

# SERVICE INNOVATION AND PERFORMANCE OF HOSPITAL ORGANIZATIONS

*Completed Research Paper*

**Sang Cheol Park**

Graduate School of Business  
Sogang University  
Shinsu-dong, Mapo-gu, Seoul, Korea  
[sangch77@sogang.ac.kr](mailto:sangch77@sogang.ac.kr)

**Chulmo Koo**

College of Business  
Chosun University  
Seosuk-dong, Dong-gu, Gwangju,  
Korea  
[helmetgu@gmail.com](mailto:helmetgu@gmail.com)

**Chang E. Koh**

College of Business  
University of North Texas  
Denton, Texas, U.S.A.  
[Chang.Koh@unt.edu](mailto:Chang.Koh@unt.edu)

## **Abstract**

*While there are numerous studies conducted to explore various performance issues of hospital organizations, few have approached them from a service-orientation perspective. This study examines how service-oriented activities affect the service climate that can lead to service innovation and performance improvement in hospital organizations. We present a research model based on the concept of the service dominant logic and the resource-based view to justify the importance of service in hospital organizations. The study postulates and confirms that internal capabilities and external infusion influence the service climate, which in turn affects service innovation and performance.*

**Keywords:** Resource-based view, service dominant logic, service climate, service performance

## Introduction

Healthcare industry becomes a central part of the economy of the U.S economy (Agarwal et al., 2010). The healthcare industry is facing a dilemma to satisfy the increasing demand for healthcare services, in much the same way as products and services in other business areas that customers chase their needs and preferences of (Anderson and Agarwal, 2011) while handling the escalating every expenses of such like health services . Fundamentally, delivering superior quality service to customers is related to overall firm performance (Jaworski and Kohli, 1993), depending on environmental conditions such as market turbulence and competitive intensity. In terms of health service and business value consideration, Health Information Systems (HIT) (Anderson and Agarwal, 2011; Angst and Agarwal, 2009; Feldman and Horan, 2011; Agarwal et al., 2010; Goh et al., 2011; Kelley et al., 2011; Menon et al., 2000; Payton et al., 2011; Setia et al., 2011; Shaw and Stahl, 2011) in general and related technologies have majorly made an impact on every aspect of health or medical service.

However, this industry has invested rather, sparingly and reluctantly; in resources such as HIT in improving operational efficiency such as equipment used for diagnosis and therapeutic purposes, and patient care in comparison to their industries in which there have been a considerable amount of work on the productivity (Menon et al., 2000). But through a last decade, various compelling factors such as competitive pressures, rising costs, revenue constraints, and increasingly stringent regulatory requirements have been driving the industry to take on major initiatives to improve service quality, process efficiency, and staff productivity (Agarwal et al., 2010; Gao et al., 2010) in maintaining cost minimization and revenue maximization . As a result, profits of most hospital organizations have been steadily decreased. In the case of large for profit healthcare organizations, earnings have decreased from complex, inpatient services, as more and more patient care has shifted to the outpatient sector (Guo and Anderson, 2005).

In this situation, we need to consider a paradigm shift from traditional healthcare or hospital management approaches to service-oriented healthcare approaches (Lusch and Varo, 2006; Vargo and Lusch, 2004a). This approach highlights that service climate within the hospitals can be viewed as the key component with their customers, markets, staff and competitors. It is increasingly utilized by hospital organizations as an innovative way to provide the much-needed stimulus to increase the profitability of healthcare industry. Thus, service climate in the healthcare industry can be critical to the success of the industry as it is a fundamental requirement for the professional development and licensure maintenance of healthcare professionals.

While relevant research on healthcare or medical issues in IS area have been limited to find out how hospital organizations adopt or hinder health information-aided IT (e.g., Agarwal et al., 2010; Angst and Agarwal, 2009; Kelley et al., 2011; Goh et al., 2011), or why the relationship between productivity and performance in healthcare by leveraging IT was important (e.g., Menon et al., 2000; Setia et al., 2011), however, exceptionally, there has been few empirical works from the service-orientation perspective. Sawhaney et al.(2004) suggested that firms in search of growth are increasingly turning to services since they faced with saturation of their core product markets. Namely, firms are turning to service offerings for their own growth. In particular, despite increasing the importance of service innovation, most hospitals have still struggled to overcome the healthcare costs and concerns about access and medical quality. Thus, we need to present another paradigm of sustaining growth of hospital organizations by applying service-orientation view which can be an innovative method to increase performance of hospital organizations. By doing this, we assume that opportunities exist for hospital organizations in particular to gain an edge over their competitors through the diffusion of service climate. The need to adopt service innovation as a competitive weapon has been further heightened by the competitive pressures that pervade the healthcare industry. In line with this context, we tried to present the new approach which can be crucial to implementing change of service culture in hospital organizations.

First, much of the prior work on healthcare sector has neglected to consider service orientation activities which can lead to competitive advantages with service climates. Therefore, research that can shed additional light on service climate may ultimately prove beneficial to patients (customers) and to the healthcare industry itself.

Second, while previous studies have focused mainly on how IT resources in healthcare sector should affect its

performance such as cost reduction, time savings, comparatively less attention has been placed on service-orientation performance which can be led to service climate and internal/external resources. Therefore, there is a need to understand the role of service climate and how it may influence service innovation and performance.

Based on the better understanding of what drives service performance of hospital organizations for several reasons, we articulated the relationship between the antecedents and service climate and investigated empirically the role of service climate in hospital organizations.

While resource based view has been used as possible theoretical lens to better understand an organization's capabilities (Irwin et al., 1998; Bharadwaj, 2000; Ray et al., 2005), there has been very little empirical work that has investigated the application of resource-based view based on service activities to this domain. Moreover, the work that has been done in this area examined only IT factors that have known to affect the performance (Walker et al., 2005). Therefore, the theoretical mechanism that connects organizational capabilities factors to formulating service climate is underdeveloped and represents a significant theoretical gap in our understanding of the healthcare industry. The remainder of this paper is organized as follows. The next section provides a brief background on healthcare industry and some of the research that has been done in this area, particularly focusing on those studies that relate to service orientation. Then, we introduce our research model and hypotheses. The data analysis and results of our study follow. We complete the paper by discussing the implications of our findings and providing a brief conclusion.

## Theoretical Backgrounds

In this paper, we outlined the requirements of resource capabilities to provide service climate to healthcare organizations, which brought by a resource-based view theory. In addition, we put service-dominant logic into as another dimension for management of healthcare services, using resource capabilities in the healthcare organizations.

### *Service Dominant Logic*

Emerging the importance of service application as new growth engine, Vargo and Lusch (2004a) suggested that service is the best characterization of new dominant logic as a conceptual foundation of service science. Therefore, they have named this character as a service dominant logic (hereafter, S-D logic). It points directly to normative notions of investment in resource, quality of service flow, relationships among service actors (Lusch and Varo, 2006). The S-D logic, which is an alternative to the G-D logic<sup>1</sup>, is a mental model that allows organization to better understand business reality based on a service perspective (Karpen and Bove, 2008). In the S-D logic, the service has been defined as the application of specialized competences (i.e. knowledge and skills) for benefit of another entity, rather than the production of units of output (Lusch et al., 2008; Vargo and Lusch, 2004b).

Namely, service has been referred to a kind of process of doing something for someone, and includes a series of procedure that is an offering service. Based on a new definition of service, the S-D logic redefines the value creation process. On the other hand, in the G-D logic, the value is added to the product itself and at the particular point of exchange is captured in 'value-in-exchange' (Vargo and Lusch, 2004a; 2006). However, Basole and Rouse (2008)

---

<sup>1</sup> Traditionally, in line with G-D logic, the purpose of economic activities was to make and distribute units of output, preferably tangible such as goods. It has been based on units of output (product of operand resource) and has postulated goods were embedded with utility (e.g., value) during manufacturing. That is, G-D logic has focused on the output that firms produced, either tangible or intangible, rather than the competences and resources they used to develop service offerings. While S-D logic embraces the concepts of the value-in-use and co-creation of value rather than the value-in-exchange and embedded-value concepts of G-D logic. Thus, instead of firms being informed to market to customers, they are instructed to market with customers, as well as other value-creation partners in the firm's value network. After all, the goal of G-D logic is to maximize profit through the efficient production and distribution of goods which should be standardized, produced away from the market. Therefore, we employed the S-D logic to explain the relationships between service innovation and performance in hospital organizations in the healthcare industry.

argued that value in the S-D logic can only be driven and determined by customer usage which is called by 'value-in-use'. Henceforth, the S-D logic highlights that the role of customers is altered from the recipient of goods to the co-creator of service and their participation in service provision are critical for the successful value creation (Abela and Murphy, 2008; Vargo and Lusch, 2006). The research of service and service innovation has been progressed remarkably over the past three decades. However, the focus of innovation was only centered on innovations related to technological artifacts or products even though the attention given to services has rapidly grown from the 1970s till today (Droego and Hildebrand, 2009).

By the late 1990s, as it showed the differentiation between service innovation and product innovation, many researchers suggested the different aspects of innovation in service. For instances, John and Storey (1998) defined service innovation as a development of new service products. Van der Aa and Elfring (2002) referred that service innovation encompasses ideas, practices or objects which are new to the organization and to the relevant environment. Furthermore, Liu and Chen (2007) also defined service innovation as all creative activities about services or relevant with service. Following these definitions, service innovation is considered as an interactive process. Thus, we can regard service innovation as the key antecedent of service performance in the healthcare organizations. They also mentioned that service innovation success depends on the interaction between customers and providers. Namely, a high degree of interaction can lead to the value-added service. In line with this logic, we can present that healthcare organizations can create innovation in terms of service when they tried to incorporate customers' experience and capabilities into service climate in the healthcare organizations.

### ***Resource-based view***

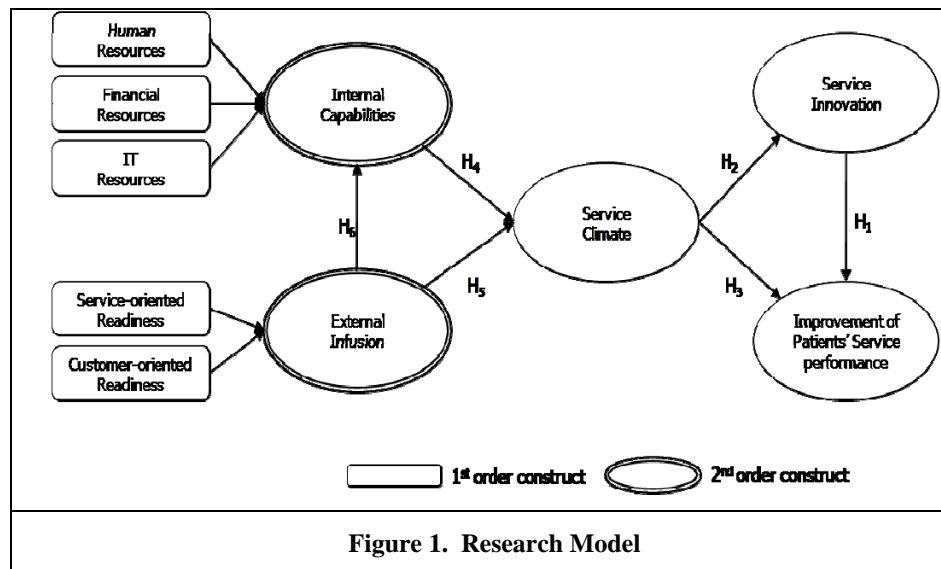
According to the resource based view of the firm, competitive advantage is an outcome of a firm's resources and capabilities that are valuable, rare, imperfectly imitable, and imperfectly substitutable (Barney, 1991). A firm's resources and assets that belong to the firm including brand names, knowledge, skilled labor, trade relationships, equipment, and efficiencies gained through knowledge and capital. This view argues that firms possess resources, a subset of which enables them to achieve competitive advantage, and a further subset which leads to superior long term performance (Barney, 1991; Grant, 1991; Penrose, 1959; Wernerfelt, 1984). Resources that are valuable and rare and whose benefits can be appropriated by the owning (or controlling) firm provide it with a temporal competitive advantage. That advantage can be sustained over longer time periods to the extent that the firm can be able to protect against resource imitation, transfer, or substitution. In general, many empirical studies have strongly supported the resource based view (e.g., McGrath et al. 1995; Miller and Shamsie, 1996; Short et al., 2002; Tarafdar and Gordon, 2007; Zaheer and Zaheer, 1997).

In healthcare organizations, such resources would be categorized such as patient capacities, capital equipments, scheduling and billing systems, and clinical staffs (Jack and Powers, 2004). Generally companies articulate their resources that could be able to contribute to profitability and compete against their competitors (Wernerfelt, 1984). Das and Teng (2000) adopted the resource-based view of the firm in explaining internal strengths and weaknesses and how they influence competitive environment. However, the external availability of resources should be considered as also factors into an organization's strategic decisions. In addition, the resource-based view of the firm is a theoretical framework used to study and explain the competitive behavior of organizations (Fahy, 2000). Although this theoretical framework is widely accepted in the literature, it has not been applied yet as a theoretical foundation for healthcare organizations. Therefore, we tried to examine the relationships between internal resources and external infusion with service activities in healthcare organizations from the resource-based view with the service dominant- logic perspectives.

## **Research Model and Hypotheses**

Figure 1 illustrates our proposed research model, which consists of five constructs derived from the resource-based view and service dominant logic that can be able to explain service innovation and service performance of healthcare organizations (Ray et al., 2005; Scotti et al., 2007). The five constructs of interest, which serve as predictors in our model, are: internal capabilities, which are consisting of human resources, financial resources, and

IT resources, on the other hand, external infusion, which are divided into service-oriented and customer-oriented readiness, service climate, and service innovation. Our study posits direct and indirect effects driven from the four constructs to improvement of patient service performance as dependent variables in this study. As we explain in our hypothesis development section below, we posit that the effect of the four main constructs on the improvement of patient service performance is either directly or indirectly influenced.



## Hypotheses

Service innovation has been described as the driving force of firm growth for decades (Schumpeter 1934). While this relationship has been borne out in a host of empirical studies (Baldwin and Johnson 1996; Barua and Mukhopadhyay 2000; Deshpande et al., 1993; Fichman, 2000; Han et al., 1998; Ramamurthy et al., 1999), some have criticized contemporary innovation literature for emphasizing technical innovations over other types of innovations, noting that the original idea of Schumpeterian innovation was much broader than simply technical or technological innovation (Galloway and Weinstein, 1997). To address this limitation, researchers have explained and shown that product/service innovation, process innovation, and organization innovation positively affect firm performance (de Vries, 2006; Gadrey et al., 1995).

When healthcare organizations are able to develop innovations, be they service, process, or organizational innovations, those firms are poised to see superior performance. The RBV posits that when a resource is valuable, rare, inimitable, and nonsubstitutable, competitive advantage can be built. Innovations are, by definition, rare. They are novel and represent creative approaches to developing new services and products, new processes, or new organizational forms. To the degree that these innovations are potentially valuable and to the degree that they cannot be quickly copied or substituted for, the firm will realize a competitive advantage over their competitors. In the healthcare organization context, we posit that if these organizations tried to consider service innovation as the key issue, that innovation will become a powerful motivating factor to improve patient service performance (Anderson and Agarwal, 2011). This leads us to our first hypothesis:

**Hypothesis 1:** Service innovation is significantly associated with the improvement of patient service performance of hospital organizations.

The healthcare industry is struggling to satisfy dramatic increases in both the demand for and control of the cost of healthcare services (Menon et al., 2000). Historically, hospitals, physician practices, and other healthcare provider

organizations invested sparingly in resources (Payton et al., 2011) such as IT, finance compared with other industries. But competitive pressures, rising costs, revenue constraints, and increasingly stringent regulatory requirements have combined to drive major initiatives to improve service quality, process efficiency, and staff productivity. Therefore, healthcare managers should understand high quality patient services that lead to highly satisfied customers (Scotti et al., 2007). Service climate in this study refers to the employee's perceptions of the practices, procedures, and behaviors that are expected, supported, and rewarded, with regard to customer service (Schneider et al., 1992; 1998). The literature in strategic management identifies service climate as a critical non-IT resource that determines customer service performance (Hansen and Wernerfelt, 1989; Schneider et al., 1992, 1998). Bharadwaj (2000) has considered the service climate as the critical factors in resources. Furthermore, Scotti et al. (2007) also highlighted that high quality customer service affected both directly and through their perceptions of customer orientation. Based on previous findings, therefore, we can propose the following hypotheses:

**Hypothesis 2:** Service climate is significantly associated with service innovation.

**Hypothesis 3:** Service climate is significantly associated with the improvement of patient service performance of hospital organizations.

Historically, hospitals, physician practices, and other healthcare provider organizations invested rarely in resources such as human, finance, and IT compared with other industries. In this time, we should consider these resources critically as the internal capabilities in the healthcare organizations. Capabilities refer to the skills that employees of an organization possess that allow them to coordinate resources to perform a task (Bharadwaj, 2000). Organizational culture, teamwork, and trust are examples of capabilities. According to previous studies, the RBV argues that firms possess capabilities that enable them to achieve competitive advantage, in turn leading to superior long-term performance (Barney, 1991; Hunt and Morgan, 1995; Penrose, 1959; Wernerfelt, 1984). Drawing on RBV theory, IS researchers have started to examine how IT resources—either alone or in conjunction with non-IT resources—affect firm performance (e.g., Ray et al., 2005). The capabilities possessed by a firm can be thought of as belonging to one of two sets—those that primarily influence or respond to market demand and those that reflect the firm's internal operations (Dutta et al., 1999).

In particular, within the rubric of internally focused capabilities, we look specifically at IT resources and IT-enabled cost efficiency as important determinants of service climate. In the context of healthcare organizations, the existing IT resources are likely to play a significant role. Moreover, hospital organizations will be competitively more successful when able to efficiently manage costs. Therefore, these same capabilities have been identified as applicable to healthcare contexts as well (Amit and Schoemaker, 1993; Bharadwaj, 2000; Day, 1994). In addition, Scotti et al. (2007) have highlighted that HRM practices may interact with the creation of a customer-oriented work climate to spur the chain reaction is also desirable. The work of prior investigators offers compelling empirical evidence that bundling complementary sets of human resource practices closely resembling HPWS (e.g., facilitative management, resources, training, communications, teamwork, aligned goals, rewards) positively affects employees' perceptions of their ability to deliver high-quality services to their customers in a variety of profit, retail service settings, including insurance (George 1990; Hallowell et al., 1996), banking (Schneider and Bowen, 1985), and telecommunications (Batt, 2002).

In the healthcare context, professionals' perceptions of their ability to serve patients have been conceptually linked to their work conditions (Newman et al., 2001), and employee development practices have been empirically connected with hospital staff productivity (Goldstein, 2003). Lastly, the financial resource is an important resource for the customer service process. Failure to invest in IT resources and capabilities, by sourcing them internally or externally, can put a firm at a competitive disadvantage in terms of the performance of its customer service process (Ray et al., 2005). For this reason, organizations in healthcare industry have a strong incentive to financially invest a competitive level of service. For instances, educational programs on healthcare services are producing enough trained professionals to keep up with this demand. Thus, we have considered that financial resources are also important factors in internal capabilities.

**Hypothesis 4:** Internal capabilities which have been facilitating by human resources, financial resources, and IT resources are positively affecting in formulating service climate of hospital organizations.

With respect to our research context, the external infusion, which stand for customer-orientation and service-

orientation activities, is require to constantly capturing a change of customer needs and service expectations in a hospital, delivering high quality services are essential and hospital-wide responsiveness to it by supporting of hospital organizations' internal capability. When sufficiently the hospital organizations can sense promptly a necessary of its service and operate their activities for caring patients based on diffusing service, a hospital-wide's procedure and process, and their employees' overall behavior would be differently. Meanwhile, hospital organizations must deliver high-quality patient services that generate highly satisfied and loyal customers (Scotti et al., 2007). The emphasis on customer orientation is apparent in virtually every industry, and the positive impact of customer orientation on firm performance has been widely documented (Holland et al., 2007). A key capability for superior customer orientation is the ability to track and predict changing customer preferences, especially in volatile markets (Holland et al., 2007).

Customer oriented activities enables hospital organizations to track shifts in customer choices much more rapidly. This has resulted in more accurate forecasts of service demand. In the relation to customer orientation, Scotti et al. (2007) have found that customer orientation influence employee and customer perceptions of service quality and patient satisfaction in a national sample of 113 Veterans Health Administration ambulatory care centers. In addition, we can regard service orientation readiness as one of important factors in driving external infusion as well. Within hospital organizations, service-oriented activities can be infused from external atmosphere to their internal capabilities for creating service organization for the healthcare (Holland et al., 2007). The ability to provide superior customer service has been found to have a strong link to increased overall firm performance (Bolton, 1998). In the healthcare context, we would expect a superior ability to deliver desired patient service to result in reinforcing the internal capability of hospital organizations. This can come about, for example, as a result of being able to provide enhanced value to customers (via unique product-service combinations), through the deepening of customer relationships, and by gaining customer insights during service interactions (Homburg et al., 2002; Venkatesan and Kumar, 2004).

So far, our discussion of externally focused capabilities such as customer and service-oriented readiness has emphasized their positive impact on internal capabilities of each hospital organization, as well as the notion that such capabilities with external infusion are expected to have significant effect on for developing and diffusing service climate in hospital organizations. Therefore, externally infused activities such as service-oriented and customer oriented readiness place an emphasis on anticipating and creating durable customer relationships, and are thus more closely associated with diffusion of service atmosphere into hospital organizations while internally focused capabilities emphasize human, finance and IT resources. In this study, we focus on two critical, externally oriented capabilities (infusion)—customer-orientation readiness and service readiness in the healthcare context. The ability to gather, interpret, and use patient information (i.e., customer-oriented readiness) and the ability to deliver superior service (i.e., service-oriented readiness) are all important externally oriented success factors in managing the hospital organizations. Thus, we propose the following hypotheses:

**Hypothesis 5:** External infusion makes positively an impact in formulating service climate of hospital organizations.

**Hypothesis 6:** External infusion is significantly associated with internal capabilities.

## Research Methodology

### *Data Collection*

In this section, we describe how we operationalized each of our constructs. To increase the reliability of the survey measurement, multiple measurement items were developed for each construct. The actual measurement items are shown in Appendix A. Given that our study focused on examining improvement of patient service performance, it was important to be able to probe perceptions of those who had working experiences in hospital organizations. We therefore adopted a survey approach in order to test our research model. The survey was developed and refined as follows. First, we developed an initial version of the questionnaire in which each subject was asked to respond based on his or her working experiences in the hospital organizations. Then, we asked two domain experts to review

the questionnaire. Based on their feedback, revisions were made to improve the questionnaire items<sup>2</sup>. Subsequent to revision of survey items, we disseminated the questionnaires, which were in the form of hardcopies for respondents by hands. Almost of all hospitals in Korea bring their blood sample to test in the blood testing center in an every single weekend by in person. Before a total of 600 questionnaires were distributed directly to administrative managers in hospital organizations using of errands, we called them via person to person. We picked up 508 acquisitions from the managers, which resulted in a response rate of 84.6%. The data collection period was two months, from August 1, 2010 to September 30, 2010. A total of 500 valid questionnaires were used.

### **Data Analysis**

Table 1 shows the demographics for our sample. Most respondents (78.4%) were in the 26-45 age groups; 61.0% of these subjects were male and 39.0% were female. Most hospitals are located at local area in Korea (80.4%). Almost of all hospitals are based on private and general type-organizations (89.6%). The average number of hired employees is 90.7 persons and the average number of beds in hospital organizations that we targeted was 126.

| <b>Table 1. Sample Demographics</b> |                   |           |       |                    |                      |           |       |
|-------------------------------------|-------------------|-----------|-------|--------------------|----------------------|-----------|-------|
| Items                               | Category          | Frequency | Ratio | Items              | Category             | Frequency | Ratio |
| Gender                              | Male              | 305       | 61.0% | Positions          | Deputy section chief | 169       | 33.8% |
|                                     | Female            | 195       | 39.0% |                    | Section chief        | 170       | 34.0% |
| Age                                 | <=25              | 20        | 4.0%  |                    | Head of department   | 90        | 18.0% |
|                                     | 26-35             | 180       | 36.0% |                    | Executive            | 41        | 8.2%  |
|                                     | 36-45             | 212       | 42.4% |                    | Hospital director    | 30        | 6.0%  |
|                                     | 46-55             | 69        | 13.8% | Types of hospitals | Private hospitals    | 230       | 46.0% |
|                                     | >=56              | 19        | 3.8%  |                    | General hospitals    | 218       | 43.6% |
| Location                            | Metropolitan area | 98        | 19.6% |                    | University hospitals | 52        | 10.4% |
|                                     | Local area        | 402       | 80.4% |                    |                      |           |       |

### **Measurement Model**

Convergent and discriminant validity were analyzed using confirmatory factor analysis (CFA) conducted using the PLS approach. Convergent validity was assessed using three criteria recommended by Fornell and Larcker (1981): (1) all scale items should have significant and high loadings (higher than 0.6) on their respective scales, (2) the average variance extracted (AVE) for each construct should exceed 0.50, and (3) composite reliability of each construct should exceed 0.80. The CFA results, shown in Table 2, all items considered in this study had path loadings that were significant and exceeded 0.60. The lowest AVE among all of our constructs was 0.60 and the lowest composite reliability was 0.80. Hence, our data sample is satisfied all three conditions of convergent validity. Additionally, the Cronbach alpha value for each of our construct exceeded 0.70, assuring internal consistency of our measurement scales. The next step in establishing measurement reliability was to examine the internal consistency

<sup>2</sup> Since the original measures were in English, they were translated into the Korean language for administration to respondents. To check for translation bias, a back-translation technique was employed, where different translator translated in Korean questionnaires back into English. A high degree of correspondence between the original English measures and the back-translated measures assured us that the translation process did not introduce any bias in the survey instrument.



for each block of measures (that is, construct reliability).

This was done by examining the composite reliability, Cronbach's alpha, and the average variance extracted (AVE) for each block of measures, as shown in Table 3 and Table 4. Composite reliability scores and Cronbach's alpha scores both measure the internal consistency within a given construct's items. The threshold values for composite reliability and Cronbach's alpha are not absolute ones, but our measures appear to be more than acceptable by established criteria. Bearden et al. (1993) claims that a score of .7 indicates "extensive" evidence of reliability, and a score of .8 or higher provides "exemplary" evidence. As shown in Table 4, all of the constructs in our measurement model exhibited composite reliabilities of 0.858 or higher, and they all exhibited Cronbach's alpha of 0.779 or higher. Average variance extracted (AVE) assesses the amount of variance that a latent construct "captures from its indicators relative to the amount due to measurement error" Fornell and Larcker (1981) view AVE as a measure of construct reliability. The guideline threshold for AVE is 0.5, meaning that 50% or more variance of the indicators is accounted for (Chin, 1998). As Appendix C indicates, all of the constructs in our measurement model exceeded the established criteria for AVE. Thus, all of the constructs in our measurement model exceeded the threshold judged to be acceptable for construct reliability.

**Table 2. Confirmatory Factor Analysis Results**

| Constructs                 | Items | Item loadings | S.E.  | T-Statistic | Constructs                                   | Items | Item loadings | S.E.  | T-Statistic |
|----------------------------|-------|---------------|-------|-------------|--|-------|---------------|-------|-------------|
| Financial resources        | FC1   | 0.792         | 0.100 | 8.254       | Customer-oriented readiness                  | CS1   | 0.819         | 0.042 | 19.330      |
|                            | FC2   | 0.841         | 0.103 | 8.460       |  | CS2   | 0.841         | 0.041 | 20.381      |
|                            | FC3   | 0.895         | 0.080 | 11.672      |  | CS3   | 0.852         | 0.033 | 25.698      |
|                            | FC4   | 0.761         | 0.126 | 6.460       |  | CS4   | 0.799         | 0.063 | 12.719      |
| Service-oriented readiness | SE1   | 0.869         | 0.030 | 29.385      |  | CS5   | 0.825         | 0.041 | 20.011      |
|                            | SE2   | 0.895         | 0.026 | 34.924      |  | CS6   | 0.819         | 0.039 | 21.035      |
|                            | SE3   | 0.775         | 0.070 | 11.138      |  | CS7   | 0.844         | 0.038 | 22.191      |
| Service climate            | CR2   | 0.850         | 0.037 | 23.137      | Improvement of patients' service performance | PR1   | 0.861         | 0.039 | 22.231      |
|                            | CR3   | 0.870         | 0.032 | 27.434      |  | PR2   | 0.869         | 0.034 | 25.438      |
|                            | CR4   | 0.896         | 0.029 | 31.203      |  | PR3   | 0.845         | 0.042 | 20.060      |
|                            | CR5   | 0.893         | 0.027 | 33.107      |  | PR4   | 0.878         | 0.035 | 24.930      |
|                            | CR6   | 0.879         | 0.038 | 22.988      |  | PR5   | 0.868         | 0.039 | 22.618      |
|                            |       |               |       |             |  | PR6   | 0.852         | 0.042 | 20.459      |
| Human resources            | HC1   | 0.679         | 0.119 | 5.916       | IT resources                                 | IT1   | 0.813         | 0.047 | 17.328      |
|                            | HC2   | 0.775         | 0.098 | 8.213       |  | IT2   | 0.898         | 0.027 | 33.211      |
|                            | HC3   | 0.814         | 0.085 | 9.826       |  | IT3   | 0.876         | 0.035 | 25.231      |
|                            | HC4   | 0.821         | 0.078 | 10.711      |  |       |               |       |             |
| Service innovation         | BC1   | 0.663         | 0.117 | 5.760       |  |       |               |       |             |
|                            | BC3   | 0.842         | 0.044 | 19.150      |  |       |               |       |             |
|                            | BC4   | 0.847         | 0.038 | 22.257      |  |       |               |       |             |
|                            | BC2   | 0.726         | 0.076 | 9.698       |  |       |               |       |             |

| Table 3. Reliability of Constructs           |                             |       |       |                       |                  |       |
|--|-----------------------------|-------|-------|-----------------------|------------------|-------|
| Construct                                    |                             | Mean  | S.D.  | Composite Reliability | Cronbach's alpha | AVE   |
| External infusion                            | Service-oriented readiness  | 3.361 | 0.733 | 0.885                 | 0.803            | 0.721 |
|  | Customer-oriented readiness | 3.665 | 0.727 | 0.939                 | 0.924            | 0.687 |
| Service climate                              |                             | 2.776 | 0.932 | 0.944                 | 0.926            | 0.773 |
| Improvement of patients' service performance |                             | 3.347 | 0.714 | 0.947                 | 0.934            | 0.75  |
| Service innovation                           |                             | 3.393 | 0.822 | 0.858                 | 0.779            | 0.605 |
| Internal capabilities                        | IT resources                | 3.197 | 0.826 | 0.899                 | 0.808            | 0.749 |
|  | Financial resources         | 3.323 | 0.790 | 0.924                 | 0.894            | 0.744 |
|  | Human resources             | 3.364 | 0.814 | 0.874                 | 0.810            | 0.635 |

Having established convergent validity, we then turned to discriminant validity. Going across the rows, each indicator has a higher loading with its construct than a cross-loading with any other constructs. This provides good evidence of discriminant validity (Fornell and Larcker, 1981). As the test of discriminant validity, we considered whether the AVEs of the latent constructs were greater than the square of the correlations among the latent constructs (see Table 4). When this is true, more variance is shared between the latent construct and its block of indicators than with another constructs. As you can be seen by reading across the rows of the Tables 4, our measures passed this test, thus providing additional evidence of discriminant validity. Having established the validity of our measurement model, we now turn to the structural model using PLS.

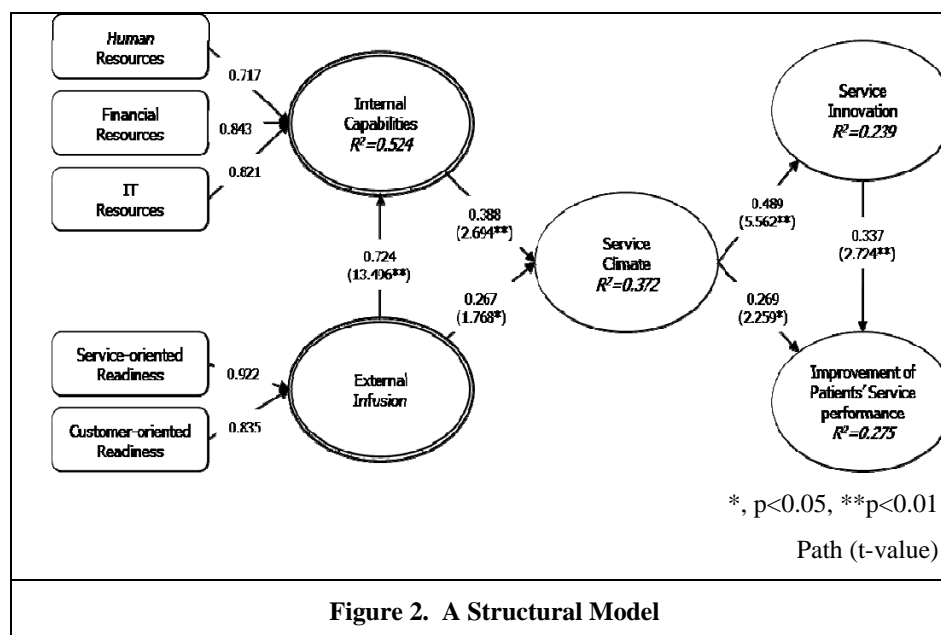
| Table 4. Squared Pairwise Correlations and Assessment of Discriminant Validity  |              |              |              |              |              |              |              |              |
|---|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|
| Constructs  | FC           | SE           | CS           | CR           | PR           | HC           | BC           | IT           |
| FC  | <b>0.863</b> |              |              |              |              |              |              |              |
| SE  | 0.406        | <b>0.849</b> |              |              |              |              |              |              |
| CS  | 0.351        | 0.578        | <b>0.829</b> |              |              |              |              |              |
| CR  | 0.402        | 0.529        | 0.372        | <b>0.879</b> |              |              |              |              |
| PR  | 0.450        | 0.397        | 0.408        | 0.434        | <b>0.866</b> |              |              |              |
| HC  | 0.499        | 0.606        | 0.506        | 0.428        | 0.361        | <b>0.797</b> |              |              |
| BC  | 0.384        | 0.599        | 0.505        | 0.489        | 0.468        | 0.468        | <b>0.778</b> |              |
| IT  | 0.358        | 0.588        | 0.509        | 0.525        | 0.418        | 0.507        | 0.604        | <b>0.865</b> |
| Note: Diagonal elements represent square root of AVE value for the corresponding construct  |              |              |              |              |              |              |              |              |
| Legend: FC: Financial resource, SE: Service-oriented readiness, CS: Customer-oriented readiness, CR: Service climate, PR: Improvement of patients' service performance, HC: Human resources, BC: Service innovation, IT: IT resources |              |              |              |              |              |              |              |              |

Given our high response rates, non-response bias was not a concern in our study. However, common method bias (CMB) could still pose a substantive threat to the internal validity of our findings given that most of our independent variables were measured at a single point in time, mostly using perceptual Likert scales. To test for this bias, based on the recommendation of Podsakoff et al. (2003) and the analytical procedure used by Liang et al. (2007), we added a common method factor to our PLS model, and allowed indicators of all constructs to be associated

reflectively with the method factor. Then each indicator variance explained by the principle constructs and by the method factor was computed. The results, shown in Appendix B, indicate that while all of the substantive factor loadings (on hypothesized constructs) were significant and high (the lowest value being 0.721), the same could not be said for the method factor loadings (the highest value was 0.04). The average substantive factor loading was 0.842, while the average method factor loading was 0.048. Furthermore, the average substantive explained variance for the hypothesized indicators was 0.710, while the average common method-based variance is only 0.002. The above evidence suggests that that common method bias was likely not a significant threat in this study.

### Hypotheses Testing

The next step in our data analysis was to examine the path significance and magnitude of each of our hypothesized effects and the explanatory power of the proposed model. This analysis was also done using the PLS path analytic technique. Results are shown in Figure 2.



Given the sample used in this study, a strict significance level of 0.01 was used for all statistical tests. The explanatory power of a structural model can be evaluated by looking at the  $R^2$  value (variance accounted for) of the final dependent construct. It is also instructive to examine the  $R^2$  values for the intermediate variables in the structural model. The final dependent construct in this study (improvement of patients' service performance) has an  $R^2$  value of 0.275, indicating that the model accounts for 27.5% of the variance in the dependent variable. The  $R^2$  value for service innovation was 0.239. Furthermore, the  $R^2$  value of service climate and internal capabilities were 0.524 and 0.372 respectively. In our judgment, these  $R^2$  values are sufficiently high to make interpretation of path coefficients meaningful. After computing the path estimates in the structural model using the entire sample, all of the hypotheses from  $H_1$  to  $H_6$  were found to be significantly supported.

As shown in Figure 2, the path between service innovation and improvement of patients' service performance ( $\beta=0.337$ ,  $t=2.724$ ), the path between service climate and service innovation ( $\beta=0.489$ ,  $t=5.562$ ), the path between service climate and customer performance ( $\beta=0.269$ ,  $t=2.259$ ), the path between internal capabilities and service climate ( $\beta=0.388$ ,  $t=2.694$ ), the path between external infusion and service climate ( $\beta=0.267$ ,  $t=1.768$ ), and the path between external infusion and internal capabilities ( $\beta=0.724$ ,  $t=13.496$ ) are all significant at  $p < 0.01$  and  $p < 0.05$ .

## Implications

We draw upon multiple theoretical views that of service climate to construct and test a research model of how internal capabilities with external infusion can influence the service climate which can lead to service innovation as well as service performance in hospital organizations. Based on empirical test, we hold important implications for both research and practice. Before discussing these implications, however, it is important to point out the study's limitations.

First of all, while most of the variables specified in our model are relevant to a range of settings, the discrete linkages quite likely vary in strength. Furthermore, future research should seek to illuminate the multidimensional drivers of service climate in terms of healthcare context and their relative importance. Further research is also needed to test the linkage between the extent of service climate and financial performance and to elaborate the sequence of paths that form any such connection. Furthermore, the results of representative respondents may limit the generalizability of our findings since we tried to empirically test our data from Korean hospitals. Thus, future research should be required to evaluate the generalizability of the model by collecting from larger and more diverse samples such as service participants such as doctors, nurses, expert service provider or other stakeholders such as administrative people facing on patients in hospitals.

Second, in this study, the resource-based model of investigation into patient service performance requires future empirical research in the health care industry. Hospitals have undergone acute resource shortages in recent years, and they have participated in alliance and acquisition strategies as a result. The distribution of organizational forms in the hospital sector has been shifting from independent ownership to interorganizational relationships with other firms including health care systems, networks, and management contract arrangements. Thus, we advocate further research that examines linkages between hospital organizations and their position in healthcare industry. Finally, although the study was primarily cross-sectional in nature, we need to observe service performance as the time goes by. Therefore, we cannot completely check the change of time periods. To better understand service performance, future research using longitudinal design is needed to clarify the development of service climate and improvement of service performance. Time-series designs may also be helpful in exploring how the service climate which is affected by internal and external capability can lead to increase service performance in many hospital organizations. By adopting time-series designs, future study needs to explore the relationship between service climate and its performance in other service sector such as hotel, resorts and so forth. In spite of the aforementioned limitations, we believe that our work has important implications for both research and practice.

### *Implications for research*

Hospital organizations face an increasingly competitive and resource constrained environment that makes sustaining a competitive advantage more difficult. Under this circumstance, we first, drawing from resource-based view with service-dominant logic, we attempt to present key drivers of core capabilities within the hospitals and hospital organizations. Our constructs collectively explain more than 27.5% of the variance in improvement of patient service performance. This suggests that our constructs with service-dominant logic, which derived from resource-based view, provides a powerful means of understanding competitive advantage that face in hospital organizations. Our results clearly show that internal capabilities with external service infusion can help to explain service climate, as they were all significant variables of service innovation and performance of hospital organizations. Further, we tried to focus on illustrating service-oriented management of hospital organizations by considering service climates within the organizations. Evidence also is accumulating that customer-oriented work climates produce superior service quality and customer satisfaction, operating independently (Henning- Thurau 2004) or in conjunction with high-performance human resource practices in proprietary firms in retail services industries (Schneider, et al., 1998; Yoon et al., 2001).

In line with prior findings, we tried to apply the importance of service climates into managing the hospital organizations. In particular, the relationship between service climate and service innovation as catalysts for superior improvements of patient service performance has received little empirical investigation within the hospital organizations. We offer empirical justification for the relationships between service climate and service innovation that contribute to high performance in a healthcare setting and yields findings that can be used to guide hospital

managers in their efforts to design and enhance their organizational practice. Finally, only a few previous studies have provided any empirical evidence that service performance is stimulated by developing service climate and service innovation. Based on the empirical support, we can speculate that the impact of service climate and service innovation may raise the improvements of patient service performance. In particular, service-dominant logic may explain why service climate and service innovation are recognized to the hospital organizations.

### ***Implication for practice***

This study also has some practical implications for hospital organizations. In particular, our empirical findings provide a simple and powerful means that can help to improve performance of hospital organizations. First, it is important for hospital managers to understand the factors that formulate and promote the antecedents of service innovation. Internal capabilities, which are the combination of human, finance and IT resources, and external infusion based on service concept, which is consisting of service-oriented and customer-oriented activities appear to be particularly important determinants of service climate. Based on our findings, we can present that maximizing internal capabilities with service-orientation in the healthcare industry provide a portfolio of offerings that are relevant to patients' service needs.

Second, service climate and service innovation appear to be particular important determinants of improvement of patients' service performance. According to Scotti et al.(2007), service climate can promote business performance and lead to competitive advantage in the healthcare sector. In order to foster a high-performance of patients' service orientation, the importance of patient service must be incorporated into the internal capabilities in each hospital organization. Thus, managers must continuously emphasize the importance of customer service, clearly define customer service objectives, and solicit input from patients regarding their perceptions of service encounters. Once achieved, a customer-oriented work environment must be reinforced by strategic HRM practices that nurture a high-performance climate of service excellence. Several managerial actions are conducive to cultivating customer-oriented high-performance work systems in the hospital organizations.

Lastly, from the standpoint of hospital organizations, it should be noted that service climate and service innovation could be detrimental in that it may ultimately result in improve their own performance. For instances, a willingness to listen to the customer could be one of the defining features of a customer-oriented work climate. Having heard the voice of the customer, health services managers should promptly communicate information needed to help hospital providers improve their level of service quality. Our study supports the argument that service providers, by virtue of their frequent and close contact with patients, are reliable sources of insight into the needs and expectations of their customers. Managers should explicitly acknowledge this truth and survey the opinions of frontline providers as part of their regular market-research activities.

### **Conclusion**

In this study, we attempt to examine how internal capabilities from infusion external service and customer activities have affected service climate that lead to both service innovation and performance in healthcare. The results suggest that 1) internal capabilities and external infusion have influenced the service climate, 2) service climate have affected both service innovation and patients' service performance. The results suggest that 1) internal capabilities and external infusion have influenced the service climate, 2) service climate have affected both service innovation and patients' service performance. The chief contribution of this study is that it develops and tests a theoretically service-oriented model of managing hospital organizations by adopting resource-based view and service dominant logic.

While such the perspective has been suggested in the literature, and there is already evidence that resource capabilities in a certain organization are predictive of its performance, this is the first study that provides empirical evidence that internal resource capabilities with external infusion of customer and service orientation have both direct and indirect effects on service climate and service innovation. The theoretical perspectives explored here represent promising new avenues for research into managing hospital organizations, and we invite others to test and

extend our model so as to further improve our understanding of this important phenomenon.

## References

- 1 Abela, A. V., Murphy, P. E.(2008). Marketing with integrity: ethnics and the service-dominant logic for marketing, *Journal of the Academy of Marketing Science*, 36, 1, 39-53.
- 2 Agarwal, R., Gao, G., DesRoches, C., and Jha, A. K. (2010). The digital transformation of healthcare: Current status and the road ahead, *Information Systems Research*, 21, 4, 796-809.
- 3 Amit, R., and Schoemaker, P. (1993), Strategic assets and organizational rent. *Strategic Management Journal*, 14, 1, 33–46.
- 4 Anderson, C. L., and Agarwal, R. (2011). The digitization of healthcare: Roundary risks, emotion, and consumer willingness to disclose personal health information, *Information Systems Research*, 1-22.
- 5 Angst, C. M., and Agarwal, R. (2009). Adoption of electronic health records in the presence of privacy concerns: The elaboration likelihood model and individual persuasion, *MIS Quarterly*, 33, 2, 339-370.
- 6 Batt, R. (2002), Managing customer services: human resource practices, quit rates, and sales growth," *Academy of Management Journal*, 45, 3, 587-97.
- 7 Barney, J.(1991), Firm resources and sustained competitive advantage, *Journal of Management*, 17, 1 , 99–120.
- 8 Baldwin, J.R., and Johnson, J. (1996). "Business Strategies in More- and Less-Innovative Firms in Canada," *Research Policy* (25:5), pp. 785-804.
- 9 Basole, R. C., Rouse, W. B.(2008), Complexity of service value networks: conceptualization and empirical investigation, *IBM Systems Journal*, 47, 1, 53-70.
- 10 Barua, A., and Mukhopadhyay, T. (2000). "Information Technology and Business Performance: Past, Present, and Future," in: *Framing the Domains of IT Management*, R.W. Zmud (ed.). Cincinnati, Ohio: Pinnaflex Education Resources.
- 11 Bearden, W.O., Netemeyer, R.G., and Mobley, M.F.(1993). *Handbook of marketing scales*. (1993).
- 12 Bharadwaj, A.(2000), A resource-based perspective on information technology capability and firm performance: an empirical investigation. *MIS Quarterly*, 24, 1, 169–196.
- 13 Bolton, R.(1998). A dynamic model of the duration of the customer's relationship with a continuous service provider: The role of satisfaction, *Marketing Science*, 17, 1, 45–65.
- 14 Bontis, N., Crossan, M.M. and Hulland, J.(1995). Managing an organizational learning system by aligning stocks and flows, *Journal of Management Studies*, 39, 4, 437-469.
- 15 George, W. R. (1990). Internal marketing and organizational behavior: a partnership in developing customer-conscious employees at every level, *Journal of Business Research*, 20, 1, 63-70.
- 16 Chin, W.W. (1998). The partial least square approach to structural equation modeling. . in *Modern Method for Business Research*, G.A. Marcoulides(ed.), Mahwah, NJ: Lawrence Erlbaum, 150-170.
- 17 Classen, D.C., Kanbouwa, M., Will D. Casper, J. Lewin, J. and Walker, J. (2005)., The patient safety institute demonstration project: a model for implementing a local health information infrastructure, *Journal of Healthcare Information Management*, 19, 4, 75-86.
- 18 Cool, K., and Schendel, D.(1988), Performance differences among strategic group members, *Strategic Management Journal*, 9, 207-233.
- 19 Cordell, W.H., Overhage J.M., Waeckerle JF. (1998), Strategies for improving information
- 14 Post-ICIS 2011, LG CNS/KrAIS Workshop, Shanghai, China

- management in emergency medicine to meet clinical, research, and administrative needs. *Academy of Emergency Medicine*, 5, 162-167.
- 20 Coldstein, S. M, (2003), Employee development: an examination of service strategy in a high-contact service environment, *Production and Operations Management*, 12, 2, 186-203.
- 21 Crossan, M., Lane, H.W. and Wroderick, E.W.(1999) An organizational learning framework: from intuition to institution, *Academy of Management Review*, 24, 3, 522-537.
- 22 Das, T. and Teng, B. (2000). A resource-based theory of strategic alliances, *Journal of Management*, 26, 31-61.
- 23 Day, G.(1994), The capabilities of market-driven organizations. *Journal of Marketing*, 58, 37–52.
- 24 de Vries, E.J. (2006)., Innovation in services in networks of organizations and in the distribution of services, *Research Policy*, 35, 7, 1037-1051.
- 25 Dean, A. M. (2004), Links Between organizational and customer variables in service delivery: evidence, contradictions, and challenges, *International Journal of Service Industry Management* 15, 4, 332-350.
- 26 Dennis J. Scotti, D.J., Harmon, J.M. and Behson, S.J. (2007), Links among high-performance work environment, service quality, and customer satisfaction: an extension to the healthcare sector, *Journal of Healthcare Management*, 52, 2, 109-124.
- 27 Deshpande, R., Farley, J.U., and Webster Jr., F.E. (1993). Corporate culture, customer orientation, and innovativeness in Japanese firms: a quadrad analysis, *Journal of Marketing* , 57, 1, 23-27.
- 28 Dierickx, I. and Cool, L.(1989) Assets stock accumulation and sustainability of competitive advantage, *Management Science*, 35, 12, 1504-1513.
- 29 Droege, H., Hildebrand, D.(2009). Innovation in services: present findings, and future pathways, *Journal of Service Management*, 20, 2, 131-155.
- 30 Dutta, S. Narasimhan, O. and Rajiv, S.(1999), Success in high-technology markets: Is marketing capability critical? *Marketing Science*, 18, 4, 547–568.
- 31 Fahy, J. (2000), The resource-based view of the firm: some stumbling-blocks on the road to understanding sustainable competitive advantage, *Journal of European Industrial Training*, 24, 94-106.
- 32 Feldman, S. S., and Horan, T. A. (2011). The dynamics of information collaboration: A case study of blended IT value propositions for health information exchange in disability determination, *Journal of the Association for Information Systems*, 12, special issue, 189-207.
- 33 Fichman, R. (2000). The diffusion and assimilation of information technology investments, in: *Framing the Domains of IT Management*, R.W. Zmud (ed.). Cincinnati, Ohio: Pinnaflex Education Resources, 105-127.
- 34 Fornell, C., and Larcker, D.F. Evaluating structural equation models with unobservable variables and measurement error. *Journal of Marketing Research* 18, 1 (1981), 39-50.
- 35 Gadrey, J., Gallouj, F., and Weinstein, O. (1995), New modes of innovation: how services benefit industry, *International Journal of Service Industry Management* , 6, 3, 4-16.
- 36 Ganguly, P. and Ray,P.(1998). Enterprise-wide networking and computing in health-care industry: a case study, *IEEE ENCOM* 98.
- 37 Gallouj, F., and Weinstein, O. (1997), Innovation in services, *Research Policy* , 26, 4, 537-556.
- 38 Gibson, P., Greenhalgh, G. and Kerr, R.(1995). Manufacturing management principles and concepts, Londong: Chapman & Hall.
- 39 Goh, J. M., Gao, G., and Agarwal, R. (2011). Evolving work routines: Adaptive routinization of

information technology in healthcare, *Information Systems Research*, 1-21.

- 40 Grant, R. M.(1991), The resource-based theory of competitive advantage: implications for strategy formulation, *California Management Review*, 33, 1, 114-135.
- 41 Karpen, I. O., Bove, L. L.(2008), *Linking S-D logic and marketing practice: Toward a strategic service orientation*, Otago Forum 2: Academic Papers.
- 42 Kelly, H., Chiasson, M., Downey, A., and Pacaud, D. (2011). The clinical impact of eHealth on the self-management of diabetes: A double adoption perspective, *Journal of the Association for Information Systems*, 12, special issue, 208-234.
- 43 Kolata G (2005) *In unexpected medicare benefit, U.S. will offer doctors free electronic records system*, New York Times A14 July 21
- 44 Hair, J.F., Jr., A.R.E., R.L., T., and W.C, B. (1998). *Multivariate data analysis*.
- 45 Han, J.K., Namwoon, K., and Srivastava, R.K. (1998), Market orientation and organizational performance: Is innovation a missing link?, *The Journal of Marketing*, 62, 4, 30-45.
- 46 Hansen, G., and Wernerfelt, B.(1989), Determinants of firm performance: The relative importance of economic and organizational factors, *Strategic Management Journal*, 10, 5, 399-411.
- 47 Hallowell, R., Schlesinger, L.A. and Zornitsky, J. (1996). Internal service quality, customer and job satisfaction: linkages and implications for managers, *Human Resource Planning* 19, 2, 20-31.
- 48 Hennig-Thurau, T. (2004), Customer orientation of service employees: its impact on customer satisfaction, commitment, retention, *International Journal of Service Industry Management*, 15, 5, 460-478.
- 49 Homburg, C., Hoyer, W.and Fassnacht, M. (2002), Service orientation of a retailer's business strategy: dimensions, antecedents, and performance outcomes, *Journal of Marketing*, 66, 86-101.
- 50 Holland, J, Wade, M.R. and Antia, K.D.(2007). The impact of capabilities and prior investment on online channel commitment and performance, *International Journal of Electronic Commerce*, 23, 4, 109-142.
- 51 Hunt, S., and Morgan, R. (1995), The comparative advantage theory of competition, *Journal of Marketing*, 59, 1-15.
- 52 Irwin, J.G., Hoffman, J.J., and Lamont, B.T. (1998), The effect of the acquisition of technological innovations on organizational performance: a resource-based view, *Journal of Engineering and Technology Management*, 15, 1, 25-54.
- 53 Jack, E. and Powers, T., (2006), Managerial perceptions on volume flexible strategies and performance in health care services, *Management Research News*, 29, 5, 228-241.
- 54 Johnne, A. and Storey, C.,(1998), New service development: a review of the literature and annotated bibliography, *European Journal of Marketing*, 184-252.
- 55 John Poulos, The network-centric healthcare enterprise: computing for the future, <http://www.altel.com/corporate/inform/enss/nchlthcr.htm>
- 56 Liang, H., Saraf, N., Hu, Q., and Xue, Y. (2007), Assimilation of enterprise systems: the effect of institutional pressures and the mediating role of top management, *MIS Quarterly*, 31, 1, 59-87.
- 57 Linchtentahaler, U.(2009), Absorptive capacity, environmental turbulence and the complementarity of organizational learning process, *Academy of Management Journal*, 52, 4, 822-846.
- 58 Liu, L. L., Chen, X. G.(2007). Service innovation mechanism based on customer-employee interaction, *2007 International Conference on Management Science & Engineering 14 th*.
- 59 Lusch, R. F., Vargo, S. L.(2006). Service-dominant logic: reactions, reflections and refinements, *Marketing Theory*, 281-288.



- 60 Mahoney, J. T., and Pandian, R. (1992). The resource- based view within the conversation of strategic management, *Strategic Management Journal*, 13, 363-380.
- 61 McGrath, R. G., MacMillan, I. C., and Venkataraman, S. (1995). Defining and developing competence: a strategic process paradigm, *Strategic Management Journal*, 16, 251-275.
- 62 Menon, N. M., and Lee, B., and Eldenburg, L. (2000). Productivity of information systems in the healthcare industry, *Information Systems Research*, 11, 1, 83-92.
- 63 Miller, D., and Shamsie, J. (1996). The resource-based view of the firm in two environments: The Hollywood film studios from 1936-1965, *Academy of Management Journal*, 39, 3, 519-543.
- 64 Santhanam R., and Hartono E. (2003), Issues in linking information technology capability to firm performance. *MIS Quarterly*, 27, 1, 125-153.
- 65 Schneider, B., Wheeler, J. K., and Cox, J. F. (1992), A passion for service: using content analysis to explicate service climate themes, *Journal of Applied Psychology*, 77, 5, 705-716.
- 66 Schneider, B., While, S. W., Paul, M. C. (1998), Linking service climate and customer perceptions of service quality: test of a causal model, *Journal of Applied Psychology*, 83, 2, pp. 150-163.
- 67 Schneider, B. and Bowen, D.E. (1985), Employee and customer perceptions of service in banks: replication and extension, *Journal of Applied Psychology*, 70, 3, 423- 433.
- 68 Schumpeter, J.A. 1934. *The Theory of Economic Development: An Inquiry into Profits, Capital Credit, Interest, and the Business Cycle*. Cambridge, MA: Harvard University Press.
- 69 Scotti, D. Harmon, J. and Behson, S. (2007), Links among high-performance work environment, service quality, and customer satisfaction: an extension to the healthcare sector, *Journal of Healthcare Management*, 52, 2, 109-124.
- 70 Short, J.C., Ketchen, D.J.Jr., Palmer, T.B., and Hult, G.T.M. (2007), Firm, strategic group, and industry influences on performance, *Strategic Management Journal*, 28, 147-167.
- 71 Sawhney, M., Balasubramanian, S. and Krishnan, V. (2004), Creating growth with service, MIT Sloan Management Review, Winter, 34-43.
- 72 Tarafdar, M. and Gordon, S.R. (2007), Understanding the influence of information systems competencies on process innovation: a resource based view, *Journal of Strategic Information Systems*, 16,4, 353-392.
- 73 Payton, F. C., Pare, G., LeRouge, C., and Reddy, M. (2011). Health care IT: Process, people, patients and interdisciplinary considerations, *Journal of the Association for Information Systems*, 12, 2/3, 1-13.
- 74 Penrose, E. T. *The Theory of the Growth of the Firm*, Wiley, New York, 1959.
- 75 Podsakoff, P. M., MacKenzie, S. B., Lee, J-Y., and Podsakoff, N. P. (2003), Common method biases in behavioral research: a critical review of the literature and recommended remedies. *Journal of Applied Psychology*, 88, 5, 879-903.
- 76 Ramamurthy, K., Premkumar, G., and Crum, M.R. (1999), Organizational and interorganizational determinants of EDI diffusion and organizational performance," *Journal of Organizational Computing and Electronic Commerce* 9,4, 253-285.
- 77 Ray, G., Muhanna, W.A. and Barney, J.B. (2005), Information Technology and the performance of the customer service process: a resource-based analysis, *MIS Quarterly*, 29, 4, 625-652.
- 78 Van de Aa, W., Elfring, T., (2002). Realising innovation in services, *Scandinavian Journal of Management*, 155-171.
- 79 Vargo, S. L. and Lusch, R. F. (2004a), Evolving to a new dominant logic for marketing, *Journal of Marketing*, 1, 1-17.
- 80 Vargo, S. L., Lusch, R. F. (2004b), The four services marketing myths: remnants from a

manufacturing model, *Journal of Service Research*, 4, 324-335.

- 81 Vargo, S. L., Lusch, R. F.(2006b), *Service-dominant logic as a foundation for a general theory*, In R. F. Lusch and S. L. Vargo (Eds.), *The Service-Dominant Logic of Marketing: Dialog, debate and directions*. Armonk, NY: M.E. Sharpe.
- 82 Venkatesan, R., and Kumar, V.(2004). A customer lifetime value framework for customer selection and resource allocation strategy, *Journal of Marketing*, 68, 4, 106–125.
- 83 Walker J, Pan E, Johnston D, Adler-Milstein J, Bates D, Middleton, B.(2005),The value of health care information exchange and interoperability. *Health Affairs*, 24, 5–10
- 84 Wernerfelt, B. (1984), A Resource-Based View of the Firm, *Strategic Management Journal*, 5, 171-180.
- 85 Yoon, M, H, Beatty, S.E.and Suh, J.(2001), The effect of work climate on critical employee and customer outcomes: an employee-level analysis, *International Journal of Service Industry Management*, 12, 500-521,
- 86 Zaheer, A., and Zaheer, S. (1997), Catching the wave: alertness, responsiveness, and market influence in global electronic networks, *Management Science*, 43, 11, 1493-1509.

## **Appendix A. Measurement Items**

### **Service Climate (Ray et al., 2005)**

~~CR1. Patient service unit has established clear standards for the quality of service to be delivered. (drop)~~

CR2. The hospital measures and tracks the quality of service provided by the patient service unit.

CR3. Patient service representatives are informed about external patient evaluation of the quality of service delivered by the patient service unit.

CR4. The hospital offers competitive salaries to patient service representatives.

CR5. Patient service representatives are recognized for delivering quality service.

CR6. Patient service representatives are rewarded for delivering quality service.

### **Improvement of patients' service performance (Linchtentahaler et al., 2009)**

Relative to your competitors, how does your organization perform concerning the following statements:

PR4. Attain growth

PR5. Increase profits

PR6. Increase market share

PR7. Increase the number of customers (e.g. suppliers etc.)

PR8. Increase the number of patients

PR9. Achieve overall performance.

### **Service innovation (Partially modified based on Ray et al., 2005)**

BC1. Our hospital is performing service innovation via cost-saving activities such as controlling costs, outsourcing and so forth.

BC3. Our hospital is performing service innovation via improving interior space of our hospital building.

BC4. Our hospital is performing service innovation via attracting potential patients

MC3. Overall, our hospital is committed to service innovation of our hospital.

**[Internal capabilities] (Self-development)**

**Human resources**

HC1. Our medical team has great capabilities to treat patients.

HC2. Our functional management has great capabilities to support patients and medical teams.

HC3. Our functional managers are knowledgeable about the business operations of our hospital.

HC4. The relation between labor and management has been well cooperative.

**Financial resources**

FC1. Our hospital has a sufficient capability to raise funds.

FC2. Our hospital has an adequate level of liquid funds.

FC3. The financial structure of our hospital is solid.

FC4. Our hospital holds the high credit-rating from all of the major credit rating agencies.

**IT resources**

IT1. IT infrastructure of our hospitals (e.g PACS, OCS, EMR, or ERP etc) has been well constructed.

IT2. IT staffs of our hospital have qualified technical skills.

IT3. IT staffs are knowledgeable about their IS operations of our hospital.

**[External infusion] – (Self-development)**

**Service-oriented readiness**

SE1. Our hospital is committed to the medical service-oriented activities.

SE2. Our hospital makes efforts to offer personalized medical services to the patients.

SE3. Our hospital guarantees medical teams make their own decisions about what to do on their work.

**Customer-oriented readiness**

CS2. Our hospital tried to provide our patients with all information that patients wanted.

CS3. Our hospital tried to correctly answer when patients have questions on their diseases.

CS4. Our hospital tried to correctly explain patients' physical conditions.

CS5. Our hospital tried to provide patients with the benefits of our medical services.

CS6. Our hospital tried to meet patients' needs that they wanted.

CS7. Our hospital tried to give more helpful services to patients.

## Appendix B Common Method Bias Test

| Constructs                      | Indicator | Substantive<br>Factor Loading(R1) | R1 <sup>2</sup> | Method Factor<br>Loading(R2) | R2 <sup>2</sup> |
|---------------------------------|-----------|-----------------------------------|-----------------|------------------------------|-----------------|
| Financial<br>Resources          | FC1       | 0.829                             | 0.686           | 0.043                        | 0.002           |
|                                 | FC2       | 0.877                             | 0.768           | 0.044                        | 0.002           |
|                                 | FC3       | 0.924                             | 0.855           | 0.047                        | 0.002           |
|                                 | FC4       | 0.824                             | 0.679           | 0.04                         | 0.002           |
| Service-<br>oriented readiness  | SE1       | 0.871                             | 0.759           | 0.052                        | 0.003           |
|                                 | SE2       | 0.897                             | 0.804           | 0.050                        | 0.002           |
|                                 | SE3       | 0.775                             | 0.6             | 0.048                        | 0.002           |
| Customer-<br>oriented readiness | CS1       | 0.842                             | 0.709           | 0.048                        | 0.002           |
|                                 | CS2       | 0.854                             | 0.729           | 0.048                        | 0.002           |
|                                 | CS3       | 0.799                             | 0.638           | 0.043                        | 0.002           |
|                                 | CS4       | 0.828                             | 0.685           | 0.048                        | 0.002           |
|                                 | CS5       | 0.819                             | 0.67            | 0.050                        | 0.003           |
|                                 | CS6       | 0.843                             | 0.711           | 0.049                        | 0.002           |
| Service Climate                 | CR2       | 0.853                             | 0.727           | 0.045                        | 0.002           |
|                                 | CR3       | 0.872                             | 0.761           | 0.042                        | 0.002           |
|                                 | CR4       | 0.897                             | 0.805           | 0.041                        | 0.002           |
|                                 | CR5       | 0.892                             | 0.796           | 0.047                        | 0.002           |
|                                 | CR6       | 0.88                              | 0.774           | 0.041                        | 0.002           |
| Performance<br>Improvement      | PR1       | 0.864                             | 0.746           | 0.051                        | 0.003           |
|                                 | PR2       | 0.868                             | 0.753           | 0.051                        | 0.003           |
|                                 | PR3       | 0.843                             | 0.711           | 0.048                        | 0.002           |
|                                 | PR4       | 0.886                             | 0.784           | 0.050                        | 0.002           |
|                                 | PR5       | 0.878                             | 0.771           | 0.049                        | 0.002           |
|                                 | PR6       | 0.859                             | 0.738           | 0.052                        | 0.003           |
| Human<br>resources              | HC1       | 0.721                             | 0.52            | 0.04                         | 0.002           |
|                                 | HC2       | 0.798                             | 0.637           | 0.045                        | 0.002           |
|                                 | HC3       | 0.831                             | 0.69            | 0.048                        | 0.002           |
|                                 | HC4       | 0.831                             | 0.691           | 0.048                        | 0.002           |
| Service<br>Innovation           | BC1       | 0.669                             | 0.448           | 0.042                        | 0.002           |
|                                 | BC3       | 0.841                             | 0.707           | 0.053                        | 0.003           |
|                                 | BC4       | 0.844                             | 0.713           | 0.057                        | 0.003           |
|                                 | BC2       | 0.742                             | 0.551           | 0.050                        | 0.003           |
| IT resources                    | IT1       | 0.818                             | 0.668           | 0.053                        | 0.003           |
|                                 | IT2       | 0.902                             | 0.813           | 0.052                        | 0.003           |
|                                 | IT3       | 0.874                             | 0.764           | 0.054                        | 0.003           |
| <b>Average</b>                  |           | <b>0.842</b>                      | <b>0.71</b>     | <b>0.048</b>                 | <b>0.002</b>    |