



Effects of innovation leadership and supply chain innovation on supply chain efficiency: Focusing on hospital size



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ABSTRACT

This study examines the effects of innovation leadership and supply chain (SC) innovation on SC efficiency in the healthcare organization. Specifically, this study attempts to investigate the moderating effect of hospital size (more than 500 and <500 beds) on the relationships. The data used in this study were collected from relatively large hospitals with more than 100 beds. The structural equation modeling (SEM) technique with AMOS 17.0 was used to test hypotheses in the research model. The results show that innovation leadership positively affects SC innovation which in turn increases SC efficiency.

For hospitals with more than 500 beds the results confirm the effect of innovation leadership on SC innovation and a positive relationship between SC innovation and SC efficiency. On the other hand, hospitals with <500 beds hospital size is not moderated between information technology and SC efficiency, but other relationships are supported in the research model showing hospital size moderates the relationships between innovation leadership, SC innovation, and SC efficiency. The study demonstrates SC innovation plays a key role in improving operational processes for SC efficiency and contributes to the practice of healthcare management and theoretically to efficiency through innovation in supply chain management for the healthcare industry.

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1. Introduction

The rapidly growing national healthcare expenditures (NHE) in the U.S. as well for developing countries are a significant issue in supply chain management (SCM) (Lee et al., 2011). Currently, information technology in healthcare systems has been receiving and deserves attention to evaluate the SC efficiency (Pai and Huang, 2011).

Healthcare providers in the United States and other nations are trying to respond to the tremendous pressure to reduce costs. Many attempts, however, are counterproductive, ultimately leading to higher costs and sometimes lower quality care (Kaplan and Haas, 2014). By 2020 supply chain will be the biggest hospital expense although today it is second (MH&L, 2015). MH&L (2015) surveyed healthcare supply chain executives and announced that over 80% agreed supply chain is extremely important for reaching profitability (89%) and revenue targets (83%), while 61% agreed cost reduction strategies in the supply chain have been extremely important in responding to customer pricing pressure. The increasing rate leads to focusing on cost reduction through hospital operational efficiency (Watcharasriroj and Tang, 2004).

To better understand the reasons why hospitals utilize SCM to reduce costs and improve efficiency and effectiveness through innovation, it is essential to analyze the various characteristics of how SCM affects performance. Innovation is a collective process of implementing ideas generated throughout resources, skills, and personnel within organizational functions and/or different organizations (Tatikonda and Rosenthal, 2000). Innovation makes it possible to achieve desired outcomes in a variety of settings (e.g., organizational performance, efficiency and/or effectiveness). Therefore, it is important to provide an environment in which healthcare leaders focus on innovation through various devices (e.g., IT applications, leadership, etc.) (Lee et al., 2011). Typically, new care services, new ways of patient care, or new technology represent innovation in healthcare systems (Länsisalmi et al., 2006). As expected, different SC require different techniques for each aspect of SCM, such as SC innovation based on hospital size. Since there is no one-size-fits-all SC, most hospital units operate multiple SCs. Thus, hospitals need to explore operations management strategies based on hospital size differences in SCM because of the importance of SC efficiency in the healthcare industry.

Previous studies related to SCM have focused mainly on reducing the delivery cost of the supply chain (EHCR, 1996; Rivard-Royer et al., 2002; Kumar et al., 2008), enhancing relationships with suppliers (Lambert et al., 1997; Kumar et al., 2008; Lee et al., 2011), and improving

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organizational performance (Lambert et al., 1997; Minkman et al., 2007; Kumar et al., 2008) in the healthcare system. However, for successful implementation of recommendable best practices there is a paucity of research that examines the influence of innovation leadership and SC innovation on SC efficiency for different sized organizations in the healthcare industry.

The purpose of this study is to examine the effect of innovation leadership and SC innovation on SC efficiency in the healthcare industry and the effect of hospital size (e.g., more than 500 and <500 beds) on the relationships in order to suggest different management strategies. More specially, the research question seeks to be answered in this present paper is as follows: (1) Does innovation leadership impact SC innovation? (2) Do process improvement and information technology of SC innovation have an impact on SC efficiency? (3) Does hospital size (e.g., <500 beds and more than 500 beds) moderate those relationships?

A research model is proposed based on previous studies and examined using the structural equation modeling approach. The rest of this paper is organized as follows: Section 2 presents a review of previous studies; Section 3 proposes a research model and hypotheses; Section 4 shows the research methodology; Section 5 reports the results of the model; Section 6 presents conclusions and discussion.

2. Literature review

Innovation is defined as the application of new ideas, processes, products, or procedures that benefit the individual, the group, or the society (West and Farr, 1990). Porter (1990) suggest that innovation is imperative to achieve competitive advantage and organizational sustainability. Also innovation is important for handling complex and often conflicting goals in the healthcare industry.

Recently, SCM has drawn significant attention in the healthcare industry because of its significant impact on hospital performance in terms of reducing waste, preventing medical errors, improving quality of care and service, and increasing operational efficiencies (Schneller and Smeltzer, 2006; Kowalski, 2009; Shih et al., 2009). Healthcare SCM presents the flow of information, funds, and goods and services (Jacobs and Chase, 2010).

SCM is referred to as “the collaborative effort of multiple channel members to design, implement, and manage seamless value-added processes to meet the real needs of the end customer” (Fawcett and Magnan, 2001). SCM is concerned with “improving both efficiency (i.e., cost reduction) and effectiveness (i.e., customer service) in a strategic context to obtain competitive advantage that ultimately brings profitability” (Mentzer et al., 2001). Also, the Institute for Supply Management (n.d.) defined SCM as “the design and management of seamless, value-added processes across organizational boundaries to meet the real needs of the end customer”. It can mean that increased efficiency and effectiveness strive to improve organizational performance.

The goal of SCM is to achieve short-term and long-term objectives by facilitating efficient and effective information flow; the short-term objective is to increase productivity and reduce delivery time while the long-term objective is to increase customer satisfaction, market share, competitive advantage, and organizational performance (Chan et al., 2008). SCM includes business activities and operations that integrate a continuous, seamless flow of material and services for healthcare delivery including SC value chain processes from suppliers that provide products, services, and information to patients (Rivard-Royer et al., 2002; Shih et al., 2009).

2.1. Innovation leadership

Leadership is widely studied in many fields as a complex topic, and it is one of the fundamental concepts in organization theory. Leadership is the most important factor affecting innovation (Cummings and

O’Connell, 1978) because innovation refers to the successful implementation of creative ideas within an organization (Amabile et al., 1996; Amabile, 1998). Leadership that is focused on innovation includes transformational leadership (Elkins and Keller, 2003; Jung et al., 2003). Most organizations are engaged in innovative activities as a competitive strategy and accept innovation as an important method of organizational competitiveness and survival (Jung et al., 2003).

In order for healthcare organizations to survive in the competitive environment with ever-increasing customer expectations and continuously advancing technologies, efficient leadership is necessary for the development of organizational innovation which strengthens healthcare organizations internally as well as externally. The ability of leaders to effectively lead the organization is important to the delivery of care, customer/patient satisfaction, as well as the overall success of the organization in the healthcare industry. In addition to individuals that comprise the leadership team, each person or each medical staff team within the organization has certain leadership or management skills. Each medical staff team (e.g., surgical and internal disease affairs, dental, eye care, examination, etc.) cannot only reflect leadership traits, but can also directly impact other teams and the group’s overall performance.

Carmeli et al. (2010) describe the essence of innovation leadership as “encouragement of individual initiatives, clarification of individual responsibilities, provision of clear and complete performance evaluation feedback, a strong task orientation, emphasis on quality group relationships and trust in organizational members”. Innovation leadership promotes a more adaptive organizational system (e.g., high levels of support facilitates and advances information technology) and supports employees in adapting to new, changing and creative work environments (e.g., teamwork and collaboration, motivating environment, flexibility, and resources) (Van de Ven and Chu, 1989; Hammer and Champy, 1994; Christensen, 1997; Carmeli et al., 2010; Dingler and Enkel, 2016). In addition, innovation leadership is imperative as hospitals face different challenges such as medical staff shortages, the rising need for specialized care, maintenance of accurate patient databases, a rising number of uninsured patients and increasing costs of medication. For example, Intel faced soaring healthcare costs estimated to reach \$1 billion by 2012 including the steadily rising cost of care. The company tried to improve processes through process innovation using collaboration. Treatment costs of certain healthcare conditions fell by 24% to 49%. Thus, providers of healthcare services seeking quality improvements and supplier management are uniquely positioned to drive collaboration (McDonald et al., 2015).

Innovation leadership in the healthcare industry also provides inspiration for individual and organizational excellence, shares a vision, develops strategies, and increases higher quality of care and services through promoting organizational systems and supporting a creative work environment. To derive innovation in SCM, a leader must have a thorough understanding of SCM activities and have good working relationships within the organization; this includes having the right resources to support efficient operational processes throughout the healthcare organization. In this study measurement items of innovation leadership are used to evaluate leaders’ behaviors in healthcare organizations based in part on innovation group leadership indicated by the Minnesota Innovation Survey (Van de Ven and Chu, 1989) and Lovelace et al. (2001).

2.2. SC innovation

As Mishra and Shah (2009) point out, innovation is a complex process that is “typically characterized by high levels of both uncertainty and equivocality”. This suggestion of uncertainty in the environment involves technological change and customer demand. In the healthcare industry, for example, patient health information is stored online and supports patient health-related business with patient approval. Patients

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