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Hospital Service Innovation Strategies Based on the Perspective of Evaluation Systems: Cases from JCI Accredited Hospitals

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***Abstract**: Service innovation involves internal processes and responding to external environmental changes. However, most of the previous literature related to hospital evaluations has focused on the impact of hospital evaluation systems on medical quality or business models. This study aims to examine the strategic implications of hospitals to drive service innovation within the framework of a JCI evaluation system. This is an exploratory case study and a total of 13 JCI hospitals are selected as the cases. This study defines the concept of hospital evaluation as medical ethics and medical quality. Moreover, the type of hospital service innovation can be divided into technical and organizational aspects. Thus, the strategies of hospital service innovation concern technological functionalization, technological ethicalization, organizational functionalization, and organizational ethicalization. The study reveals that hospital service innovation mainly comes from technological ethicalization, and organizational functionalization, while technological functionalization and organizational ethicalization are relatively few. Finally, some managerial implications are proposed.*

***Keywords**: Hospital Service, Service Innovation, Hospital Evaluation System, Joint Commission International, JCI.*

I. Introduction

Service innovation involves internal processes such as the generation and evolution of new ideas and actions and responding to external environmental changes (Macintosh and Daft, 2003). An organization may adopt developing new services and incorporating the changes in technology or management into its organizational structure (Damanpour and Evan, 2003). Besides, market and customer demands are also critical external factors for developing service innovation (Edvardsson and Tronvoll, 2020). In recent years, hospitals accredited by the Joint Commission International, (hereinafter referred to as the JCI) are considered the preferred hospitals. Moreover, here are seven sources of innovation opportunities,

including unexpected events, inconsistencies, procedures, process needs, sudden changes in industry or market structure, demographic changes, paradigm shifts, and new knowledge (Drucker, 1985). In the evaluation process there is a requirement for the hospital to conform to medical assessment provisions in addition to improving procedures and processes in the hospital, and the sheer amount of new external knowledge that must be absorbed. Thus, in addition to the improvement of procedures and processes within the hospital, the hospital evaluation system also belongs to external knowledge. It is for this reason that this study defines the hospital evaluation system itself as one of the sources of service innovation for hospitals. Furthermore, JCI evaluation fees vary depending on the size of the hospital, duration of visit, and the number of members. The total cost of JCI evaluation fees includes pre-assessment fee, the fee for official certification, and the cost of the assessment committee's airfare and lodging. Thus a JCI evaluation is not as simple as what is shown in accounting books, what with the addition to the hospital's investment money, manpower costs, and various expenses. But the purpose of the evaluation is to improve the medical quality of patients, so to this end, this study has grouped domestic hospitals together to further collate different JCI service innovation approaches in an effort to discover what needs to be done in terms of procedures, systems, and facilities to pass the JCI evaluation. A healthcare information system affects the organizational structure, and the data are used to assess the efficacy of medical activities (Bagherzadeh Markovic, and Bogers, 2019). This study examines hospital service innovation strategy through the lens of hospital evaluation systems and discusses the service innovations that affect the hospital throughout the evaluation process. However, most of the previous literature related to hospital evaluations has focused on the impact of hospital evaluation systems on medical quality or business models. Therefore, this study aims to examine the strategic implications of hospitals to drive service innovation within the strategic analysis matrix of a JCI evaluation system.

II. Literature Review

2.1 Hospital Evaluation

The Ministry of Health and Welfare in Taiwan has stipulated hospital evaluation under Article 28 of Health Care Law, setting out the procedures for conducting and teaching hospital evaluation, assessment of qualification standards, and performance assessment systems in hospital evaluations and teaching hospitals. The assessment conditions are divided into sections setting forth operations management and medical care, and five major medical center task standards, which are: “The provision of medical services to patients afflicted with serious or acute conditions, and the continuous improvement of service quality,” “The development of quality medical services and the improvement of regional health care standards, “The implementation of holistic health care education”, “The innovative development of medical care to improve its quality and to drive the development of medical and health technology,” and “The active compliance with the national health and medical policy and participation in international health activities.” The hospital evaluation scores quality in the following dimensions: staff facilities, medical management, and community services, treatment administered by the external medicine department, treatment administered by the internal medicine department, clinical

examinations, radiology, nursing operations, pharmaceutical administration, teaching equipment, and activities, hospitalization and internship training. Regulations for existing hospital evaluations in Taiwan designate standards for management, medical care, and quality assurance, focusing primarily on hospitalization, surgery, medication, testing, pathology, radiology, nursing services, pharmaceutical operations, and emergency operations (Hsu, 1996). The Taiwanese hospital evaluation scale is separated into ten parameters for reviews: staff facilities, medical management, and community services, external medicine quality, internal medicine quality, clinical examination quality, radiology quality, nursing operations, pharmaceutical administration, teaching equipment, and activities, residency and intern training, emergency medical quality (Hsu, 1996), in the hospital evaluation process, with the development and integration of medical quality standards, it was found that although medical quality standards are still the focus of assessment systems, the current trend is gradually expanding to all relevant healthcare services quality concepts, including, for example, aspects such as patient expectations and experience, employee welfare and morale, safety culture and working environment. Pioneering studies on dentistry evaluation in Taiwan take into account aspects like facilities, personnel, medical business and equipment, medical quality, and teaching training in survey questionnaires in addition to the basic information (Huang et al., 2004). In 2006, Taiwan Municipal Wan Fang Hospital pushed for improvements to be made based on flaws discovered after a mock JCI hospital evaluation, drawing up a six-point action plan, dedicating teams for facilities management and safety, personnel qualification and education, patient care, governance, and leadership quality improvement and patient safety, and can sustainably implement a patient and family rights teams and patient and family education team, a patient and family education team and an information management team (Chiu et al., 2007). In 2003, JCI published its JCI 11 section evaluation standards, the first five sections of which are centered on the patient. The next six sections are the management standards for medical institutions (Chiu et al., 2007), in the third edition of JCI evaluation standards took effect in 2008, with 14 sections, it can be divided into three main parts. Section I consists of “International Patient Safety Objectives”, Sections 2 to 8 are the criteria for “Patient Centers,” and Sections 9 to 14 are “Medical Organizational Management”.

2.2 JCI Hospital Evaluation

There are two types of hospital evaluation systems in Taiwan, one is certified by the JCI, the second is a domestic hospital evaluation system that is divided into two types; One is accredited through the JCI, the second is through Taiwan New Hospital Evaluation and Certification. The JCI is the world's most prestigious hospital evaluation body, and its standards are used to improve the implementation of nursing evaluations (Day et al, 2013). The JCI is a well-established global accreditation organization (Dotta et al., 2013). The following is a collation and synthesis of research related to JCI hospital evaluation. With medical tourism which has developed in the wake of the opening of health care markets, passing JCI accreditation is the primary goal of the hospital, with the key significance of JCI accreditation being the provision of safe patient care per hospital policies and regulations (Lee & Chun, 2012). Exploratory research by Kweon, 2011 compares JCI and Korean local health care standards concerning sedative effects. The results of family-based in-patient models for palliative care of terminally ill patients in seven Milan hospitals based on JCI standards were explored in (Rizzi et al., 2011),

Occupational health and safety considerations and applications of JCI accredited private hospitals in Turkey being more comprehensive than other local university hospitals were researched in (Baheecik & Ozturk, 2009). In regards to heavily insured and underinsured Americans and rising healthcare costs, what prompts patients to travel abroad for affordable medical care in the form of medical tourism with JCI accreditation was investigated (Pafford, 2009). Skyrocketing medical costs in the United States drive medical outsourcing, thus creating new industries: Medical Tourism, in JCI accredited hospitals across the globe resolve medical tourism malpractice issues at the local level where there is a lack of legal aid and travel itself has inherent risk (York, 2008). Improving patient safety is one of the main challenges to passing JCI accreditation. Fiero et al., 2008 shared the accreditation process of hospital pharmaceutical departments in its empirical research. JPI evaluation procedures are used in the four quality assurance models of *visitatie* ISO, EFQM, and organizational accreditation for comparative studies (Donahue & vanOstenberg, 2000). Dispensing prescriptions is an important part of JCI accreditation standards; using RFID PBS ATPM to avoid patient prescription errors at all times (Chang et al., 2012). JCI now needs to provide clear and effective procedures in patient identification and communication to reduce errors and improve patient safety coverage (Hawkins, 2012), being that safe patient identification has been a major issue. Wrist band identification is not a top priority for medical workers and should be discussed continuously in subsequent studies (Dackiewicz et al., 2011). The State of Qatar established its health care system in concordance with JCI standards, so improvements in the State of Qatar over the past decade were studied (Bener & Mazroei, 2010). The DRK clinic in Berlin, Germany introduced JCI standard procedures to avoid errors at the surgical site and keep errors from reoccurring (Reuther, 2009). JCI standards and requirements are frequently adhered to by most hospitals in their quality assurance practices (Kilinc, 2009); Clinical laboratory quality management research is based on JCI's standards for laboratories (Inal, 2009). Laboratory Perspective JCI accredited Assessment of Medical Institutions Process (Dhatt & Sheiban, 2008), A case study on transformative leadership, transnational culture, and politics in the King Hussein Cancer Center was carried out through the JCI accreditation process (Moe et al., 2007). The structured questionnaire used by researchers in measuring hospital performance is based on the JCI standard (Hassan, 2005). No comprehensive research on JCI evaluations yet exists in the aforementioned research on the use of JCI evaluation provisions to conduct research or case studies.

The above literature shows that the core concept of hospital evaluation is patient-centered, and the overall quality of medical care can be improved through the evaluation process, so hospital evaluation is an influential way to assess medical quality, but at present no comprehensive study has been performed on JCI evaluation provisions, only a portion of them. According to a Chiu et al. (2007) study, JCI evaluation criteria can be divided into patient-centered standards, management standards for medical institutions, patient-centered standards that conform to the core concept of hospital evaluation, and the management standards of medical institutions meet the upgraded hospital quality objectives, therefore this study defines the concept of hospital evaluation as medical ethics and medical quality.

2.3 Innovation in Hospital Services

Previous research on innovation in hospital services includes analysis of hospital service innovations

through secondary sources and in-depth interviews, which lays the groundwork for five concepts of medical ethics, and customer value as ethical value, functional value, happiness value, relational value, and contextual value (Chiu et al., 2012). Concerning health care services, private insurance tends to provide more innovative benefit plans. Taylor, (2013) studied the first tentative quantification to gain insight into relevant stakeholders' position in healthcare innovation through case studies on plans and improvements to health coverage in the current hospice policy and proposes a new approach to study different stakeholders' preferences, the results of which may be taken into consideration for the innovations implemented by policymakers. Lambooij & Hummel, (2013), envisions a chronic disease center with a promising delivery system with major potential for service innovation, which is focused on elderly people with a variety of chronic diseases. This disease center is specifically set up for cost reduction and medical care quality improvements to patients with chronic diseases who are burdened with the high medical expenses that come with chronic disease treatment, By analyzing the screening process of psychiatric patients, Tanio & Chen (2013) suggests that abnormalities can be detected and treated thus improving service and the long-term physical health of psychiatric patients. Harrison et al., (2012) research ambulatory service centers (ASCs) that have emerged in recent years in the United States and other countries as well as local regions, which are an innovation in healthcare services that conduct therapeutic surgery at acceptable limits, where patients do not need to stay overnight. Carey et al. (2011) researches data from 130 hospital innovations, analyzing the role of successful innovations in which business planning has a direct impact on the success of innovations and the more innovative business plans appear more important. Zippel & Schultz, (2011) integrate the findings present in the above research but did not study JCI evaluation provisions and service innovations.

Based on this literature review, new services within an organization are defined by this study as service innovation. In section 2.1, the hospital evaluation system is inferred to be a source of hospital innovation; however, few research explores hospital service innovation based on the perspective of hospital evaluation system. Service innovation types can be divided into two aspects, including technical and organizational, so this study defines hospital service innovation into two types: technical and organizational.

III. Method

This is an exploratory study that belongs to the longitudinal method. In Taiwan, the first hospital accredited by JCI is Min-sheng General Hospital in 2006. Thus, the study collected data from 2003, the first three years of Taiwan's first JCI hospital. A total of 13 JCI hospitals are selected as the cases. Service innovation projects provided by the 13 cases were learned about through JCI evaluation. The study used multiple sources of evidence in data collection (Yin, 1994). The first part was taken from the "Joint Knowledge Electronic Database", the second part from the website of the cases, and the third part from public access to government, health authorities, and assessment unit information, and finally from in-depth interviews. Finally, a total of 959 service innovation events were collected. The approach taken to enhance the credibility of the study adopted multiple sources of evidence (secondary sources and in-depth interviews) and development of database of the cases.

The core concept of hospital evaluation is patient-centered, and through the evaluation process to

improve the overall quality of hospital care, so hospital evaluation is an influential way to assess medical quality (Chiu et al., 2007). The JCI evaluation criteria can be divided into patient-centric standards and management standards for medical institutions, therefore this study defines the concept of hospital evaluation as medical ethics and medical quality. Moreover, the type of hospital service innovation can be divided into technical and organizational aspects. Accordingly, this study builds a strategic analysis matrix for hospital service innovation shown in Figure 1.

The operational definition of each strategic dimension is as follows. Firstly, technological functionalization refers to medical technology, medical equipment, and medical research that can improve and maintain the quality of medical care in hospitals, from outside the hospital for technological functional innovation and development. For example: JCI Chapter 12, No.: FMS.9: the provision of 24-hour-a-day, 7-day-a-week electrical power. Seconly, technological ethicalization defines that when hospitals provide medical services, they should provide services to meet the demand in addition to medical care quality, which gives rise to different service innovations in health, patients, and science and technology. For example: JCI, Chapter 3, No.: PFR.6.1: Inform patients of possible therapeutic effects and shortcomings of the treatment plan, as well as possible problems during the recovery period.

Thirdly, organizational functionalization defines that in addition to clear procedures and processes for medical care, the hospital is committed to structural innovation within the organization, and the organization cooperative model for innovation to improve the quality of health care in hospitals. For example, JCI Chapter I, No. IPSG.5: Medical institutions should implement effective hand hygiene programs. Finally, organizational ethicalization defines that hospitals should provide quality health care services based on the patient's condition or special needs, which is divided into organizational social innovation, and ethical organizational environment. Example: JCI Chapter V, Number: COP.7: Medical Staff understands the special needs of terminally ill patients.

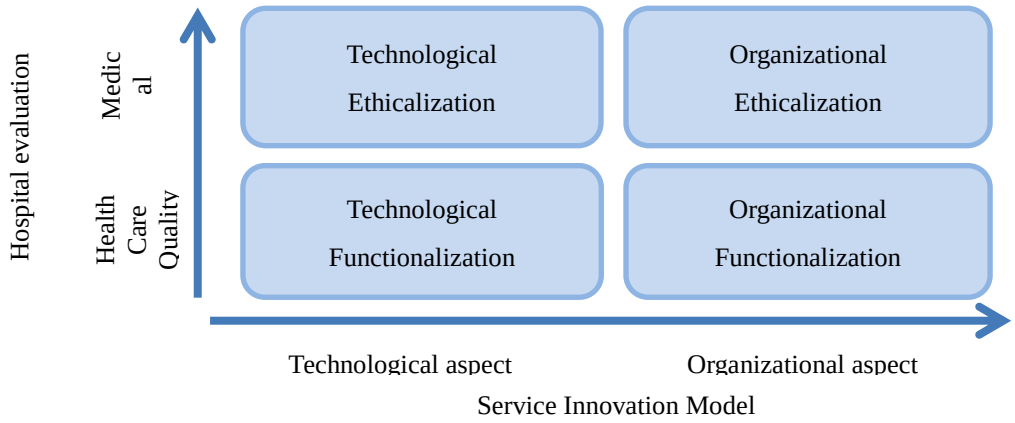

Figure 1 Strategic Analysis Matrix for Hospital Service Innovation

As for the data analysis, it includes basic analysis includes the hospital's name, health insurance type, mission of hospital, before and after evaluation, and JCI evaluation. Moreover, strategic analysis includes the four strategies for hospital service innovation, their sub-strategies, and operation strategies. Finally, the collected data,

a total of 959 service innovation events, were analyzed into the strategic analysis matrix (Figure 1), and the coding and frequency analysis are summarized in Table 1.

Table 1 Coding and Statistics on the Strategic Matrix of Hospital Service Innovation

Strategy	# of Event/ %/ Ranking	Sub-strategy	# of Event/ %/ Ranking	Operation strategy	# of Event/ %/ Ranking
A Technological functionalization	188/19.6/3	A1 Functional technological innovation adoption	44/4.6/8	A11 Introduction of new medical technology	8/0.8/24
				A12 Introduction of new medical equipment	36/3.8/11
		A2 Functional technological innovation development	144/15/3	A21 Medical technological innovation	31/3.2/12
				A22 Medical device innovation	28/2.9/15
				A23 Healthcare research innovation	85/8.9/1
B Technological ethicalization	339/35.3/1	B1 Health-oriented technological innovation	185/19.3/1	B11 Health promotion	39/4.1/10
				B12 Health eating promotion	62/6.5/6
				B13 Health literacy promotion	84/8.8/2
		B2 Patient-oriented technological innovation	125/13/4	B21 Quality of life maintenance	30/3.1/14
				B22 Service process streamlining	27/2.8/16
				B23 Minimally invasive surgery	22/2.3/19
				B24 Customized service	46/4.8/9
		B3 Technology-oriented innovation	29/3/9	B31 Telemedicine service	14/1.5/20
				B32 Mobile health care service	11/1.1/23
				B33 Electronic medical record service	4/0.4/25
C Organizational functionalization	273/28.5/2	C1 Organizational structural innovation	175/18.2/2	C12 Organizational foresight	31/3.2/13
				C12 Organizational paragon	65/6.8/5
				C13 New organization	79/8.2/3
		C2 Organizational co-operation model Innovation	98/10.25	C21 Cross-industry integrated services	74/7.7/4
				C22 Hospital strategic alliance	24/2.5/17
D Organizational ethicalization	159/16.6/4	D1 Organizational social innovation	95/9.9/6	D11 Promotion of public service	60/6.3/7
				D12 Health care service output	23/2.4/18
				D13 Life value creation	12/1.3/22
		D2 Organizational	64/6.7/7	D21 Supportive environment	51/5.3/8

Strategy	# of Event/ %/ Ranking	Sub-strategy	# of Event/ %/ Ranking	Operation strategy	# of Event/ %/ Ranking
		ethic environment		D22 Organization of education and training	13/1.4/21
Total	959/ 100	Total	959/100	Total	959/100

IV. Results

4.1 Hospital Service Innovation Strategies

Observing Table 1, the strategic analysis matrix for hospital service innovation was divided into four strategy types, concerning technological functionalization, technological ethicalization, organizational functionalization, and organizational ethicalization. The strategy is divided into several strategy categories, a total of 9 sub-strategy categories, and each sub-strategy category is divided into a number of operation strategies, for a total of 25 operation strategies (Table 1). The four strategies are described as follows.

Technological functionalization **【A】**

This strategy is defined for this study as the introduction, researching, improvement, and maintenance of health care quality related to technology, equipment, etc., which can improve and maintain quality health care in the hospital in the form of medical techniques and technology, equipment and research. What originates outside the hospital is used for functional technological innovation, while what originates from within the hospital is used for functional technological innovation development. The technological functionalization aspect is divided into two strategic categories that include functional technological innovation, functional technological innovation, and development, and each strategy classification is divided into a number of operation strategies, including the introduction of new medical equipment, medical technological innovation, medical equipment innovation, medical research innovation.

Functional technological innovation adoption【A1】is defined as the introduction of new medical technology and new medical equipment into hospitals. First of all, Introduction of new medical technology 【A11】 is defined as the importing of new medical technologies from outside the hospital, for example, Taipei's introduction of dynamic arc radiotherapy. Introduction of new medical equipment 【A12】 is defined as the introduction of new medical equipment and systems from outside the hospital For example China Medical Univesity introduced 640 computed tomography scanners.

Functional technological innovation development【A2】is defined as hospitals' service innovations in medical technology, medical systems, medical research. First of all, Medical technological innovation【A21】 is defined as new medical technologies that are imported from outside the hospital and developed or extended through their application in various ways. For example, National Taiwan University Hospital's development of in vitro radiotherapy of salivary glands, which are subsequently implanted back into the mouth with continued salivary secretion, restoring the patient's ability to speak and eat. Medical device innovation【A22】is defined as hospital research and development, or application of different ways to produce new medical equipment and

systems. For example, National Taiwan University Hospital's Improved design of the stitch counter reduces the chance of caregivers being hurt by surgical stitches. Healthcare research innovation【A23】is defined as the publication of medical research reports in hospitals, for example E-Da Hospital Sleep Center's tracking of more than 300 cases of sleep disorders ultimately finding that snoring was one of the reasons for divorce.

***Technological ethicalization*【B】**

This strategy is defined for this study as the medical care provided by hospitals as services rendered in other areas above and beyond a certain level of medical quality to meet patient needs, in the three aspects of health, patients, and technology, thus bringing forth service innovations. Technological ethicalization is divided into three strategic categories, including health, patient, and technology-oriented service innovations, and each strategy category is divided into several strategy items, for a total of 10 strategy items, including health promotion, healthy diet promotion, health literacy promotion, quality of life maintenance, streamlined service process, minimally invasive surgery services, customized services, telemedicine services, Mobile Health Care Services, and electronic medical records.

Health-oriented technological innovation【B1】is defined as promoting and providing to the people educational services for life, diet, and health literacy. First of all, Health promotion【B11】is defined as the provision of public activities for healthy living, physical care, and spiritual growth by hospitals, for example, E-Da Hospital organizing a symposium, where Grace Yang was invited to speak and share with healthcare professionals and patients alike on the topic of "embrace life every minute of every day." Healthy eating promotion 【B12】 is defined as providing public activities on how to balance diet and health, for example, Changhua Christian Hospital's organization of lectures to the general public aimed at understanding urinary tract diseases and nutritional support. Health literacy promotion【B13】is defined as providing more professional and in-depth health literacy to the public than the above two categories, for example, National Taiwan University Hospital holding a series of lectures discussing the topic "Is Mental Illness Hereditary?" on the relationship between psychiatry and genetics.

Patient-oriented technological innovation【B2】is defined as maintaining the people's quality of life, streamlining complex service processes in hospitals, providing time-saving and rapid recovery time minimally invasive surgical services, and customized service innovation. First of all, Quality of life maintenance【B21】 is defined as medical care in hospitals that brings consideration not only to the treatment of disease but also the patient's quality of life, for example, at Taipei Medical University a patient suffering from diffuse uterine leiomyomatosis was able to keep her uterus and retain fertility via minimally invasive surgery. Service processes streamlining 【B22】 is defined as reducing patient wait times while providing hospital services. For example, the introduction of a low-dose full-body X-ray scanner after the launch of the China Medical University Trauma and Emergency Center equipped to rotate 360 degrees to scan the full skeletal structure of patients with major trauma in just 13 seconds, negating the pain involved when the patient moves or turns over. Minimally invasive surgery 【B23】 is defined as the hospital's reduction of surgical cuts and shorting of recovery times after medical services, for example, Taipei Municipal Wanfang Hospital introduced a "jelly shuttle" laser to avoid the large postoperative epidermal wounds and easily induced skin discoloration brought on by the traditional shuttle

laser, which also lowered price and shortened the recovery period. Customized service【B24】is defined as the hospital providing further tailor-made services for patients in addition to the above service classification, for example, Minsheng Medical Aesthetics and Wellness Center's compilation of the "Ugly Duckling List" free of charge to cater to a set of cosmetic surgical procedures suited to the individual.

Technology-oriented innovation【B3】is defined as the development of telemedicine services, Mobile Health Care Services, and electronic medical records as scientific and technological advances in hospitals. Telemedicine service【B31】is defined as medical services provided by the hospital which can also serve patients when they are not in the hospital, for example, Minsheng Medical Aesthetics and Wellness Center's provision of a variety of online real-time consultation services. Mobile health care service【B32】is defined as the developmental move part of the hospital's services outside the actual hospital facility through other health care provision mediums and go to locations outside the hospital, e.g. Changhua Christian Hospital together with Siemens and Taiwan Mercedes-Benz venturing to build the country's first breast X-ray screening Mercedes-Benz roving vehicle. The van went to the countryside testing 100 women. Electronic medical record service 【B33】 is defined as the hospital converting paper medical records into electronic information. For example Chang Gung Memorial Hospital, Linkou is committed to promoting electronic medical records. To facilitate referral, this year patients no longer have to go to the original hospital to apply for medical records.

***Organizational functionalization*【C】**

This strategy is defined for this study as any and all activities of medical institutions that improve the quality of medical care procedures and processes. Hospitals are committed to structural innovation and intra-organizational cooperation models in addition to clear and cohesive procedures and medical care processes in an effort to improve the quality of medical care. In the functional part of the organization, it is divided into two strategic categories, including structural innovation within the organization, the organizational cooperation model, and service innovation, with each strategy category being divided into a number of strategy items, for a total of 5 strategy items that include organization planning and development, organizational modeling, new organization establishment, hospital strategic alliances, and cross-industry integration services.

Organizational structural innovation【C1】is defined as goal or plans made by the organization sets goals for prospective hospital planning and development between organizations actively carried out through various evaluations to establish an inter-organizational model for the hospital The integration of resources to establish new organizations, departments, centers, etc. First of all, Organizational foresight【C11】is defined as the hospital planning its future developmental direction and the improvement of hospital medical quality plan, for example, Minsheng General Hospital, introduced a foreign "undercover patient" practice two years ago to test and review the medical services of its medical staff. Organizational paragon【C12】is defined as the hospital consistently improving the quality of its medical care through evaluation or certification, for example, Taiwan Adventist Hospital passing the JCI International medical assessment. New organization【C13】is defined as the hospital consolidating its resources and setting up new organizations, departments, and centers to provide better services. For example, Show Chwuan Memorial Hospital's announcement of the launch of its three-in-one "happy delivery room" ward for child delivery, childbirth, and postpartum rest.

Organizational co-operation model innovation【C2】is defined as the hospital actively seeking out cooperation intra- or inter-industry collaborative partnerships to improve the quality of medical care., First of all, Cross-industry integrated service 【C21】 is defined as hospital and non-hospital collaboration, for example, National Taiwan University Hospital and Wantai Bank, which has long been engaged in social care and charity activities, organized pro bono "good neighbor" driver and passenger treatment events at buildings A and B of the Kuokuang West Station, which are driver and passenger health checks. Hospital strategic alliance【C22】is defined as collaboration between hospitals, for example, Taipei Medical University Hospital, the Koo Foundation Sun Yat-Sen Cancer Center, and Show Chwuan Memorial Hospital held a conference to complete the first medical system combined with RFID for early medical care and outbreak tracking systems.

***Organizational ethicalization*【D】**

This strategy is defined for this study as the provision of perfect services according to the patient's actual condition or special needs. The hospital provides quality medical services according to the patient's condition or special needs, divided into organizational social innovation, Organizational ethic environment. In the organizational ethicalization section, it is divided into two strategic categories, including organizational social innovation, organizational ethical environment service innovation, and each strategy classification is divided into a number of strategy items, a total of 5 strategy items, including Promotion of public welfare services, health care service output, life value creation, supportive environment, organization of education and training.

Organizational social innovation【D1】is defined as the public service of the hospital in society and provides health care service output and patient life value creation. First of all, Promotion of public service【D11】is defined as the hospital holding social welfare activities services. For example, Shuang Ho Hospital's opening of massage kiosks was heralded by a spectacular sonata giving by a visually impaired orchestra, after which the hospital called on the public to support visually impaired masseur's right to work. Health care service output【D12】is defined as a hospital's provision of pro bono medical services. For example, the free medical services provided two weeks prior to the launch of the Taipei Municipal Wanfang Hospital on the Marshall Islands, medical services. Life value creation 【D13】is defined as hospitals' provision of services other than medical care to patients, which allow patients to affirm the value of their own life. For example, Changhua Christian Hospital held a "Three Generations Under One Roof" Art exhibition and sales event set up to donate money to an 80-year-old cancer patient.

Organizational ethicalization environment【D2】is defined as the hospital taking itself seriously in its mission to provide an environment that can give patients support, and a more friendly medical environment in which to help them recover, as well as the hospital providing an array of education and training in the hospital. First of all, Supportive environment【D21】is defined as a hospital providing services closer to the needs of patients in the hospital's hard environment in addition to medical care. For example, Shuang Ho Hospital uses supportive adjuvant therapies such as aromatherapy, gardening, painting, puzzles, and other supportive therapies to help cancer patients undergoing radiation therapy. Organization of education and training【D22】is defined as the hospital's provision of a variety of educational and training courses to create a better learning environment for employees. For example, Show Chuwan Hospital Asian Minimally Invasive Surgery Training Center's

organization of two-day courses for "Minimally Invasive Weight Reduction and Metabolic Surgery."

4.2 Frequency Analysis of Hospital Service Innovation Strategies

Observing Table 1, the rates of the four strategies are described as follows: technological functionalization (19.6%), technological ethicalization (35.3%), organizational functionalization (28.5%), and organizational ethicalization (16.6%). Firstly, technological ethicalization is most emphasized. This shows that the continuous efforts of hospitals were to provide closer patient needs and better service in the balance of medical quality. Moreover, this strategy emphasizes health, patient, and technology-oriented innovations and these are patient-centered service innovation. This is also in line with the concept of patient-centered JCI evaluation. Secondly, organizational functionalization is a central part of hospital service execution, promotion of hospital evaluation, and hospital standardization processes. Thirdly, technological functionalization receives less attention. Only mature medical technology and equipment will be introduced and applied to practice, and thus the rate of technological functionalization is less. Finally, the rate of organizational ethicalization is the lowest, because hospitals must be an operational priority. To sum up, hospital service innovation mainly comes from technological ethicalization, organizational functionalization, while technological functionalization and organizational ethicalization are relatively few.

V. Conclusion

After categorizing the aspects of the hospital evaluation concept into medical quality and medical ethics, and service innovation into technical and organizational aspects, the strategies of hospital service innovation are grouped into four strategies. These strategies are technological functionalization, technological ethicalization, organizational functionalization, and organizational ethicalization. In addition, the value creation of hospital service innovation comes mainly from technological ethicalization and organizational functionalization. In terms of technological ethicalization, domestic hospitals recognize the importance of technological innovation. Hospital technological innovation is defined as medical treatment, medical technology, management systems, and/or innovations related to disease diagnosis (Kimberly & Evanisko, 1981; Goes & Park, 1997). Moreover, hospitals strengthen their own competitive advantage and enhance the performance of its operations through technological innovation (McDonald & Srinivasan, 2004). Medical care can only treat diseases. But bringing in the concept of medical ethics can not only treat patients but also improve relations between the hospital and patient. This is the principle of working for the patient's best interests, respecting the patient's decisions, and prioritizing patients. Moreover, when caring for patients, technology is only the implementation of health care tools, while the decision and purpose of treatment depend on the care of the patient. The most emphasis in medical ethics education today is patient autonomy. So-called informed consent is the right to giving the right to prioritize informed consent in medical care, which echoes the informed consent in Chapter III of the JCI evaluation of Patient and Family Rights. Furthermore, in terms of organizational functionalization, organizational innovation improves adaptability in the task environment. The core of organizational competitiveness is organizational innovation (Harrison & Samaon, 2002). Hospitals belong to

this highly specialized organization that strengthens the competitive advantage of the hospital itself through organizational innovation (McDonald & Srinivasan, 2004).

In conclusion, the hospital assessment provisions affect the hospital's service innovation development. The future study can explore the relationship between JCI evaluation system and hospital operation effectiveness. In addition, the differences in service innovation strategies between comparable hospital grades in an area that passes or fails the JCI evaluation can be further analyzed. The service innovations collected in this study did not exclude the hospital's background, cost considerations. In terms of the number of hospital service innovations, this can only show the frequency of hospital value creation, and may not represent the degree of value creation. The future study can also assess qualitative assessment of hospital service innovations, that is, to assess the weight of each hospital service innovation, and reflect the degree of value creation appropriately.

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