



# Effects of healthcare quality management activities and sociotechnical systems on internal customer experience and organizational performance

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## Abstract

This study examines the effects of quality management (QM) activities and socio-technical systems (STS) on internal customer (employee) experience and organizational performance in healthcare organizations. The proposed research model and developed hypotheses were tested using structural equations modeling based on the data collected from 239 employees who had more than three years of work experiences at general hospitals in South Korea. The results of the study indicated that QM activities have positive effects on STS components, which in turn help improve internal customer experience and organizational performance. The study results provide insights to healthcare organizations for sustainable hospital management strategies.

**Keywords** Quality management activities · Sociotechnical systems · Customer experience · Organizational performance · Healthcare industry

## 1 Introduction

Customer experience is important because it is an organizational goal in its own right, and ideas suggested by customers can be translated into strategic solutions for co-creating customer value (Hudadoff 2009; Lee 2018). In the customer-centric era, customers represent a valuable source of ideas for improvements of care services

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based on their experiences, which may influence their decision to revisit or recommend healthcare providers through word-of-mouth (Lee 2018).

Healthcare organizations strive to provide excellent service experience to customers, as such experience is critical to the quality of care differentiation (Wolf 2018). Healthcare providers can increase customer experience maturity and capabilities while improving loyalty and value for organizational competitive advantage (Lee 2018; Wolf 2018). Thus, positive customer experience is an integral factor for customer satisfaction and organization performance (Lee 2018; Wolf 2018). Customer satisfaction is directly related to service quality, which in turn is realized when internal customers (employees) are satisfied at work (Heskett et al. 1997; Lee 2018). Since internal customers endeavor to solve external customers' (patients and their family members) problems/complaints, organizations should put internal customer centricity at the top of their management priorities. Employees who perceive and trust that their efforts are sufficiently recognized by the organization would have a high level of job satisfaction which subsequently would improve their work performance (Heskett et al. 1997; Lee et al. 2012). The virtuous cycle, then, is realized that a high level of internal customer satisfaction engenders quality service to external customers, which in turn positively affects organizational performance (Heskett et al. 1997).

Quality management (QM) in healthcare organizations requires a holistic approach as customer needs are complex and directly related to their quality of life (Lee et al. 2013). QM activities in hospitals should be organized systematically as suggested by the QM dimensions that are included in the various recognized quality awards (e.g., Deming Prize, Malcolm Baldrige National Quality Award, and European Foundation for Quality Management, etc.) and certification programs (e.g., International Standards Organization, Joint Commission International, Accreditation Canada International, etc.) (Lee et al. 2013; Smith et al. 2017).

Organization members are the most important asset as they directly deliver service to customers (Shostack 1977; Lee 2018). Since the role of employees in a service encounter is critical, organizations should provide their employees with the support they need to deliver the best possible service to customers (Douglas and Fredendall 2004; Lee et al. 2013). QM activities should encompass the needs of both the organization itself (e.g., the goal of receiving quality awards and/or certifications) and its members (e.g., financial and non-financial rewards) to derive synergistic effects.

Smith et al. (2017) emphasized the importance of procedures and responsibilities for QM activities for organizational performance and then suggested using Socio Technical Systems (STS) theory. The theory advocates that an organization should develop appropriate cultures, processes, and systems (technical components) for providing continuous positive experiences to its customers (Smith et al. 2017). As such, innovative operational strategies should be developed by identifying the factors that positively affect internal and external customer experience through the relationship between healthcare QM activities and STS.

Customer experience has received much attention recently and is widely studied as a key factor for enhancing favorable provider-user relationships (Lee 2018), loyalty (Haeckel et al. 2003; Lee et al. 2012), word-of-mouth (Pine and Gilmore

1998; Lee et al. 2012), and repurchase intentions (Verhoef et al. 2009; Lee 2018). However, there is a paucity of empirical studies on customer experience from an integrated perspective in care processes (Zomerdijk and Voss 2010; Lee 2018).

While QM activities represent a blueprint for providing quality care services to patients, the sociotechnical system (STS) of the hospital through its three major components of employee competences, processes, and management represents the execution enabler of QM activities. The quality management literature for healthcare has yet to explore the interplay of internal employees' experience in the relationships of QM activities—> STS—> internal employees' experience and organizational performance of a hospital. This is the focus of the current study. Thus, this study attempts to answer the following three research questions: (1) How do QM activities impact STS in a hospital? (2) Do STS components impact internal customer experience? (3) Does internal customer experience impact organizational performance? A research model is developed to answer these questions. The result of the study is expected to contribute to the literature and practice in healthcare management regarding internal customer experience through QM activities and STS components which subsequently lead to improved organizational performance.

The rest of the paper is organized as follows: Sect. 2 reviews relevant literature; in Sect. 3, the proposed research model with hypotheses is developed; Sect. 4 presents research methodology; Sect. 5 reports the results of analysis; and Sect. 6 concludes the study by summarizing the results, implications, and limitations of the study.

## 2 Literature review

Healthcare services are generally defined as a series of processes for the treatment of diseases, from prevention to actual treatment of patients (Lee et al. 2012, 2013). The services include professional medical care to protect patients' lives and various preventive treatment services to ensure their well-being (Lee et al. 2013). The basic goal of care activities is to create patient satisfaction through interactions with medical staff and/or medical equipment (Lee 2018).

One of the essential characteristics of care service is the existence of 'information asymmetry' between the physician and the patient in value creation (Blomqvist and Leger 2005). The healthcare industry is a typical provider-led market where the service provider continuously strives to generate new information. In the process, there is the constant presence of high market failure risk due to the moral hazard caused by information asymmetry (Blomqvist and Leger 2005). Information asymmetry creates value because care methods, including examination, treatment, and medications, vary depending on the condition of the patient, even for the same illness. While medical technology advances, care providers increase, and medical staff also grow, the number of patients often increases at a faster pace. Therefore, building a healthy community is an emerging social issue that demands both social aspects of people and technical aspects of organizational processes, structure, and culture (e.g., STS) due to information asymmetry (Blomqvist and Leger 2005; Smith et al. 2017).

## 2.1 Quality management in healthcare

QM is described as a management method in which all members of the organization strive together to improve their work performance so as to enhance long-term customer satisfaction (Smith et al. 2009; Kristianto et al. 2012). Especially, total quality management (TQM), a process that focuses on solutions and the effects of QM on operational processes and performance, has been widely investigated by researchers and embraced by practitioners (Lee et al. 2013; Chaudary et al. 2015). The basic principle of TQM is to develop operational processes with precise descriptions of required activities to those who are responsible for quality improvement (Vincoli 1991).

TQM in healthcare institutions is intended to improve patient satisfaction through enhancing the quality of care services (McFadden et al. 2009; Lee et al. 2012, 2013). Since TQM can help improve patient satisfaction, it serves as an effective management system that continuously encourages organization members to be engaged in creating a patient-centered organization culture (McFadden et al. 2009; Lee et al. 2013). Thus, TQM can be a conduit for integrating quality policies into organizational culture and management strategies, data, and effective communication (Smith et al. 2017).

The American Society for Quality (<https://asq.org/quality-resources/totalqualitymanagement>) defines TQM as "... a management system for a customer-focused organization that involves all employees in continual improvement." It implies that TQM is a customer-focused concept. Psomas and Jaca (2016) suggested that organizations should focus on a customer-oriented culture to meet customer expectations and ensure their satisfaction. In this perspective, healthcare organizations should evaluate customer expectations based on their experience in the quality of care services and the resultant satisfaction.

The general criteria used for evaluating TQM include leadership, quality department activities, employee participation, education and training, and operational procedures. Oakland (2011) suggested that prioritizing customer-centeredness, improving processes, and ensuring total employee participation are the basic principles of TQM. Oakland (2011) also suggested that TQM support comprises executive leadership, staff education and training, support organizations for other departments and external consultants, communication with staff, rewards and recognition, and performance measurement. Zhang et al. (2014) proposed that fundamental QM activities should include leadership, customer-centeredness, education and training, process management, and employee participation/teamwork.

Based on previous studies, the key components of TQM can be summarized as follows: leadership, participation of organizational members, education and training, process management and operational procedure, and continuous improvement. Thus, in this study, measurement variables for QM activities employed are the role of leadership and the quality department, employee participation, education and training, and process and operational procedure.

*The role of leadership* is to lead staff and support them in the successful execution of QM. Thus, in this study, leadership is defined as the ability to motivate and encourage organizational members by setting and delivering realistic visions and

feasible objectives to facilitate the long-term growth of the organization. In this vein, *the role of quality department* is regarded as the ability to deploy QM activities efficiently, access to the CEO, the extent to which the department exerts impact on decision-making, the ability of systems to reflect customer opinions, and the provider's systematic efforts to deliver excellent service quality.

*Employee participation* refers to the authority and active participation of employees in delivering desired value to customers. *Education and training* help improve professional knowledge, technology, and the perceptions and beliefs of employees participating in QM activities. They are therefore referred to as an organization's continuous support for education and training to improve customer satisfaction and develop human resources.

As the level of automation of tasks and close cooperation among employees help improve an organization's productivity and work efficiency, *process and operational procedure* are defined as the ability to establish a suitable management system according to organizational changes in the structure, process, and value. In this study, the measurements of QM activities are adopted, with modifications, from the studies of Sampson and Terziowski (1999) and Lee, et al. (2016). Table 1 provides the measurement items for QM activities.

## 2.2 Sociotechnical system theory

Sociotechnical system (STS) theory was proposed by Emery and Trist (1960) to describe complex social interactions among humans, machines, technologies, and the environment in the workplace (Baxter and Sommerville 2010). STS requires social and cultural factors within the system to achieve its purpose. The theory proposed that not only technology providers but also technical operators, mass media, consumers, and NGOs should be considered as major actors in the system (Smith et al. 2017).

STS theory is an attempt to best integrate technical and non-technical components of a system. This approach leads to changes in the organization or organizational members through continued interactions among users (Geels 2004). Social demand, which is a non-technical component, optimizes functions of technology and people by integrating human demands, including people's attitudes (e.g., competencies, functions, attitudes, and values), interactions among people, reward systems, and the structure of authority (Baxter and Sommerville 2010; Smith et al. 2017). Technical demand includes technical components, such as transformation processes, tasks, and technologies required to transform input resources into outputs for improving organizational productivity.

Interactions among various users can be an essential component for ensuring the stability and sustainability of STS (Smith et al. 2017; Lee 2018). Organizations that create a work environment where employees are empowered to freely exercise their capabilities for delivering high levels of service can induce customer satisfaction that in turn would improve organizational performance (Cahill and Warshawsky 1995).

**Table 1** Measurement items of QM activities

Component	Measurement items	References
Role of the leadership	RSM1: solid quality management objectives and visions of CEO RSM2: CEO's willingness to deliver a vision, objectives, and value to organizational members RSM3: CEO's commitment to and supervision of the practice of quality management	Forker et al. (1997), Sampson and Terziowski (1999); Lee et al. (2016)
Education and training	EAD1: implementing education and training programs for improving customer satisfaction EAD2: providing (human and material) resources needed for education and training EAD3: management's recognition of the importance of employees EAD4: recognizing the importance of human resources development through education and training EAD5: providing opportunities for education and training	
Role of quality department	RQD1: implementing customer satisfaction improvement projects RQD2: launching a customer satisfaction department (team) RQD3: proportion of the customer service department in hospital management RQD4: the customer service department's (team's) role as a mediator of inter-departmental issues	
Process and operational procedure	POP1: degree to which clear instructions are given for tasks or missions POP2: level of task automation POP3: guaranteeing employee flexibility in handling customer support tasks POP4: degree of mutual cooperation among employees in solving task-related problems	
Employee participation	EPA1: degree to which employees' opinions are reflected in decision-making EPA2: smooth communication between employees and the management EPA3: degree of cooperation among employees to accomplish goals EPA4: degree of task-improvement projects for employees	

While Smith et al. (2017) did not clearly identify an environmental system of STS, Kull et al. (2013) suggested that environmental systems should include social and technological systems. Their rationale was that the environmental system can be regarded as a unit of industry, government, and society, whereas the social system would be a unit of group culture, social network, or politics, and the technical system is viewed as a unit of equipment, methods, knowledge, etc. (Kull et al. 2013). As such, under the environmental system, it is possible to improve the organizational performance and quality of work-life through an effective integration of social and technical systems.

The environmental system is where social components can be implemented to foster employee work performance and organizational profitability (Schneider et al. 2009). This implies that user interactions are important for maintaining a balance between social/technical components of STS. For example, in the Cleveland Clinic's patient experience improvement project, the human interaction between patients and medical staff (i.e., communication) is considered the most critical factor. In this project, medical staff participated in various mandatory education and training programs, which helped them communicate better with patients (Merlino and Raman 2013). This is a real-world case that demonstrates that medical staff's human activities have a positive effect on patient experience.

Above all, personal competence of organization members is imperative to successfully provide services to meet social needs. That is, employees should have the ability to balance the organization's goals with social needs. The process of improving personal competence of employees should be continuous to provide the best service by responding to the dynamic environment with agility and adaptability. In other words, the organization must be equipped with a system or process that can implement its technical and human resources for organizational goals and social needs. In healthcare providers, STS can be a catalyst for changes in the organization and their members through continuous interaction with customers (Geels 2004). For instance, improving the physical interaction with patients using IT-supported devices would be important, if medical staff did not previously understand the operational context of such technology enabled solutions. Since the effectiveness of STS depends on how well it helps balance organizational goals with social needs, it is necessary to build a healthy work environment where creative ideas can be explored freely for effective interactions with customers. STS seeks to harmonize social demands of customers/employees and technical demands of the organization (Smith et al. 2017). Thus, STS can be divided into a technical system that develops procedures, a social system that translates established procedures and responsibilities into action, and an integrated system that combines the two systems. For an effective utilization of STS in hospitals, in this study, meeting social demand refers to *employee competence*, technological demand to respond to dynamic changes refers to *process*, and interactions for social and technical harmonization are referred to *management*.

A social system includes the requirement for task performance of employees who need the systems and processes to provide quality customer experiences (Lee 2018). Employee competence of STS represents employees' individual abilities to perform tasks, prepared through education, training, and evaluation (Smith et al. 2017). In this study, employee competence is defined as employees' willingness to develop

new skills, which are necessary to deliver quality healthcare (Smith et al. 2010, 2017). The study adapted measurement items of employee competence suggested by Ahire et al. (1996) and Smith et al. (2017).

A technical system includes the requirements for task performance to provide positive customer experiences (Lee et al. 2016; Lee 2018). STS processes of a hospital include continuous improvement in care delivery services (Smith et al. 2017). For example, quality improvement activities contribute to the development of a quality culture through effective design of the process structure (Shostack 1984; Lee 2018; Lee et al. 2013). In this study, the process of STS is defined as the degree of efforts required to continuously improve efficiency in the delivery of care services. In the study, measurement items of the process are based on the studies of Lee et al. (2016) and Smith et al. (2017).

An integrated system of interactions for social and technical harmonization refers to management aspects involved in meeting the needs of employees and demands of customers in the work environment of the healthcare system. The components of the management of STS are focused on customer-centric logic (Smith et al. 2017). These dimensions represent the quality culture of the organization which engenders quality services to customers and enhanced organizational performance (Ferris et al. 1998; Kull et al. 2013; Lam et al. 2015; Smith et al. 2017). In this study, the component of management is defined as the degree of efforts at organizational and individual levels to meet customer requirements based on the well-designed workplace. The measurements of management dimension are adopted, with modification, from the studies of Lee et al. (2016) and Smith et al. (2017). Table 2 provides the detailed description of measurement items for the STS components.

### 2.3 Internal customer experience

Healthcare customers have different experience expectations as the primary value they seek may not be just quality care services (Wolf 2018). Thus, most hospitals try to implement continuous innovations to better accommodate external customers' needs and experiences (e.g., the Cleveland Clinic and the Mayo Clinic). Gundersen Lutheran Health Systems, an integrated healthcare organization in Wisconsin, Minnesota, and Iowa, strives to provide excellent care services to patients through internal customer satisfaction. The hospital proclaims that "it is critically important that the service we provide matches or exceeds the expectations of our internal customers" (Myers 2012, p.1). A new trend among healthcare providers is customer-centered service as a priority for providing experience value to both internal and external customers.

Nowadays, customers can analyze their personal medical information through various means such as smartphones, wearable devices, and genetic analysis tools (Lee 2018; Lee and Lim 2018). Customers as patients no longer simply follow the suggestions of their physicians but actively participate in treatment decision-making using their own search of disease-related information on the Internet and their own direct or indirect experiences. On the other hand, employees are more engaged in their tasks when they perceive sufficient support from the management as the

**Table 2** Measurement items: STS components

Component	Measurement items	References
Employee capability	ECE1: providing education on quality management practices ECE2: opportunities for education and training ECE3: providing education on quality assurance methods ECE4: education and training received are sufficient to ensure delivery of care service ECE5: employee training is sufficient to ensure jobs are performed correctly	Ahire et al. (1996), Smith et al. (2017)
Process	PCI1: making efforts to continuously improve work performance PCI2: actively work to prevent mistakes when we fail PCI3: efficiency of the information technology system PCI4: service delivery process is designed with demands of patients and employees in mind	Lee et al. (2016), Smith et al. (2017)
Management	MCC1: members can acquire information on customer demands MCC2: customer demands are communicated to members MCC3: hospital utilizes customer demands as references for providing quality service MCC4: open discussion about quality culture in the workplace	Lee et al. (2016), Smith et al. (2017)

organization is concerned for high-quality care service for customers as well as employee well-being (Heskett et al. 1997; Lee et al. 2012). To operate effectively in the dynamic environment, healthcare providers should equip and support their employees with the ability to respond to changes quickly with efficacy.

The Cleveland Clinic serves a countless number of patients and has been ranked as one of the best hospitals in the world in terms of quality care services by Newsweek (Cleveland Clinic Newsroom 2020). However, its reputation for patient experience has failed to achieve the same level of excellence due to the less than the best perceived empathy relationships with its patients. It was ranked second in the US News hospital ranking, while ranked first in areas related to cardiac care for decades (Cleveland Clinic Newsroom 2020). Since introducing a patient experience improvement project, Cleveland Clinic has become a model hospital for patient-centered care and a leader in providing the best patient experience (Cleveland Clinic Newsroom 2020). The innovative patient experience model of Cleveland Clinic has been benchmarked by healthcare organizations around the world (e.g., the UK, Canada, Saudi Arabia, South Korea, China, Ghana, Mexico, the Netherlands, Nigeria, and Turkey) (Cleveland Clinic 2015).

The studies on the patient experience indicated that hospitals should shift away from the traditional perspective of providing services to patients unilaterally to focusing on patient experience, while simultaneously striving to increase customer satisfaction and operational efficiency. Previous research related to patient experience reported that excellent experience has a positive effect on patient satisfaction (Merlino and Raman 2013; Lee 2018), loyalty (Haeckel et al. 2003; Lee et al. 2012), and word-of-mouth recommendation (Pine and Gilmore 1998; Lee et al. 2012). Empirical studies examined how experience is affected by interactions with medical staff (Verhoef et al. 2009; Zomerdijk and Voss 2010; Anderson and Smith 2016; Smith et al. 2017) because employees affect the patient's perceived service quality, satisfaction, revisit intentions, and recommendations (Lee et al. 2013; Zeithaml et al. 2013; Lee 2018).

A healthcare system is a complex structure that requires consistent and seamless operations for each treatment unit, organizational function, and department. On the other hand, patients assess their feelings and experiences related to their treatment service received at each treatment unit. Thus, a strong partnership with customers is essential to provide excellent patient experiences, enabled by a service-dominant logic culture. Such customer-centered (i.e., patient-centered) culture is imperative to provide quality healthcare services and this is possible when staff truly understand and relate to their patients' pain and needs.

As customers are divided into internal (employees) and external customers (patients and their family members), internal customer experience translates to a positive/negative attitude toward external customers (Heskett et al. 1997). As external customers who are cared for by engaged employees are more likely to revisit than customers who felt treated with disrespect, improving the positive experience of internal customers is critical for patient experience (Heskett et al. 1997). The employees who trust the quality of their hospitals' services would most likely recommend their own hospitals to their relatives or friends. Such behavior would

indicate that the employees have a good experience and loyalty to the hospital (Lee et al. 2012).

The assessment of care services and the hospital's systems can be more objectively evaluated by employees (Lee et al. 2012). Thus, the experience of internal staff is a critical factor for continuous improvement of task efficiency and effectiveness as well as with positive attitudes and the intention of performing well. In addition, the experience of internal staff will influence the customers' revisit intention and recommendation to others about the hospital. In this study, internal customer experience is measured based on Slater and Narver (1994) and Lee et al. (2012) for recommendation, intention to use, and overall satisfaction based on customers' objective and emotional evaluations of their experiences while at the hospital.

## 2.4 Organizational performance

Organizational performance can be measured using various approaches. The approach that uses financial performance acknowledges that QM activities positively affect performance (Garvin 1988). Walker and Ruekert (1987) suggested that it is inadequate to evaluate performance uniformly because performance indicators contradict one another to a certain degree. Among the various indicators that have been suggested, financial indicator items are mostly related to the flow of capital and revenue, such as operating profit, return on investment, market share, and economic value added (Denton and White 2000). Accounting indexes for management, such as profitability, are widely used in many hospitals to measure financial performance because of the non-financial performance, such as the effectiveness of a doctor's treatment process and outcomes of care service, or customer (patient) satisfaction based on service evaluation, are difficult to apply (Lee et al. 2019).

In this study, growth and profitability are used as indicators of financial performance. Healthcare revenue is an indicator of hospital growth (Lee et al. 2019). As the profitability index is an indicator that determines whether the ratio of capital invested is appropriate, it measures the hospital's financial performance during a certain time period (Lee et al. 2019). In this study, the healthcare revenue growth rate, market share, healthcare profitability, and changes in the number of patients are employed as measurement items of organizational performance based on Slater and Narver (1994) and Lee et al. (2019). Table 3 provides the detailed measurement items for internal customer experience and organizational performance.

## 3 Research model and hypotheses development

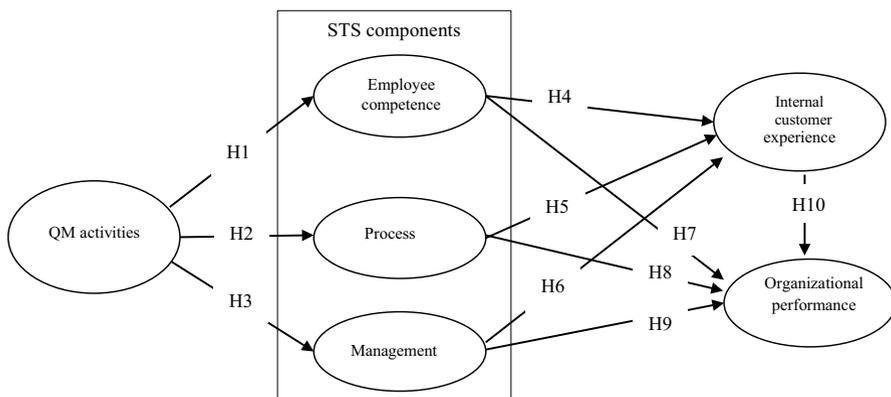
Healthcare organizations continuously strive to improve patient safety and the quality of care service through the implementation of healthcare accreditation/certification systems. The era of Industry 4.0 provides the healthcare industry an impetus to undertake a paradigm shift in terms of care service quality and treatment procedures (Lee and Lim 2018; Yoon and Lee 2019). Thus, in this study, we

**Table 3** Measurement items for internal customer experience and organizational performance

Components	Measurement items	References
Internal customer experience	PEX1: recommendation to potential customers (family members) based on own experience PEX2: intention to use/revisit based on own experience PEX3: overall satisfaction with the hospital service based on own experience	Slater and Narver (1994), Lee et al. (2019)
Organizational performance	OPE1: hospital's revenue growth rate compared to that of competing hospitals OPE2: degree of changes in profit compared to those of competing hospitals OPE3: hospital's market share compared to that of competing hospitals OPE4: decrease or increase in the number of patients compared to that of competing hospitals	

examine the effects of QM activities on internal customer experience and organizational performance through STS components. The proposed research model is shown in Fig. 1.

To improve the quality of care services, management should focus on the hospital's actual conditions, such as patient-centered medical facilities and equipment, application of advanced technologies, convenient treatment processes, and staff amicability (Lee et al. 2013). In addition, QM activities foster employee commitment, which has a positive effect on task performance (Lee et al. 2012). Since the delivery of quality care service to patients depends on employees,

**Fig. 1** The proposed research model

organizational efficiencies, and treatment processes, hospital systems should encompass the competences to handle the needs of both the provider and patients (Lee et al. 2012; Lee 2018).

The concept of care service quality has been developed to reduce medical errors and increase customer satisfaction (McFadden et al. 2009; Lee et al. 2016). Nowadays, quality of care service is replaced with “the adoption of system approaches aiming at impressing the customers, rather than setting standards for quality of care” (Tekin and Erol 2017, p.1). Thus, healthcare organizations need to consider the perceptions of employees to achieve a high quality of care service. The internal-centered organization tends to focus on the maintenance and improvement of the existing work environment, such as using QM activities, while the external-orientated emphasizes adaptation, competition, and interaction with the external environment to meet the expectations of customers, such as fast-developing technologies and social issues (Kull et al. 2013; Le et al. 2013, 2016).

QM stresses procedures and responsibilities to achieve the desired results and thus considers devising implementation approaches as a key factor for attaining positive results. As QM activities have direct impacts on delivering quality care and customer satisfaction, all members of the organization should embrace them. In other words, the quality improvement of care can be pursued through QM activities, which in turn will result in customer satisfaction.

There is increasing social support for and interest in quality care services, while information asymmetry exists in the healthcare industry. Thus, STS can support continuous development and innovation in health systems through application of advanced technologies. STS can support to balance and harmonize the social needs desired by both employees and customers with technical capabilities of health systems (Zomerdijk and Voss 2010; Smith et al. 2017).

QM activities and STS theory both focus on how an organization can continuously apply efficient methods to ensure positive customer experience (Smith et al. 2017). McFadden et al. (2009) examined mediation using a patient safety culture, considering differences between leadership, context, and specific quality practices. The patient safety culture plays a mediator role between leadership and patient safety initiatives (McFadden et al. 2009). As a result, we can assume that commitments (e.g., QM activities) of a hospital is important for improving the patient's illness/treatments and enhancing performance through the organizational culture (e.g., social system). Healthcare organizations can apply QM activities and STS theory together to develop operational capabilities that positively impact internal customer experience and lead to improved external customer satisfaction and organizational performance.

While QM activities are developed from a planned perspective, STS can be viewed as an implementation aspect that enables employees and systems to operate seamlessly at service encounters. For this reason, it is important to motivate all members of the organization to engage in QM activities, and STS requires members' competence for its implementation through established processes and systems to fulfill customers' and organization's needs. Thus, it is necessary to balance and harmonize QM activities with STS with its technical support for the systems and processes to deliver the social needs and services desired by employees. STS can be regarded

as a mediating factor for improving internal customer experience and organizational performance through QM activities (Smith et al. 2017).

QM activities can be the basis for enhancing employee competences through education and training, as well as guidelines for job performance and evaluation. For example, well-trained medical staff that is authorized for care delivery can respond to patient demands quickly and effectively (Bitner et al. 1994). Thus, QM activities can positively impact on staff performance to deliver quality care service to customers that in turn support organizational goals.

Quality improvement depends on employee satisfaction, which can be improved by nurturing work environments. QM activities can enable sociotechnical factors for effective job performance of employees (Lee et al. 2012; Smith et al. 2017). With more proactive QM, social and technical components not only support employees to best utilize their abilities on the job but also play a role in achieving congruence between employees' personal desires and organizational goals (Lee et al. 2012, 2013; Smith et al. 2017). Consequently, QM activities can drive employee competence, sound hospital management, and effective patient treatment processes based on STS components. The following hypotheses are proposed.

**H1** QM activities have a positive effect on employee competence as part of STS.

**H2** QM activities have a positive effect on the hospital's processes as part of STS.

**H3** QM activities have a positive effect on the hospital's management as part of STS.

Lopez-Valeiras et al. (2018) emphasized that the operational strategy to increase the workability and skills of employees is imperative for achieving organizational goals. In particular, to survive and thrive in the healthcare industry where competition is becoming increasingly intense in the 4th Industrial Revolution era, improving the ability of organization members through education and training can be the most important factor to meet customer needs (Yoon and Lee 2019). With the advent of rapid scientific and technological advances, hospitals need to regularly provide opportunities to their members to learn new knowledge, information, and skills required for innovative care delivery process that is the core factor of internal customer satisfaction (Heskett et al. 1997; Lee et al. 2012; Lopez-Valeiras et al. 2018). Since social factors involve interactions between customers and employees (Pasmore and Sherwood 1978), the service process should be consistently evaluated, particularly by the customer (Kinman 2009). Strengthening employee competence is a catalyst for effective customer-employee interactions (Amabile 1998; Lee et al. 2012).

The satisfaction felt during or after receiving a service positively influences the customer's personal experience (Lee et al. 2012; Smith et al. 2017). This implies that expanding the role of the customer in the sociotechnical component of service encounters improves the balance between social and technical components, thus enhancing customer experience (Grönroos 1990; Smith et al. 2017). The degree of

satisfaction depends on how efficiently and effectively care services are delivered according to the perceptions of internal customers. In conclusion, STS components can have a positive effect on improving the internal customer experience. Thus, the following hypotheses are proposed.

**H4** Employee competence as part of STS has a positive effect on internal customer experience.

**H5** A hospital's process as part of STS has a positive effect on internal customer experience.

**H6** A hospital's management as part of STS has a positive effect on internal customer experience.

The components of STS seek to balance the social needs of customers/employees and the technical requirements for improving organizational performance through joint optimization of social and technical components (Zomerdijk and Voss 2010; Smith et al. 2017). Organizations' efforts toward this balanced approach enhance employee satisfaction, which in turn improves the overall organizational performance (Heskett et al. 1997; Lee et al. 2012). In addition, management performance can be enhanced through operations-related strategies for care services to foster patient satisfaction, intention to revisit, and word-of-mouth recommendations.

To secure individual work competence and efficacy, organizational support to employees is essential in the form of providing requisite knowledge, information, and skills for quality care services. Initiatives taken by employees to strengthen their own competences form the basis for delivering effective organizational support to ensure customer satisfaction and organizational performance. Consequently, STS components can have a positive effect on improving organizational performance. Thus, the following hypotheses are proposed.

**H7** Employee competence as part of STS has a positive effect on organizational performance.

**H8** A hospital's process as part of STS has a positive effect on organizational performance.

**H9** A hospital's management as part of STS has a positive effect on organizational performance.

The most important goal of external customers is receiving the most appropriate care service at the right time. If a hospital has sufficient resources (e.g., number of skilled and motivated medical staff, up-to-date technologies and equipment, and other support functions) to provide timely care service to meet treatment needs, it is an ideal environment to provide excellent care experience to the customer. Engaged employees usually exhibit not only positive relationships with co-workers and

customers, but also demonstrate high levels of productivity (Harter and Mann 2017). While the employee-patient relationship is not easily or often recognized as a critical factor for hospital performance, it is the main force for customer's return intention and word-of-mouth recommendation. The increase in the satisfaction level of internal customers would enhance their productivity which indirectly triggers hospital preference of external customers (Lee et al. 2012; Tekin and Erol 2017; Lee 2018).

Internal customer experiences have been regarded as a critical success factor for organizational performance in the healthcare industry. As the employees' perceptions affect their experience which in turn impacts employee satisfaction, there is a positive relationship between employee experience and organizational performance. For example, when employees perceive that they receive sufficient support from the organization, their work motivation and performance would increase, which further enhance external customers' experience and satisfaction (Heskett et al. 1997; Tekin and Erol 2017; Lee et al. 2012). Therefore, the following hypothesis is suggested.

**H10** Internal customer experience has a positive effect on organizational performance.

## 4 Research methodology

### 4.1 Data collection

For this study, we collected data from general hospitals in South Korea. In South Korea, the public hospital category includes the following: national, public, and municipal hospitals; special corporate hospitals; and provincial hospitals. All other hospitals are considered private hospitals. The classification criteria based on the size of beds include general hospitals, intensive care units, special care units, and incubator units. Hospitals are further classified into general, mental, infectious, oriental, and dental hospitals. According to the Korea Health Industry Development Institute (KHIDI), general hospitals include the following: tertiary general hospitals with more than 300 beds, general hospitals with more than 160, and hospitals with more than 30 beds. Our sample hospitals, tertiary general hospitals (with more than twenty medical specialty departments) and general hospitals with more than 160 beds (typically with more than nine medical specialty departments) provide emergency room services to treat urgent health problems. The target hospitals for this study are those with more than 160 beds because "small hospitals often do not share the complexity issues of large hospitals and may not have developed extensive quality management systems" (Goldstein and Schweikhart 2002).

A survey questionnaire was developed initially in English and then translated into Korean by two bilingual operations management faculty using the double translation protocol (Survey Research Center 2011). The initial questionnaire was tested by managers in ten Korean general hospitals as a pilot study to review whether the questionnaire items accurately and fully described our research questions, and then

**Table 4** Hospitals' characteristics and respondents' demographic data

Employees respondents' characteristics		Hospitals' characteristics	
Items	Frequency (percent)	Items	Frequency (percent)
Gender	Male	Hospital type	Tertiary
	Female		General
Age	20 s	Ownership	Private hospital
	30 s		Public hospital
	40 s	Location	Metropolitians
	50 s		
Position	Physician	Number of beds	161 to 300
	Nurse		301 to 500
	Medical technician Administrator		501 to 1,000
Work experiences in this hospital (years)	3 to 5	1,001 more	21 (8.8%)
	6 to 10		43 (18.0%)
	11 to 15		123 (51.5%)
	16 to 20		52 (21.7%)
	21 more		

Private hospitals operated by universities, corporations, medical corporations, or individual in South Korea. Public hospitals operated by government support in South Korea

eliminated some items suggested by managers as they were deemed difficult to measure precisely.

Data were collected from employees, who directly contact with and/or provide services to patients, by means of hospital visits or online contacts with the selected general hospitals from January 20 to February 20, 2019. Hospitals in this survey participated on a voluntary basis. Out of the 700 questionnaires that were distributed to care team members in the selected hospitals, we received 247 (35.29%) responses. Incomplete questionnaires were removed from the sample. The final sample consists of 239 (34.14%) valid returned questionnaires. Table 4 presents the sample profile.

As shown in Table 4, about 18.0% of respondents were in public hospitals and about 82.0% from private hospitals. The study participants all had a sufficient amount of work experience as they had at least 3 years of experience in the hospital. The respondents' positions included: nurses (34.7%), medical technicians (25.1%), administrators (23.0%), and physicians (17.2%).

## 4.2 Variables

The questionnaire utilized 5-point Likert scales to measure the constructs of the study. The data were analyzed by SPSS 23.0 and the AMOS 23.0 programs for structural equation modeling (SEM), which provide all of the tools necessary to test the hypotheses. Reliability was tested based on Cronbach's alpha value (Table 5). All of the coefficients of reliability measures for the constructs exceeded the threshold value of 0.7 for exploratory constructs in basic research (Nunnally 1978). In the reliability test, the Cronbach's alpha value for education and training of QM activities was the highest (0.899), while management of STS was the lowest (0.724). All of the Cronbach's alpha values were significant at  $p < 0.05$ .

For the validity test, confirmatory factor analysis (CFA) was performed to identify the most meaningful basis and to examine similarities and differences of the data based on Brown's (2006) recommendation. To provide evidence of the convergent and discriminant validity of theoretical constructs, CFA is employed to test measurement models for each construct. As the results of CFAs, the values of standardized regression weight and all variables proposed by the study were shown to be greater than 0.5 and statistically significant at the 0.05 level (see Table 5).

This model consisted of six major components: QM activities, STS components, internal customer experience, and organizational performance. QM activities are a multidimensional construct with second-order latent variables: role of the leadership, education and training, role of quality department, process and operational procedure, and employee participation. STS consists of three components: employee competence, process, and management with observed variables. On the other hand, internal customer experience and organizational performance were assessed by measurement items as observed variables.

Beltrán-Martín et al. (2008, p. 1025) suggested a second-order factor as follows: "(a) each observed variable will have a nonzero loading on the factor, (b) error terms associated with each observed variable will be uncorrelated, (c) the first-order

**Table 5** Results of CFA

	Constructs	Variables	Standardized loading	<i>t</i> -value	<i>p</i> -value	Cronbach's Alphas
QM activities	Role of the leadership	QRL1	.776	13.912	.000	.881
		QRL2	.881	15.781	.000	
		QRL3	.876	–	–	
	Education and training	QET1	.901	14.985	.000	.899
		QET2	.864	14.324	.000	
		QET3	.787	12.817	.000	
		QET4	.772	–	–	
		QET5				
	Role of quality department	QQD1	.846	11.256	.000	.828
		QQD2	.729	10.057	.000	
		QQD3	.645	8.995	.000	
		QQD4	.702	–	–	
	Process and operational procedure	QOP1	.768	8.423	.000	.852
		QOP2	.889	9.028	.000	
		QOP3	.877	8.984	.000	
		QOP4	.551	–	–	
Employee participation	QEP1	.853	14.583	.000	.897	
	QEP2	.812	13.706	.000		
	QEP3	.853	14.586	.000		
	QEP4	.796	–	–		
STS	Employee competence	SEC1	.813	6.908	.000	.779
		SEC2	.639	6.259	.000	
		SEC3	.723	6.638	.000	
		SEC4	.565	6.279	.000	
		SEC5	.870	–	–	
	Process	SPR1	.682	10.671	.000	.864
		SPR2	.813	13.055	.000	
		SPR3	.878	14.088	.000	
		SPR4	.779	–	–	
	Management	SMA1	.723	3.047	.002	.724
		SMA2	.839	3.079	.002	
		SMA3	.850	3.081	.002	
		SMA4	.611	–	–	
	Internal customer experience	PEX1	.909	9.462	.000	.821
		PEX2	.516	9.766	.000	
		PEX3	.625	–	–	
Organizational performance	OPE1	.731	11.317	.000	.869	
	OPE2	.781	12.188	.000		
	OPE3	.878	13.471	.000		
	OPE4	.773	–	–		

factors will be correlated, and (d) covariation among the first-order factors and the observable variable will be explained fully by their regression onto the second-order factor.”

In the proposed model, QM activities involve inter-correlated latent variables that were measured by models using the second-order factors. Employee competence,

**Table 6** Results of fit indices for CFA

Measurement model	$\chi^2$	d.f	$\chi^2/d.f$	GFI	CFI	RMR	SRMR	RMSEA
First order CFAs	1189.595	689	1.727	.875	.903	.052	.072	.055
Second order CFAs	1183.401	708	1.671	.881	.902	.059	.079	.053
Recommended values			$\leq 3.0$	$\geq .9$	$\geq .9$	$\leq .08$	$\leq .08$	$\leq .08$

*GFI* goodness of fit index, *CFI* comparative fit index, *RMR* root mean square residual, *SRMR* standardized root mean square residual, *RMSEA* root mean square error of approximation

**Table 7** Correlation matrix and average variance extracted (AVE)

Factor	QM activities	Employee competence	Process Management	Internal customer experience	Organizational performance
QM activities	<b>.919</b>				
Employee competence	.401	<b>.851</b>			
Process Management	.378	.584	<b>.847</b>		
Internal customer experience	.401	.694	.483	<b>.877</b>	
Organizational performance	.485	.299	.142	.230	<b>.888</b>
CR	.709	.352	.220	.288	.415
AVE	.961	.928	.910	.929	.917
	.845	.724	.718	.769	.789
					.711

C R (Composite Reliability) =  $\sum (\text{factor loading})^2 / [\sum (\text{factor loading})^2 + \sum (\text{error})]$ . AVE =  $\sum (\text{factor loading})^2 / [\sum (\text{factor loading})^2 + \sum (\text{error})]$ . Bold value is the square root of AVE

process, and management of STS, internal customer experience, and organizational performance variables were analyzed by measurement models using the first-order factors. Statistics of CFAs for first- and second-order factors are shown in Table 6. The results of goodness of fit tests for the measurement models with first- and second-order CFAs are summarized in Table 6.

Compared to the recommended values for the goodness of fit tests, the values of CFI, SRMR, RMSEA, and  $\chi^2/d.f.$  of the measurement models were satisfactory, while the values of GFI were not for both in first and second-order factor models (0.875 and 0.881, respectively). As shown in Table 6, the goodness of fit values of the measurement models with the second-order had better values in fit indices. Consequently, the fit statistics related with the proposed research model for QM activities components using the second-order factor were satisfactory (Table 6), as suggested by Beltrán-Martín et al. (2008).

Table 7 provides the square roots of average variance extracted (AVE) of latent variables, while the off-diagonal elements are correlations between latent variables. For discriminant validity, the square root of AVE of any latent variable should be greater than the correlation coefficient between this particular latent variable and

other latent variables (Barclay et al. 1995). AVE, which measures the level of variance captured by a construct versus the level due to measurement error, above 0.7 would be considered a very good acceptable value (Fornell and Larcker 1981). CR is considered to be a less biased estimate of reliability than Cronbach's alpha, and the acceptable value of CR is 0.7 and above.

The values of AVE and CR for QM activities, employee competence, process and management of STS, internal customer experience, and organizational performance were all greater than 0.7 and 0.9, respectively. The statistics shown in Table 7 satisfied this requirement, lending evidence to discriminant and construct validity.

## 5 Results

As the first step of hypotheses testing, the goodness of fit test was conducted for the proposed research model. Compared to the recommended values, the model had the values of CFI (0.924), RMSEA (0.057), and RMR (0.067) that indicate good fit and  $\chi^2/d.f$  (1.785) was significant. However, the value of GFI (0.871) did not satisfy the recommended value.

This study needs to control for hospital size and employees' positions to remove their compounding effects, if any, in the analysis process. First, we included two control variables in the model to check their effects. Hospital size and employees' positions could potentially be confounding variables with QM activities. Large hospitals tend to have more quality control activities to reduce medical errors and up-to-date facilities, equipment, and systems (McFadden et al. 2009; Lee et al. 2012). An employee's work scope is often defined by the position that person holds in the hospital. For example, physicians provide care services to the patients under care, while nurses and medical technicians provide services on the direction of the attending doctor. We tested whether the results of the proposed model would be consistent across varying hospital size and employees' positions. We found the control variables did not have a significant effect on the model results.

Table 8 presents the result of the significance test for the research model as well as the summary of hypotheses tests. For H1, H2, and H3, the standardized path coefficient between QM activities and employee competence of STS (H1) was 0.675, between QM activities and process (H2) was 0.646, and the coefficient with management (H3) of STS was 0.726. These coefficients are statistically significant at the 0.01 level, supporting H1, H2, and H3.

The results imply that the role of the leadership, education, and training, the role of quality department, process and operational procedure, and employee participation in QM activities have influences on the employee competence, process, and management of STS. The results confirm that STS components support employees to improve care quality through the integration of social and technical needs of the organization (Lee et al. 2012; Smith et al. 2017). The processes and management of STS may be effectively implemented through established rules of a hospital, but employee competency varies from person to person to complete the task. While the process and management of STS are controlled by an organization, the contributing

employee competences rest with the subjective characteristics of individuals' competencies.

For H4, H5, and H6, the standardized path coefficients between internal customer experience and employee competence, process, and management of STS were 0.560, 0.303, and 0.584, respectively, and statistically significant at the 0.001 level, thus supporting H4, H5, and H6. Staff members can provide care quality and improve work performance as they have direct or indirect experiences to increase customer satisfaction through STS components (Smith et al. 2017). As a systematic approach to deliver quality care and to enhance experiences, hospitals should invest in enhancing workforce capability for a better work environment (Lee 2018). In addition, consistent processes can help improve internal customer expectations through their experience.

For H7, H8, and H9, the standardized path coefficients between organizational performance and employee competence, process, and management of STS were 0.427, 0.454, and 0.225, respectively, and statistically significant at the 0.01 level, supporting H7, H8, and H9. The results of the study are similar to those of previous studies (Grönroos 1990; Lee et al. 2012; Smith et al. 2017). Thus, STS components can efficiently and effectively provide care services by positively influencing internal customers' experience and organizational performance.

As shown in Table 8, we examined the effects of control variables, number of beds and positions, on employee competence, process, and management of STS. There was no significant relationship between the number of beds and employee competence, process, and management component of STS. Similarly, no significant relationship was found for employee position (physician, nurse, medical technician, and administrator) and STS components.

**Table 8** Results of significance test for paths of the model

Path	Path coefficient	t-value	p-value	Hypothesis test
QM activities → Employee competence	.675	6.473	.000**	Supported H1
QM activities → Process	.646	5.853	.000*	Supported H2
QM activities → Management	.726	2.955	.003*	Supported H3
Employee competence → Internal customer experience	.560	3.665	.000**	Supported H4
Process → Internal customer experience	.303	3.494	.000**	Supported H5
Management → Internal customer experience	.584	6.019	.000**	Supported H6
Employee competence → Organizational performance	.427	4.628	.000**	Supported H7
Process → Organizational performance	.454	2.643	.008*	Supported H8
Management → Organizational performance	.225	3.335	.000**	Supported H9
Internal customer experience → Organizational performance	.202	3.331	.000**	Supported H10
Number of Beds → Employee competence	.103	1.453	.143	control variable
Number of Beds → Process	.069	1.042	.298	control variable
Number of Beds → Management	.073	.911	.146	control variable
Position → Employee competence	.036	.519	.604	control variable
Position → Process	.065	.936	.349	control variable
Position → Management	.059	.781	.435	control variable

\* $p < .01$ , \*\*  $p < .001$  /

\* $p < .01$ , \*\* $p < .001$

To test the mediation effect of internal customer experience, we performed the Sobel test using the bootstrapping method. As shown in Table 9, there are mediation effects of employee competence, process, and management components of STS to organizational performance through internal customer experience as a mediator variable. As proposed research model, QM activities showed no direct effect (path) to internal customer experience and organizational performance. Thus, the Sobel test was excluded for QM activities.

## 6 Conclusions

The needs of customers should be the core element of healthcare services (Hudadoff 2009; McColl-Kennedy et al. 2012; Lee 2018). In the highly competitive Industry 4.0 age, healthcare providers should balance the needs of customers and demands of the organization based on patient-centered QM activities and STS components for sustainability. As customer experience and organizational performance can be improved by employees' work motivation and task efficiency, QM activities and STS components are key influencers of positive customer experience and organizational performance.

This study examined the impact of healthcare QM activities on STS components, internal customer experience, and organizational performance. A research model was proposed with associated hypotheses for the research. The study results suggested that patient-centered quality management is the key success factor for healthcare organizations. The components of STS help improve task efficiency as they can systematically reflect the demands of employees and the organization. The successful implementation STS would ultimately improve the internal customers' experience which in turn result in desired organizational performance.

The study results confirmed positive effects of QM activities on employee competence (H1), process (H2), and management (H3) of STS. The results of this study shed new insights about how hospitals should implement QM activities to improve their employee competence, operational processes, and management of STS. These results indicate that the effectiveness of QM activities is important for STS components to balance social demands of customers/organizational members with sociotechnical demands of the organization. Most hospitals make substantial amounts of investments to improve customer satisfaction, yet they often fail to achieve their desired objectives (e.g., zero medical errors and infection) because many do not understand the key to external customer satisfaction is the motivation of what internal customers (Lee et al. 2012, 2016). Since QM activities focused on meeting customer requirements with continuous improvement, healthcare organizations need to develop and effectively implement STS components to for sociotechnical needs of internal customers and the organization.

The study results also revealed positive relationships between internal customer experience and employee competence (H4), process (H5), and management of STS (H6). Since employees are the first direct contact point with customers, their levels of work engagement and motivation will affect the quality of patient care through STS components (Lee et al. 2012; Lee 2018). While individual

employees' competences differ based on many factors, the organization's support in terms of offering opportunities for education and training is important for task efficacy and motivation (Lee et al. 2012). Self-development opportunities would not uniformly improve individual employee's work competence. However, such opportunities provide motivation and impetus for employees to enhance their confidence and competences. Thus, education and training support should be available at the personal, organizational, and even environmental levels. Competent and engaged employees are not only efficient at their own tasks, but they also develop favorable relationships with patients when quality care services are provided. Then employees will develop a positive work experience which eventually leads to organizational performance. The results of the study also revealed that positive relationships between organizational performance and employee competence (H7), process (H8), and management (H9) of STS. The results seem to be reasonable given that STS components help improve quality of care service, the key ingredient of organizational performance. As hospitals endeavor to improve the quality of their service, they develop certain rules, attitudes, and norms for employees to effectively meet customers' needs. The support that a hospital provides to its employees often mirrors how well external customers are served (Osman et al. 2004). Thus, it is critical for healthcare organizations to develop and support STS components in their work systems and processes to enhance organizational performance.

The study results also confirmed the positive effect of internal customer experience on organizational performance (H10). As employees of the hospital represent the core competence in delivering quality service and patient experience, management must provide effective communication and support systems that lead to internal customer satisfaction (Lee et al. 2012; Lee 2018). When employees perceive positive experience in a hospital, it would transcend to quality care services and positive relationships with patients. Thus, positive employee experience has a positive effect on organizational performance of the hospital.

These results suggest potential areas where internal customer experience satisfaction can be improved through components of STS. Lee (2018) suggested that hospital administrators should invest in advanced medical technologies to optimize and improve care quality and patient experience satisfaction. To ensure organizational sustainability, healthcare institutions should consider providing customized services to patients through differentiated care services based on QM activities. Medical staff

**Table 9** Results of Sobel test

Independent variables	A mediator variable	Dependent variables	Sobel test	Two-tail <i>p</i> -value
Employee competence	Internal customer experience	Organizational performance	2.030	.042
Process	Internal customer experience	Organizational performance	1.963	.049
Management	Internal customer experience	Organizational performance	2.211	.027

should provide quality care services through the application of advanced medical technologies in the treatment process. In addition, advanced information technology applications are rapidly expanding with the development of innovative treatment processes such as artificial intelligence (AI), Internet of Things based on smart sensors, big data analytics, 3-D printing, and medical robots (Yoon and Lee 2019). Various factors influence internal customer experience, including advanced digital technologies, systems, interaction with patients, the service environment, and the like (Lee 2018; Yoon and Lee 2019). Thus, healthcare organizations should develop sustainable and efficient hospital management strategies based on the expertise and opinions of medical staff, as well as the consideration of patient complaints, in order to gain competitive advantage through continuous innovations, including applications of advanced information technologies.

## 6.1 Implications of the study results

The results of the study have significant implications for the healthcare sector. The healthcare environment has witnessed a major shift in strategy from treatment-centered services to prevention and management-centered services (Lee 2018). This shift can partially be attributed to the rising income level of society. In addition, public interest in health has grown significantly with the aging population, which has given rise to demands for customized healthcare services. The compounding effect of the changing diversity of customer needs and the ever-expanding application of digital devices highlight the increasing importance of employees' competences and work motivation (Lee 2020). In other words, while the patient-centric approach of healthcare organizations is supported by QM activities, the actual implementation of QM activities is enabled by employee competences with the support of effective processes and management. This study results provide both theoretical and practical implications in that the competitive sustainability of hospitals would be attained when a hospital can develop and manage the seamless path: planning for quality care services (QM activities)—> implementation of those activities through STS components (employee competence, processes, and management)—> internal customer experience and organizational performance.

The advances and innovative applications of digital technologies are not limited to business enterprises but have had a major impact on the healthcare industry. Diverse types of smart medical devices and diagnostic tools are rapidly being introduced to the market, e.g., AI-based IBM Watson. Healthcare organizations are working tirelessly to increase satisfaction with healthcare services through various strategies aimed at satisfying demands for quality care services and customer value. Unfortunately, this has intensified the competition, and more diverse operational process strategies are required for sustainable hospital management.

## 6.2 Limitations and future research needs

This study has some limitations that should be considered when understanding the findings of this study for their generalizability. First, the study data were collected from selected general hospitals with more than 100 beds in metropolitan areas of South Korea. Korea is the most advanced digital country in the world and most general hospitals operate with high-tech systems. However, there are many smaller hospitals that may not have advanced technology enabled systems in care services. Second, this study did not consider the type of QM activities in each sample hospital, assuming that QM activities are similar in each hospital. The characteristics of sample hospitals might have affected the results of the study. Lastly, as this study considered employees as internal customers, customer experience was measured by perception of employees. Thus, the generalizability of this study results should consider this limitation.

Future study should consider the limitations discussed above in further expanding the body of knowledge in this area. Additionally, cross-cultural and longitudinal studies using QM activities and STS components are also suggested. In addition, as QM activities in each department of a hospital might be different, such activities of different departments should be incorporated in the future study. Also, to examine the relationship between customer experience and STS, a systematic approach, such as the person-by-person method with data collected from different parts (i.e. two parts—employees and customers), is recommended.

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