting a Location Based Service Strategy and Service Portfolio", *Proceedings of the 37th Hawaii International Conference on System Sciences*, 2004.

Tippins M. J. and Sohi R. S. "It Competency and Firm Performance: Is Organizational Learning a Missing Link?", *Strategic Management Journal*, 2003, Vol. 24, No. 8, pp. 745-761.

Tsai W. "Knowledge Transfer in Intraorganizational Networks: Effects of Network Position and Absorptive Capacity on Business Unit Innovation and Performance", *Academy of Management Journal*, 2001, Vol. 44, pp. 996-1004.

Ulrich L. "Absorptive Capacity, Environmental Turbulence, and the Complementarity of Organizational Learning Processes", *Academy of Management Journal*, 2009, Vol. 52, No. 4, pp. 822–846.

Varshney U. and Vetter R. "A Framework for the Emerging Mobile Commerce Applications", *Proceedings of the 34th Hawaii International Conference on System Sciences*, 2001.

Vlachos P., Vrechopoulos A. P., and Doukidis G. "Exploring Consumer Attitudes towards Mobile Music Services", *the International Journal on Media Management*, 2003, Vol. 5, No. 2, pp. 138-148.

Vrechoupoulos A., Constantiou I., Sideris I., Doukidis G., and Mylonopoulos N. "The Critical Role of Consumer Behaviour Research in Mobile Commerce", *International Journal of Mobile Communications*, 2003, Vol. 1, No. 3, pp. 329-340.

Wang C. C., Lo S. K., and Fang W. "Extending the Technology Acceptance Model to Mobile Telecommunication Innovation: The Existence of Network Externalities", *Journal of Consumer Behaviour*, 2008, Vol. 7, pp. 101-110.

Wang S. and Cheung W. “E-Business Adoption by Travel Agencies: Prime Candidates for Mobile e-Business”, *International Journal of Electronic Commerce*, 2004, Vol. 8, No. 3, pp. 43-63.

Wang Y. S., Lin H. H., Luarn P. "Predicting Consumer Intention to Use Mobile Service", *Information Systems Journal*, 2006, Vol. 16, pp. 157-179.

Weill P. and Broadbent M. “Leveraging the New Infrastructure: How Market Leaders Capitalize on Information Technology”, Harvard Business School Press: Cambridge, MA, 1998.

Weill P., Subramani M., and Broadbent M. “Building IT Infrastructure for Strategic Agility”, *Sloan Management Review*, 2002, Vol. 44, No. 1, pp. 57-65.

Wolfinbarger M. and Gilly M. C. “eTailQ: Dimensionalizing, Measuring and Predicting etail Quality”, Journal of Retailing, 2003, Vol. 79, pp. 183-198.

Yao J. E., Xu X., Liu C., and Lu J. “Organizational size: A Significant Predictor of IT Innovation Adoption”, *Journal of Computer Information Systems*, 2003, Vol. 1, No. 2, pp. 76-82.

Zahra S. A. and Gerard G. “Absorptive Capacity: A Review, Reconceptualization, and Extension”, *Academy of Management Review*, 2002, Vol. 27, No. 2, pp.185-203.

Zeithaml V. A., Parasuraman A., and Malhorta A. “Service Quality Delivery through Web Sites: A Critical Review of Extant Knowledge”, *Journal of the Academy of Marketing Science*, 2002, Vol. 30, No. 4, pp. 362-375.

Zhang Z. J. and Jasimuddin Sajjad M. “Toward a Strategic Framework of Mobile Knowledge Management”, *Knowledge and Process Management*, 2008, Vol. 15, No. 2, pp. 87-96.

Zhu K., Kraemer K. L., Gurbaxani V., and Xu S. X. “Migration to Open-Standard Interorganizational Systems: Network Effects, Switching Costs, and Path Dependency”, *MIS Quarterly*, 2006, Vol. 30, pp. 515-539.

Zhu K. and Kraemer K. L. “Post-Adoption Variations in Usage and Value of E-Business by Organizations: Cross-Country Evidence from the Retail Industry”, *Information Systems Research*, 2005, Vol. 16, No. 1, pp. 61-84.

Zhu K., Kraemer K. L., and Xu S. “Electronic Business Adoption by European Firms: a Cross-country Assessment of the Facilitators and Inhibitors”, *European Journal of Information Systems*, 2003, Vol. 12, pp. 251–268.

Appendix A: Complete Questionnaire for the mobile service "Orbi" before the exhibition (English Version)

(1: Strongly disagree, 2: Disagree, 3. Somewhat Disagree, 4: No opinion, 5: Somewhat Agree, 6: agree, 7: Strongly agree)

Factor	Question	Score
NE1	The number of companies adopt Orbi services will increase the value of the service.	1 2 3 4 5 6 7
NE2	The number of participants (ex: buyers, mass media, VIP) adopt Orbi services will increase the value of the service.	1 2 3 4 5 6 7
IC1	Buyers in our industry are generally quick to adopt new service innovation (Ex: Orbi service).	1 2 3 4 5 6 7
IC2	Suppliers in our industry are generally quick to adopt new service innovation (Ex: Orbi service).	1 2 3 4 5 6 7
IC3	Competitors in our industry are generally quick to adopt new service innovation (Ex: Orbi service)	1 2 3 4 5 6 7
CP1	The willing to adopt Orbi service is highly affected by competitors.	1 2 3 4 5 6 7
CP2	Within our highly competitive industry, any customer's service innovation (Ex: Orbi service) is noticed by companies to create competitive advantage.	1 2 3 4 5 6 7
OC1	Using Orbi service to keep the customer relationship in exhibition corresponds with our company's faith that encourages and emphasizes customer innovation.	1 2 3 4 5 6 7
OC2	Our company believes customer's service innovation (Ex: Orbi service) is beneficial to sales growth.	1 2 3 4 5 6 7
BA1	Using new service innovation (Ex: Exhibition Analysis Report of Orbi service) to help transforming the enormous information to reliable, relevant and accurate customers' information is important for our company.	1 2 3 4 5 6 7
BA2	It is important for our company to access customer's information fast whenever we need the customer's information.	1 2 3 4 5 6 7
OF1	How many employees (including Subsidiaries and factory) of your company in 2009? □(1) 1~10 □(2) 11~50 □(3) 51~100 □(4) 101~200 □(5) 201~500 □(6) 501~1,000 □(7)More than 1,000	
OF2	How many years have your company founded? □(1) Less than 1 year □(2) 1~3 □(3)4~6 □(4) 7~10 □(5) 11~15 □(6) 16~20 □(7)More than 21years	

Appendix B: Complete Questionnaire for the mobile service "Orbi" in the exhibition (English Version)

(1: Strongly disagree, 2: Disagree, 3. Somewhat Disagree, 4: No opinion, 5: Somewhat Agree, 6: agree, 7: Strongly agree)

Factor	Question	Score
MK1	Our company knows how to design company information to place on Orbi platform to increase buyer awareness for your company brand.	1 2 3 4 5 6 7
MK2	Our company knows how to design product information to place on Orbi platform to increase the buyers' interest in your company products.	1 2 3 4 5 6 7
MK3	Our company knows how to design mobile ads and booth activities information to place on Orbi platform to increase the rate of exposure.	1 2 3 4 5 6 7
MOP1	Our company normally sends the relevant information on products and services to existing customers on mobile devices.	1 2 3 4 5 6 7
MOP2	Our company normally sends the relevant information on products and services to potential customers on mobile devices.	1 2 3 4 5 6 7
MOB1	Using mobile device (ex: cell phone or PDA) conduct the marketing activities (such as sending SMS and mobile advertising, etc.) is not strange for our exhibition staff.	1 2 3 4 5 6 7
MOB2	Our company has enough exhibition staff can support mobile marketing (such as using mobile device for marketing activities).	1 2 3 4 5 6 7
AC1	Our company usually has the action of collecting industry information.	1 2 3 4 5 6 7
AC2	Our company usually has the action of collecting buyer demand.	1 2 3 4 5 6 7
AC3	Our company has the ability to quickly respond to and deal with the requirements of buyers.	1 2 3 4 5 6 7
AC4	Our company has the ability to quickly respond to market changes.	1 2 3 4 5 6 7
AC5	Our company is good at applying customer information in develop new service and products.	1 2 3 4 5 6 7
AU1	Our company thinks the marketing tactics of Orbi services company is helpful.	1 2 3 4 5 6 7
AU2	Our company has the willingness to continue using Orbi service in the follow-up exhibition.	1 2 3 4 5 6 7