



Effect of Service Quality on Costumer Loyalty: Multiple Comparisons between Internal and External Costumers

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Abstract

Many hospitals establish survival business strategies and secure costumers with high loyalty to the hospital that is also an important strategy. This study identified the causal relationships among service quality, service value, costumer satisfaction and costumer loyalty and difference in path-coefficients depending on costumer type. The subjects of this study were 314 medical, health care and administrative workers, who were working at 1 university dental clinics located in Seoul for more than one month and 303 adult males and females aged between 18 and 60, who visited the same clinics more than 2 times within 9 months. This study found that service quality has effects on increases in service value and costumer satisfaction; service value has effects on costumer satisfaction and costumer loyalty; and costumer satisfaction has an effect on costumer loyalty. Tangibles and assurance had more effects on internal costumers' satisfaction unlike external costumers, while service value had greater effects on external costumers' satisfaction. This study furthermore provided baseline data for hospital managers to improve costumer loyalty.

Keywords: Service, Costumer, Loyalty

Introduction

The levels of income and education have improved in modern society, and unlike the past, medical technologies have advanced together with the rapid aging of the population. Medical needs of the population are on a constant rise accelerating the growth of medical institutions and large enterprises in the medical industry, which has consequently led to the phenomenon of medical oversupply [1]. In South Korea, the 2007 bankruptcy rate of small hospitals with 99 beds was 9.3%, those with 100-199 beds was 6.2%, those with 200-299 beds was 3.1%, and those with more than 300 beds was 2.8%, which reflects the overall financial difficulties experienced by the medical industry [2]. In this challenging medical environment, many hospitals establish survival business strategies and secure costumers with high loyalty to the hospital that is also an important strategy [3].

The concept of costumer loyalty can be divided broadly into behavioral, attitudinal and integrated approaches. Costumer loyalty by behavioral approach indicates the costumer's tendency of repeated purchases of a specific brand for a certain period of time, which can be measured by buying rate, purchase possibilities, repurchase availability and purchase frequency [4].

The attitudinal approach indicates a psychological commitment to a specific brand, which is measured by costumer's favorable attitude toward a specific brand (preferences and immutability of preferences, word-of-mouth intention and willingness to pay premium price) to understand purchase intention or potential future purchase [5]. The integrated approach is a combination of the behavioral and attitudinal approach to costumer loyalty, in which costumers are deeply involved in the process of purchasing products, so they continuously purchase preferred goods or services in the future [6].

Maintenance of costumer loyalty has many benefits such as hospital marketing price reduction, reduction in transaction costs, consumer switching cost reduction, positive word of mouth effect and reduction of failure costs [7]. However, since consumer loyalty is predicted by repeated and continuous future purchase of a specific brand or good without switching to another product or service despite the changing environmental milieu, and is never easy to maintain [8]. For instance, in the first year, 1,000 costumers purchased a company's product; in the second year, only 400 repurchase the product (repurchase rate: 40%); and in the third year, only 180 of the 400 costumers (45%) repurchase the product; in the fourth year, 80 of the 180 persons (50%) repurchase the product; and finally, in the fifth year, only 50 of the 80 costumers (60%) repurchase the product. However, the lifetime value that the company has from the first year costumers is converted to \$75, but the lifetime value from costumers who continuously purchase for 5 years amounts to \$115.09 [9]. Therefore, if hospitals consider creating profit and cost reduction, identifying ways to increase costumers' loyalty from a variety of perspectives and planning measures are important survival strategies.

Maintenance of costumer loyalty has many benefits such as hospital marketing price reduction, reduction in transaction costs, consumer switching cost reduction, positive word of mouth effect and reduction of failure costs [7]. However, since consumer loyalty is predicted by repeated and continuous future purchase of a specific brand or good without switching to another product or service despite the changing environmental milieu, and is never easy to maintain [8]. For instance, in the first year, 1,000 costumers purchased a company's product; in the second year, only 400 repurchase the product (repurchase rate: 40%); and in the third year, only 180 of the 400 costumers (45%) repurchase the product; in the fourth year, 80 of the 180 persons (50%) repurchase the product; and finally, in the fifth year, only 50

of the 80 costumers(60%) repurchase the product. However, the lifetime value that the company has from the first year costumers is converted to \$75, but the lifetime value from costumers who continuously purchase for 5 years amounts to \$115.09 [9]. Therefore, if hospitals consider creating profit and cost reduction, identifying ways to increase costumers' loyalty from a variety of perspectives and planning measures are important survival strategies.

The medical field emphasizes the value of a service among the factors affecting costumer loyalty. Service value is defined as the ratio between what costumers acquire in the process of purchasing goods and the sacrifice involved[10]. Service value becomes an important factor in costumers' decision to repurchase the same goods in the future by evaluating satisfaction and dissatisfaction of the goods purchased, considering what they acquire when they purchase goods (benefits) and the money they spend [11]. Lee and Ulgado[12] reported that the service value judged by costumers, according to costs vs. benefits in actual shopping situations, has an effect on their purchase intention. Shoemaker and Lewis [9] emphasized the creation of service values through the loyalty triangle. Moreover, Dube and Shoemaker [13] suggested methods of increasing the hospital costumer loyalty by presenting strategies for the creation of service values, as carried out by various companies.

In addition to service values, costumer satisfaction is another important factor to increase costumer loyalty. Based on Oliver's expectation-mismatch theory [6], costumer satisfaction is a concept expressed by satisfaction and dissatisfaction according to the level of inconsistency between costumers' expectation before their purchases of a service and their actual experience after their use of the service. Considering preceding studies on the correlation between costumer satisfaction and loyalty, Fornell[14] emphasized that, if a company increases costumer satisfaction, costumer loyalty improves; and furthermore, reducing price sensitivity plays a decisive role in reducing existing costumers' reporting and failure costs, reducing new costumer acquisition costs and improving the company's image. In addition, costumer satisfaction is an important factor affecting costumer loyalty, according to a preceding study conducted on American bank costumers [15] and on e-commerce costumers in Malaysia and Qatar [16]. Moreover, Murti et al.[17] emphasized that in the competitive medical environment, increasing costumer satisfaction is a direct factor to increase hospital costumer loyalty.

Increased costumer loyalty, service value and costumer satisfaction can be modulated by service quality. Since generally, medical service focuses on the issue of health, it has more complex characteristics than those of other services [18]. Also, since the field of medical service, unlike general services, involves highly specialized and scientific service, there are a wide variety of concepts and definitions of service, leading to independently developed and utilized measurement tools [19]. However, in recent years, the importance of service quality perceived by patients has come to the fore as many hospitals carry out costumer-centered business and accept the general service quality perceived by patients has come to the fore as many hospitals carry out costumer-centered business and accept the general service industries' measurement tools for medical service quality [20-21]. Service quality measurement tools generally used in service industries includes SERVQUAL developed and modified by Parasuraman et al.[22] and SERVPERF suggested by Cronin and Taylor [23]. However, though SERVQUAL can arithmetically calculate the difference between performance-expectation, it is difficult to objectively measure actual expectation and performance with the same costumers [24]. As a result, the medical service currently uses SERVPERF more frequently. The measurement items in SERVPERF proposed by Cronin and Taylor [23] include 5 items: tangibles, reliability, responsiveness, assurance and empathy. Tangibles refer to hospital facilities, equipment, the medical personnel's clothing and appearance; reliability refers to the medical

personnel's effort to provide the promised medical service at the fixed time, and concern for and relief of patients' difficulties; responsiveness refers to personnel's effort to provide prompt service accurately and spontaneously to customers who visit the hospital; assurance refers to the medical personnel's knowledge and kindness, and ability to deliver acceptable customer service; and empathy refers to the medical personnel's interest in hospital customers and ability to rapidly evaluate the customers' requirements and provide medical service at the convenient time.

Lee et al. [25] reported that service quality perceived by hospital customers has an effect on customer satisfaction and an indirect effect on customer loyalty. Caruana [15] found that service quality perceived by bank customers has a direct effect on customer satisfaction and a resulting effect on customer loyalty. Parasuraman and Grewal [26] emphasized that service quality perceived by customers has an effect on service value and an effect on customer loyalty and that these 3 factors are interconnected. Parasuraman and Grewal [26] emphasized through the Triangle and Pyramid Model that in a company's marketing strategy to increase customer loyalty, a separate approach for external vs. internal customers would more easily facilitate achievement of goals. However, most preceding studies of service quality, service value, customer satisfaction and customer loyalty were conducted on external customers, so the factors affecting internal hospital customer loyalty have not been comprehensively identified.

This study attempted to identify causal relationships among service quality, service value, customer satisfaction and customer loyalty with dental clinic customers based on the above contents and to compare relationships among service quality, service value, customer satisfaction and customer loyalty according to internal customers and external customers and the differences in path-coefficients.

Materials and Methods

Study design and sample

The study was a descriptive comparison using the self-report survey method to investigate the effect of medical service quality perceived by internal and external customers of one university dental clinic on loyalty. The subjects of this study were 314 medical, health care and administrative workers, who were working at 1 university dental clinics located in Seoul for more than one month and 303 adult males and females aged between 18 and 60, who visited the same clinics more than 2 times within 9 months from 1, June, 2012 to 30, March, 2013. They were given sufficient explanation and provided written consent.

Measurements

Service quality

Service quality is an overall judgment or attitude to the excellence of a specific service, and the SERVPERF tool developed by Cronin and Taylor [23] was modified for the purpose of the study. The service quality measurement consisted of 5 sub-factors: Tangibles refers to physical facilities, equipment, personnel and communication tools; reliability refers to an ability to give people trust in the promised service and provide it exactly; responsiveness refers to an ability to voluntarily help customers and provide fast service; assurance refers to the service providers' ability to deliver knowledge, courteousness, faith and trust; and empathy refers to an ability to provide customers with personal care. It consists of a total of 22 questions, and the range of scores is 1 to 7 points per question, in which the higher the score reflects higher service quality. The reliability of the tool in this study was Cronbach's $\alpha = 0.95$.

Service value

Service value refers to the overall rating of what consumers think they pay for a service and the perceived effectiveness of the service. The tool with measurement items developed by Cronin et al. [27],

Ettinger [28] and Gooding [11] was modified for the purpose of this study. It consists of a total 4 questions, and the range of scores is 1 to 7 points per question, in which the higher score reflects higher service quality. The reliability of the tool in this study was Cronbach's $\alpha=0.92$.

Customer satisfaction

Customer satisfaction refers to the state of satisfaction with the goods purchased by customers. The tool with measurement items developed by Reidenbach and Sandifer-Smallwood [29], Westbrook [30] and Woodside et al. [31] was modified for the purpose of this study. It consists of a total of 3 questions, and the range of scores is 1 to 7 points per question, with higher scores reflecting higher service quality. The reliability of the tool in this study was Cronbach's $\alpha=0.83$.

Loyalty

Loyalty refers to customers' intention to repurchase goods. The tool with measurement items developed by Reidenbach and Sandifer-Smallwood [29] was modified for the purpose of the study. It consists of a total of 3 questions, and the range of scores is 1 to 7 points per question, with higher scores reflecting higher service quality. The reliability of the tool in this study was Cronbach's $\alpha=0.96$.

Data analysis

SPSS Windows 18.0 (SPSS Inc., Seoul, Korea) and AMOS 7.0 (SPSS Inc., Seoul, Korea) were used for data analysis. We conducted a frequency analysis to understand the subjects' personal characteristics and a confirmatory factorial and correlation analysis to verify the reliability and validity of the research tools. A structural equation model analysis was conducted to understand theoretical relationships between the individual variables. A measurement invariance test was conducted before a comparison of the path-coefficients between a group of internal customers and a group of external customers to verify whether the factors had the same factorial structures. The invariance test divided internal and external customers, and verified the difference in χ^2 value between a constrained and a free (unconstrained) model regarding the factor loading amount of the groups using a confirmatory factorial analysis. Structural model invariance across the groups is a technique to investigate the difference in path-coefficients between the measurement models. The analysis was conducted through processing metric invariance constraints and cross-group equality constraints.

Results

General characteristics of subjects

Characteristics of internal customers among the study subjects showed 142 males (45.4%) and 172 females (54.6%); 174 were married (55.5%) and 140 were single (44.5%); 39 were lower than

high school graduates (12.4%), 48 were high school graduates (15.3%), and 227 were junior college graduates or higher (72.2%); 83 were aged under 30 (26.3%), 83, over 31, under 35 (26.3%), 63, over 36, under 40 (20.1%), and 85, over 41 (27.3%); 101 were in administrative job (32.2%), 105, in health care (33.4%), and 108, in medical care (34.4%); and 75 earned less than 3 million won (23.9%), 108, more than 3 million won, less than 5 million won (34.4%), 86, more than 5 million won, less than 7 million won (27.3%), and 45, more than 7 million won (14.4%) per month.

External customers' characteristics showed 133 males (44.0%) and 200 females (56.0%); 158 were married (52.3%) and 145 were single (47.7%); 50 were lower than high school graduates (16.6%), 55 were high school graduates (18.1%), 130 were junior college graduates or higher (42.8%), and 68 were graduates of graduate school or higher (22.5%); 70 were under 30 (23.1%), 56 were over 31, under 40 (18.5%), 67 were over 41, under 50 (22.1%), 64 were over 51, under 60 (21.1%), and 46 were over 61 (15.2%); 104 were students (34.2%), 69, housewives (22.7%) and 90, office workers and civil servants (29.8%); 36 earned less than 2 million won (11.9%), 115, more than 2 million won, less than 4 million won (38.0%), 86, more than 4 million won, less than 6 million won (28.4%), and 66, less than 6 million won (21.8%) per month.

Analyses of Validity, Reliability and Correlation

The measurement model was modified by a convergent validity test to remove measurement items and factors with poor validity through a primary confirmatory factorial analysis so as to correct the measurement model and a discriminant validity test to verify whether the factors are independent without any correlations. The convergent validity is standardized factor loadings (λ) over 0.60 and significance (t) over 1.96 in the confirmatory factorial analysis [32]. Variables were selected by verifying their squared multiple correlation and standardized residual covariance, and the items that did not meet these conditions were eliminated. The suitability of the final model appeared as follows: $\chi^2=652.87$, $p<0.001$, $\chi^2/d.f.=3.51$, RMSEA=0.09, GFI=0.88, AGFI=0.84, NFI=0.86 and CFI=0.90. To look into the items eliminated, of the sub-factors of service quality, one question about tangibles ("Our hospital has the latest medical equipment appropriate for medical service"), one about reliability ("Our hospital provides all medical services promised") and one about service value ("I have achieved what I wanted through our hospital's medical services") were removed. In addition, as a result of calculation of construct reliability and Average Variance Extracted (AVE) to identify the convergent validity, all values met the general criteria (construct reliability: over 0.70; AVE: over 0.50) of convergent validity [33] (Table 1).

Factor	Sub-factors	Analysis of validity				CCR	AVE
		FL	SE	t	P		
Tangible	tangible 2	0.82	fix		<0.001	0.85	0.65
	tangible 3	0.72	0.06	16.20	<0.001		
	tangible 4	0.77	0.06	17.33	<0.001		
Reliability	reliability 2	0.79	fix		<0.001	0.82	0.60
	reliability 3	0.81	0.05	20.28	<0.001		
	reliability 4	0.71	0.07	17.14	<0.001		
	reliability 5	0.74	0.05	17.92	<0.001		
Responsiveness	responsiveness 1	0.85	fix		<0.001	0.87	0.64
	responsiveness 2	0.71	0.04	18.40	<0.001		
	responsiveness 3	0.83	0.04	23.22	<0.001		
	responsiveness 4	0.89	0.04	26.56	<0.001		

Table. 1 Cont.....

Assurance	assurance 1	0.89	fix		<0.001	0.86	0.64
	assurance 2	0.88	0.04	28.26	<0.001		
	assurance 3	0.83	0.04	25.37	<0.001		
	assurance 4	0.75	0.04	21.15	<0.001		
Empathy	empathy 1	0.68	fix		<0.001	0.90	0.62
	empathy 2	0.88	0.07	17.69	<0.001		
	empathy 3	0.87	0.07	17.48	<0.001		
	empathy 4	0.84	0.06	17.04	<0.001		
	empathy 5	0.80	0.06	16.26	<0.001		
Service quality	service quality 2	0.84	fix		<0.001	0.81	0.65
	service quality 3	0.85	0.04	23.22	<0.001		
	service quality 3	0.80	0.04	21.11	<0.001		
Customer satisfaction	customer satisfaction 1	0.87	fix		<0.001	0.87	0.61
	customer satisfaction 2	0.86	0.04	25.85	<0.001		
	customer satisfaction 3	0.70	0.05	18.53	<0.001		
Loyalty	loyalty 1	0.92	fix		<0.001	0.90	0.62
	loyalty 2	0.91	0.03	33.69	<0.001		
	loyalty 3	0.89	0.03	31.47	<0.001		

Table 1 Convergent validity

$\chi^2=652.87$, $p<.000$, $\chi^2/d.f=3.51$, RMSEA=0.09, GFI=0.88, AGFI=0.84, NFI=0.86, CFI=0.90

FL factor loading, SE standard error, CCR composite construct reliability, AVE average variance extracted

Discriminant validity differs depending on each different latent variable. As a result of a test of the construct reliability and AVE to evaluate the reliability of the factors of the measurement variables, the general standard for the recommendation of construct reliability, over 0.70 and the standard for AVE, over 0.50 [32] was utilized. Discriminant validity was indicated when the correlation coefficient value (0.39-0.77) between the concepts was smaller than AVE square of root ($\sqrt{}$) value (0.78-0.87) (Table 2).

Research Hypothesis Testing

Thirteen hypotheses were established in total between 5 sub-factors of service quality (tangibles, reliability, responsiveness, assurance,

empathy). Service value, customer satisfaction and customer loyalty, and the indicators of the suitability of the research model were as follows: $\chi^2=9.24$, $d.f=4$, $\chi^2/d.f=2.31$, GFI=0.98, AGFI=0.90, NFI=0.99, CFI=0.99, and RMSEA=0.07. These results met the criterion for goodness of fit evaluation and the relative goodness of fit indices, GFI, AGFI, NFI, and CFI (≥ 0.90) suggested by Bagozzi and Yi [32]. In addition, RMSEA=0.07, was smaller than 0.08 indicative of the simplicity of the model, which showed a relatively good fit. Through the process of testing convergent and discriminant validity, the research model was judged to be suitable. As a result of verifying the hypotheses, 11 of the 13 hypotheses were adopted (Table 3).

Variables	X1	X2	X3	X4	X5	X6	X7	X8
X1: Tangible	0.81							
X2: Reliability	0.55*	0.78						
X3: Responsiveness	0.40*	0.77*	0.80					
X4: Assurance	0.57*	0.73*	0.69*	0.79				
X5: Empathy	0.39*	0.74*	0.74*	0.67*	0.81			
X6: Service quality	0.48*	0.70*	0.66*	0.71*	0.74*	0.78		
X7: Customer satisfaction	0.54*	0.67*	0.63*	0.72*	0.67*	0.69*	0.79	
X8: Loyalty	0.44*	0.71*	0.69*	0.76*	0.73*	0.77*	0.76*	0.87

Table 2 Correlation and discriminant validity

* $p<0.001$; shaded section: discriminant validity, non shaded section: correlation

Path			External and internal costumers				
			B	β	SE	t	P
Tangible	→	Service quality	0.06	0.08	0.04	1.86	0.126
Reliability	→		0.12	0.14	0.06	2.35	0.019

Table. 3 Cont.....

Responsiveness	→		-0.03	-0.03	0.05	-0.57	0.568
Assurance	→		0.38	0.41	0.05	8.06	<0.001
Empathy	→		0.36	0.35	0.04	8.35	<0.001
Tangible	→		0.08	0.10	0.04	2.45	0.014
Reliability	→		0.06	0.07	0.06	1.18	0.238
Responsiveness	→	Costumer satisfaction	0.09	0.09	0.04	2.05	0.041
Assurance	→		0.20	0.22	0.05	4.34	<0.001
Empathy	→		0.20	0.20	0.04	4.68	<0.001
Service quality	→		0.36	0.37	0.04	9.21	<0.001
Service quality	→	Loyalty	0.60	0.65	0.06	10.75	<0.001
Costumer satisfaction	→		0.38	0.40	0.05	8.25	<0.001

Table. 3 The result of path coefficient

$\chi^2=9.23$ (d.f=4, $p<0.056$), GFI=0.99, AGFI=0.90, RMR=0.01, NFI=0.99, CFI=0.99, RMSEA=0.07

Direct Effect, Indirect Effect and Total Effect Test

This study analyzed the direct, indirect and total effects of exogenous variable, service quality (tangibles, reliability, responsiveness, assurance, and empathy) on dependent variable, loyalty with parameters of service value and costumer satisfaction. Bootstrapping method was used for the significance of the effects. As a result of the analysis, reliability, assurance and empathy among the variables of service quality had direct effects on service value, and tangibles, responsiveness, assurance, empathy and service value had significant direct effects on costumer satisfaction. Also, reliability, assurance and empathy among the variables of service quality had indirect effects on costumer satisfaction mediated by service value. Service value and costumer satisfaction had significant effects on loyalty, and service value had a significant effect mediated by costumer satisfaction, and tangibles, reliability, assurance and empathy among the variables of service quality had significant effects on dependent variable, loyalty with parameters of value consistency and costumer satisfaction (Table 4).

Comparison of Path-coefficients in Internal and External Costumers

Before verifying the difference between the internal and the external costumer groups, to test the measurement equality between the 2 groups, they were separated, and the difference in χ^2 value was tested using a confirmatory factorial analysis between a constrained model and a free model (unconstrained model) of the factor loading amount. As a result, in the free model, $\chi^2=1208.59$ and d.f=349, while in the constrained model, $\chi^2=1753.60$, and as the degree of

freedom in the free model and the constrained model increased to 349, the chi-square difference was 545.01, which showed that there was no significant difference between the 2 groups ($\Delta\chi^2/d.f=545.01/349=1.56$) (Standard for difference in χ^2 : $\Delta\chi^2(1)>3.84$). Also, RMSEA became somewhat better, but there was almost no changes in CFI and TLI, so the measurement equality was secured.

Next, to verify the difference in path-coefficients between the groups, first, path-coefficients of each group were identified. In the internal costumers' group, significant causal relationships were found in 9 paths, while in the external costumers' group, they were found in 8 paths. The factors by which service quality has a significant effect on service value were reliability, assurance and empathy in the internal costumers, while in the external costumers, tangibles, assurance and empathy were included ($p<0.05$). The factors affecting costumer satisfaction were tangibles, assurance, empathy and service value in the internal costumers, while in the external costumers, assurance, empathy and service value were included ($p<0.05$). However, the factors affecting loyalty were service value and costumer satisfaction in both internal and external costumers ($p<0.05$).

The differences in χ^2 value of the free and constrained model on 13 paths existing in the research model were evaluated to identify the significant differences in path-coefficients between groups. As a result, χ^2 variation had statistically significant differences in the paths from tangibles to costumer satisfaction ($\Delta\chi^2=5.08$, d.f=1); from assurance to costumer satisfaction ($\Delta\chi^2=4.62$, d.f=1); and from service value to costumer satisfaction ($\Delta\chi^2=5.99$, d.f=1) in the 2 groups (Standard for difference in χ^2 : $\Delta\chi^2(1)>3.84$) (Table 5).

Exogenous variables	Endogenous variables	Direct effect (p)		Indirect effect (p)		Total effect (p)	
Tangible	Service quality	0.06	0.126			0.06	0.126
Reliability		0.12	0.019*			0.12	0.019*
Responsiveness		-0.03	0.568			-0.03	0.568
Assurance		0.38	<0.001*			0.38	<0.001*
Empathy		0.36	<0.001*			0.36	<0.001*
Tangible	Costumer satisfaction	0.08	0.014*	0.02	0.101	0.10	0.018*
Reliability		0.06	0.238	0.04	0.013*	0.10	0.078
Responsiveness		0.09	0.041*	-0.01	0.826	0.08	0.168
Assurance		0.20	<0.001*	0.13	0.003*	0.33	0.002*
Empathy		0.20	<0.001*	0.13	0.004*	0.33	0.007*
Service quality		0.36	<0.001*			0.36	0.004*

Table. 4 Cont.....

Tangible	Loyalty			0.08	0.018*	0.08	0.018*
Reliability				0.11	0.004*	0.11	0.004*
Responsiveness				0.01	0.694	0.01	0.694
Assurance				0.35	0.003*	0.35	0.003*
Empathy				0.34	0.011*	0.34	0.011*
Service quality		0.60	<0.001*	0.13	0.004*	0.74	0.004*
Costumer satisfaction		0.38	<0.001*	-0.05	0.999	0.38	0.003*

Table. 4 Direct effect, indirect effect and total effect (N=617)

$X^2=14.00$ (d.f=4, $p<0.056$), GFI=0.99, AGFI=0.94, RMR=0.01, NFI=0.99, CFI=0.99, RMSEA=0.07

Path			Internal costumer		External costumer			
			B	(p)	B	(p)	Δ d.f	$\Delta\chi^2$
Tangible	→	Service quality	0.03	0.517	0.09	0.028	1	1.05
Reliability	→		0.18	0.033	0.08	0.230	1	0.64
Responsiveness	→		0.02	0.810	-0.04	0.473	1	0.40
Assurance	→		0.31	<0.001	0.42	<0.001	1	1.88
Empathy	→		0.37	<0.001	<0.001	0.34	1	0.31
Tangible	→	Costumer satisfaction	0.16	0.003	0.01	0.821	1	5.08*
Reliability			0.02	0.862	0.08	0.163	1	0.42
Responsiveness	→		0.01	0.158	0.08	0.142	1	0.21
Assurance	→		0.29	<0.001	0.13	0.032	1	4.62*
Empathy	→		0.16	0.024	0.23	<0.001	1	0.20
Service quality	→		0.22	0.002	0.45	<0.001	1	5.99*
Service quality	→	Loyalty	0.59	<0.001	0.63	<0.001	1	0.01
Costumer satisfaction	→		0.41	<0.001	0.34	<0.001	1	0.38

Table. 5 Comparison of path-coefficients in internal and external costumers

Internal costumer: $X^2=9.23$ (d.f=4, $p<0.056$), GFI=0.99, AGFI=0.90, RMR=0.01, NFI=0.99, CFI=0.99, RMSEA=0.07.

External costumer: $X^2=15.66$ (d.f=4, $p<0.004$), χ^2 /d.f=3.9, GFI=0.99, AGFI=0.89, RMR=0.01, NFI=0.99, CFI=0.99, RMSEA=0.07

Discussion

This study conducted the causal relationships among service quality, service value, costumer satisfaction, and costumer loyalty perceived by costumers and the differences in path-coefficients according to the costumer type (internal costumers and external costumers), which are discussed in this section.

First, this study found that service quality had an effect on the increase in service value, which is a similar result to that of a preceding study conducted on costumers who were using sports and leisure centers in Australia [34]. This is because of the economic awareness with which costumers perceive a service value considering the benefits of purchasing goods and the money spent [11], which suggests that costumers judge that they have received more service than they paid for when they perceive better service quality. However, this study found that responsiveness, among the sub-factors of service quality did not have an effect on service value in the hospital's medical service costumers, unlike studies in other service industries. This conflicts with the result of a preceding study conducted on hotel service costumers [35] that responsiveness, one of the sub-factors of service quality, has an effect on service value. This result showed that, since hospitals are places providing diverse and complex services related to human health, unlike other industries,

costumers attach higher economic value to their reception of professional and accurate service than to the medical personnel's effort to provide service voluntarily. Thus, to increase perceived service value by costumers, it is necessary for each hospital to build business strategies centered on the medical personnel's unique expertise and accuracy.

Second, this study found that service quality and service value had effects on the increase in costumer satisfaction. This is similar to the result of a preceding study conducted on Taiwanese costumers using mobile services [36]. This result was caused by the strongly interconnected factors of service quality, service value and costumer satisfaction and that costumers think of service value as a cognitive assessment of service quality that leads to the emotional assessment process of satisfaction [34].

In order to increase costumer satisfaction, the most effective business strategy is to increase perceived service value by costumers by increasing the service quality. In addition, this study found that the reliability of the sub-factors of service quality did not have any direct effect on costumer satisfaction, which conflicts with the results of a preceding study conducted with hotel costumers [25] and one with hospital costumers in Turkey [37]. However, this study additionally confirmed that it had an indirect effect on costumer satisfaction mediated by service value. This result was caused by the cultural

difference in the countries rather than the difference between the service industries. In particular, in South Korea, with developed medical insurance systems, a lot of costumers use hospitals, so the Korean costumers have low reliability on hospital services of examination and treatment at a scheduled time.

Third, this study found that service value and costumers satisfaction had direct effects on costumers loyalty, and service quality had indirect effects on costumers loyalty mediated by service value and costumers satisfaction. This is similar to the results of a preceding study conducted on cruise costumers [38] and service industries the U.S. [34]. It corroborated that costumers loyalty is a resulting action influenced by cognitive and emotional precedence factors [39]. Thus, in the service industries, costumers think of service value as a cognitive precedence factor, as compared to their purposes of purchase, which means that this leads to the emotional assessment process of satisfaction [34]. As in the service industries, patients perceive the medical services provided by hospitals as goods and accordingly the status of costumers' satisfaction with the goods or services they pay for and purchased decides costumers loyalty. Thus, in order to increase costumers loyalty as a hospital survival strategy, the strategy should focus on a method of improving service value for visiting costumers to increase costumers satisfaction. Various solutions for the improvement of service quality would therefore be necessary.

Fourth, as a result of an inquiry into the differences in path-coefficients according to the costumers type (internal costumers and external costumers), there were statistically significant difference in tangibles, assurance and service value among the variables of service quality on the path to costumers satisfaction. This showed that satisfaction of internal costumers i.e., medical and administrative workers at hospitals, was influenced by physical facilities, equipment and the medical personnel's external conditions, but external costumers i.e., outpatient and inpatients, were not influenced. In addition, assurance that refers to the medical personnel's ability to deliver their knowledge, manners, trust and confidence affected internal and external costumers, and there was a greater effect of assurance in internal costumers. Although it is difficult to accurately compare the 2 groups since there are insufficient preceding studies, internal costumers i.e., hospital employees are subjects who have much information about the hospital and medical workers, so selection of a medical service is more frequently decided by external conditions. In contrast, external costumers i.e., patients, get higher satisfaction through the actual medical workers' medical action or information rather than external conditions. Therefore, hospital managers should build strategies for service quality, customized to the characteristics of the subjects in order to attract internal costumers and external costumers with high loyalty. In addition, service value was a factor that increases satisfaction of both internal and external costumers, with higher influence on internal than external Costumers. Though it is difficult to accurately compare the 2 groups due to lack of preceding studies, external costumers have higher medical expenses, as compared to internal costumers leading to a greater impact from economic concerns that they receive as much medical services as the cost and time spent as compared to internal costumers. Thus, hospital managers should consider the extent of service values their patients and caretakers expect, and identify and improve the service quality and various affecting factors so as to attract highly loyal external costumers.

This study suggested measures to improve costumers loyalty in the costumers using medical services and presented more specific baseline data on the approaches to the subjects by comparing the paths according to the costumers type. However, it will be necessary to evaluate the many factors affecting costumers loyalty additionally and apply them to the overall medical services. However, it will be necessary to evaluate the many factors affecting costumers loyalty

additionally and apply them to the overall medical services.

Conclusion

This study identified the causal relationships among service quality, service value, costumers satisfaction and costumers loyalty and difference in path-coefficients depending on costumers type. This study found that service quality has effects on increases in service value and costumers satisfaction; service value has effects on costumers satisfaction and costumers loyalty; and costumers satisfaction has an effect on costumers loyalty. Depending on the costumers type, tangibles and assurance had more effects on internal costumers' satisfaction unlike external costumers, while service value had greater effects on external costumers' satisfaction. This study furthermore provided baseline data for hospital managers to improve costumers loyalty.

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Ethical considerations: Kyung Hee University Institutional Review Board (IRB) approved the ethics of the study. The purposes of the study and the rights of the research subjects were explained and written subject consent was received for the progress of the study.

Authors' Contributions: Han, Sang-Sook performed statistical analyses. Han, Jeong-Won participated in the design and coordination and helped drafting the manuscript. Yu, Soon-Yong collected all data and drafted the manuscript.

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