공공기관 고객만족지수를 이용한 대학의 고객만족 측정도구 개발
Developing Measurements of University Satisfaction using Public Customer Satisfaction Index

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요약

대학 환경의 경쟁이 치열해지면서 대학들은 고객 만족 지수(CSI)를 개발해서 적용해 왔다. 하지만, 기존의 CSI는 항목의 개발에만 초점을 맞추고 있어서 이러한 항목이 실제로 학생의 만족도에 어떤 영향을 주는지에 대한 의문이 있어왔다. 이러한 문제를 극복하기 위해 공공부문에서는 선행요인과 만족도간의 인과모델을 이용하는 공공기관 고객만족지수(PCSI)을 이용해 왔다. 본 연구의 목적은 PCSI 모델을 이용하여 대학용 PCSI 측정지표를 개발하는 것이다. 본 연구에서 제시된 모델을 검증하기 위해 다중 집단 확인 요인 분석을 이용하여 재측정 신뢰도 분석방법을 이용하였다. 분석결과, 본 연구에서 개발한 대학용 PCSI 측정도구의 타당성 및 신뢰성이 검증되었다. 또한 PCSI 모형의 인과관계를 분석한 결과, 서비스상품품질, 전달품질, 환경품질, 사회품질이 학생의 고객만족에 긍정적인 영향을 주며, 고객만족은 대학성과와 사회성과에 긍정적인 영향을 주는 것으로 분석되었다. 결과적으로 실제 대학의 교육 만족도를 측정하는 데 사용될 수 있으며, 대학교육의 질적 향상을 위해 실용적 기초자료를 얻을 수 있을 것으로 기대된다.

■ 중심어 : | 공공기관 고객만족지수 | 대학만족도조사 | 대학성과 | 서비스 품질(학생만족도조사) |

Abstract

With the higher competition of university environment, universities has been adapted Customer Satisfaction Index (CSI). However, the problem of CSI focuses on score and ranking announcement. In public sectors, PCSI model is used because of increasing its strategic utilization by providing diagnosis of the phenomenon and direction for future improvement through causal model analysis. The purpose of this research is to develop a measurements of university satisfaction using PCSI. This research demonstrates validity and reliability of PCSI using test-retest method using multi-group confirmatory factor analysis. The results of this research indicate that the reliability and validity of the PCSI model is verified. Service product quality, service delivery quality, environment quality and social quality have positive effects on customer satisfaction. In turn, customer satisfaction have positve effects on university performance and social performance. In conclusion, service quality, PCSI, and service performance are clarified to be appropriate components of the satisfaction survey. These results can be used to measure the satisfaction level of education at actual universities. It is expected that practical basic data can be obtained to improve the quality of university education.

■ keyword : | Public Customer Satisfaction Index | University Satisfaction | University Performance | Service Quality |

I. Introduction

With the higher competition of university environment, social demands for the quality of university education have increased. Strengthening competitiveness has become an important issue for each university. Universities have been adapted the concept of Customer-centered Service and Customer Satisfaction Index (CSI)[1][2]. CSI is an indicator that measures satisfaction of customers. Many companies and universities have been used CSI to improve the quality of product and service[3]. However, since the problem of existing customer satisfaction model mainly focuses on score and rank, it can not know what determinants of quality influence on CSI and how CSI influences on performance.

In order to solve the problem, Public-service Customer Satisfaction Index (PCSI) model has been adapted and used in public sectors. PCSI model suggests that customer satisfaction calculation does not simply end in measurement, it is designed to increase its strategic utilization by providing diagnosis of the phenomenon and direction for future improvement through causal model analysis[4]. In other words, if customer satisfaction is a method for improving the quality of product and service in company and public institution, the satisfaction of education in university can be a method for quality improvement of education.

The purpose of this research is to develop a measurements of university satisfaction using PCSI. This research proposes a method to improve the qualitative function of the university by applying the PCSI model to the measurement of university education satisfaction. This research demonstrates validity and reliability of PCSI using test-retest method. This research uses multi-group confirmatory factor analysis to evaluate the measurement

equivalence among two data sets.

II. Research Model

1. PCSI

The quality management and performance evaluation of the public sector is spreading around the world[5][6]. Performance evaluation is essential for effective operation of public institutions because it increases the efficiency of the public sector and enhances productivity through innovations in public services[7]. However, as far as service quality evaluation and customer satisfaction measurement for public institutions are conducted in a fragmented manner for individual institutions, it has been difficult to make comparisons and improvements.

This means that as the survey of customer satisfaction in the performance assessment of the public sector is becoming increasingly important[8], customer satisfaction surveys for public institutions should be institutionalized as a system that regularly measures performance beyond the nature of one-off checks. It is not a simple measure that only targets individual institutions, but an introduction for the comprehensive customer satisfaction index that can be applied to all public institutions.

By introducing the National Customer Satisfaction Index (NCSI), which is a customer satisfaction index of private sector, has measured the customer satisfaction index of public institutions. However, since public institutions and private companies have different characters and objectives, it is difficult to apply the customer satisfaction index[9]. The existing CSI measures customer satisfaction only in terms of cognition and does not understand customer satisfaction level but understands needs for customers, and applies it to the inside of the

organization to practice the customer satisfaction management of the public institution. Therefore, it is necessary to develop a PCSI that is specific to public institutions that can review and analyze the industry's customer satisfaction model, respectively[4].

PCSI is a public institution customer satisfaction survey model and introduced in 2007. PCSI has been conducted by the Ministry of Strategy and Finance once a year for public corporations[10]. PCSI model is depicted in [Figure 1]. PCSI has a causal relationship between service quality, customer satisfaction and performance. PSI model integrates three hierarchical models for service quality, customer satisfaction and performance. This model gives provides a customer satisfaction index and the effective improvement of CSI[4].
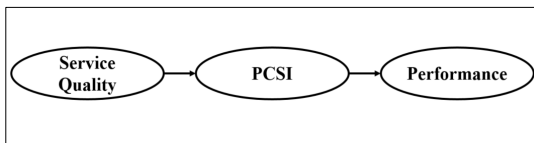

Figure 1. PCSI Model

There have been several researches conducted for public sectors; water leisure tourism[11], airline service quality assesment[12] and library organizational performance[13]. Although the university was a public institution, there is no research for university quality and performance using PCSI.

2. UCSI

It is importance to understand and improve consumer satisfaction of university education service. University has to improve the quality of education for the individual student, to enhance competitiveness through quality improvement for the provider university, and to promote welfare through efficient allocation of resources and consumer satisfaction at national level.

Since higher education is the most important infrastructure, publicity of university should be secured[14]. However, the problem of existing customer satisfaction model is to mainly focus on developing measurements from private perspectives in [Table 1][15-18]. It is necessary to be conducted from public perspectives and to identify the causality of quality on satisfaction and performance.

3. Research Model

Based on the PCSI and relative literature, this research model is depicted in [Figure 2]. The determinants of PCSI are service quality model, which composes 4 dimensions, 12 components and 33 items. Service product quality has three dimensions: benefits, expertise and innovativeness. Service delivery quality has three dimensions: responsiveness, support and empathy. Service environment quality has three dimensions: amenity, convenience and convenience. Social quality has two dimensions: integrity, publicness and security.

Second, for PCSI, overall satisfaction has 3 dimensions and 3 components: absolute satisfaction, relative satisfaction, and emotional satisfaction. Attribute satisfaction has three dimensions: product satisfaction, delivery satisfaction and environment satisfaction. Social satisfaction has social responsibility satisfaction.

Final, performance has 2 dimensions, 5 components. School performance has three dimensions: recognition, advocacy and trust. Student performance has two dimensions: development and happiness.

The causality model of PCSI is depicted in [Figure 2]. Four service quality variables influence on PCSI, then influence on PCSI performance.
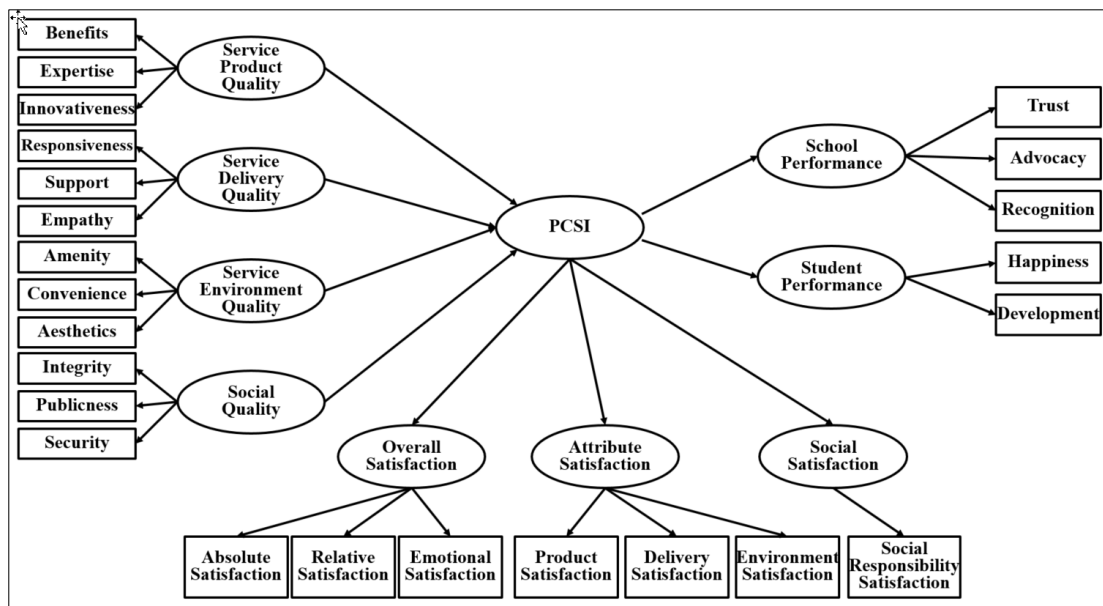
Figure 2. Research model of PCSI

III. Research Method

PSI model integrates three hierarchical models for service quality, customer satisfaction and performance. Service quality is composed of service product quality, service delivery quality, service environment quality and social quality. PCSI is composed of overall satisfaction, attribute satisfaction

Table 1. Measurements of PCSI for University

Dimension	Components		Item	Dimension	Components		Item
Service Product Quality	Benefits	A1	Liberal arts course	Service Delivery Quality	Support	A17	Latest Homepage
		A2	Major curriculum			A18	Support of students activities
		A3	Noncurricular Activities			A19	Systematic bachelor's administration
	Expertise	A4	Progress of the lecture plan		Empathy	A20	Feedback from students
		A5	Effective teaching methods			A21	Professor's interest in students
		A6	Prepare the perfect lesson	Service Environment Quality	Amenity	A22	Clean campus
		A7	Appropriateness of lecture			A23	Classroom facilities
	Innovativeness	A8	Improvement through lecture evaluation		Convenience	A24	Appropriateness of Library facility
Service Delivery Quality	Responsiveness	A9	Accurate business process			A25	Equipment management
		A10	Rapid business process			A26	Satisfactionofconveniencefacilities
		A11	Professional business process			A27	Taste of the restaurant food
		A12	Kindness of Staff			A28	School Support Services
		A13	Cooperation of Staff		Aesthetics	A29	Beautiful appearance
	Support	A14	Various scholarship system	Social Quality	Integrity	A30	Transparent finances
		A15	Various employment support			A31	A high sense of responsibility
		A16	Various Career Development Programs		Publicness	A32	Contribution to university development
					Security	A33	Protection of the student

and social satisfaction. Performance is composed of school performance and student performance in [Table 1]. The scale of this research is measured on a seven point Likert scale, ranging from strongly disagree (1) through neutral (4) to strongly agree (7).

To test the model, a web-based survey is employed in enrolled students. The survey yielded 433/361 usable responses, respectively semester 1 and 2. The demographic statistics of major indicated that all major were equally selected by stratified random sampling method. Grades and sex were shown in [Table 2].

Table 2. Demographic statistics

| | | year | | | | total |
		1	2	3	4	
sex	male	43(9,9) 34(9,4)	33(7,6) 22(6,1)	29(6,7) 24(6,6)	34(7,9) 25(6,9)	139(32,1) 105(29,1)
	female	63(14,5) 59(16,3)	70(16,2) 54(15,0)	74(17,1) 65(18,0)	87(20,1) 78(21,6)	294(67,9) 256(70,9)

Semester 1 / 2

IV. Result

1. Measurement Model

This research evaluates the equivalence and reliability of the final measurement model across the two groups using test-retest procedure. An reliability of measurements can be examined by using test of internal consistency with different groups using test-retest procedure. A test-retest method can determine the reliability and consistency of measurements[19-21].

This research uses multi-group confirmatory factor analysis (MCFA) to conduct test-retest procedure. MCFA was proposed to explore whether the phenomena under study makes different results when the same measurement models were presumed to be operation in multiple samples[22]. The measurement

equivalence is used to evaluate the measurement models for the common form and invariance of factor loadings (λ) [22-24]. Measurement equivalence is satisfied through invariance of factor loadings (λ).

The objective of multi-group comparison test was to determine whether the factor loadings were different across semester 1 and 2. First, this research constrained one factor loading to be equal across and then freely estimated this factor loading. An insignificant difference in Chi-square between the constrained and unconstrained models. The results of comparison test indicates that the standardized factor loadings for service quality model are not different in [Table 3]. Comparing unconstrained with constrained model for service quality, the difference in chi-square value of 28.95 (p=0.27) indicated that factor structure is indifferent across samples in [Table 4].

Table 3. Multi-group confirmatory factor analysis for service quality

Dimension		Item	Total	S1	S2	Dif
Service Product Quality	Benefits	A1	0,69	0,66	0,73	−0,07
		A2	0,68	0,68	0,67	0,02
		A3	0,60	0,58	0,62	−0,03
	Expertise	A4	0,66	0,69	0,62	0,06
		A5	0,80	0,80	0,80	0,00
		A6	0,79	0,79	0,79	−0,01
		A7	0,84	0,86	0,80	0,06
	Innovativeness	A8	0,69	0,73	0,66	0,07
Service Delivery Quality	Responsiveness	A9	0,85	0,89	0,80	0,09
		A10	0,84	0,88	0,79	0,10
		A11	0,86	0,87	0,86	0,01
		A12	0,69	0,65	0,74	−0,09
		A13	0,73	0,71	0,74	−0,03
	Support	A14	0,64	0,64	0,65	−0,01
		A15	0,70	0,67	0,74	−0,07
		A16	0,71	0,72	0,70	0,02
		A17	0,65	0,65	0,64	0,01
		A18	0,61	0,63	0,60	0,03
		A19	0,73	0,75	0,71	0,04
	Empathy	A20	0,64	0,62	0,67	−0,06
		A21	0,63	0,64	0,62	0,02

Service Environment Quality	Amenity	A22	0.68	0.68	0.69	−0.01
		A23	0.83	0.85	0.80	0.05
	Convenience	A24	0.66	0.68	0.64	0.04
		A25	0.74	0.74	0.74	0.01
		A26	0.73	0.72	0.75	−0.03
		A27	0.55	0.53	0.58	−0.05
		A28	0.51	0.50	0.52	−0.02
	Aesthetics	A29	0.75	0.73	0.77	−0.05
Social Quality	Integrity	A30	0.60	0.57	0.63	−0.06
		A31	0.88	0.88	0.88	0.00
	Publicness	A32	0.86	0.87	0.86	0.01
	Security	A33	0.74	0.68	0.80	−0.12

Table 4. Multi-group comparison test for service quality

Model	a chi-square	P
Measurement weights	28.95	0.27
Structural covariance	36.29	0.59
Measurement residuals	140.55	0.00

The results of comparison test indicates that the standardized factor loadings for PCSI model are not different in [Table 5]. Comparing unconstrained with constrained model for service quality, the difference in chi-square value of 2.74 (p=0.74) indicated that factor structure is indifferent across samples in [Table 6].

Table 5. Multi-group confirmatory factor analysis for PCSI

Dimension	Item	Total	S1	S2	Dif
Overall Satisfaction	Absolute Satisfaction	0.87	0.87	0.87	0.00
	Relative Satisfaction	0.81	0.85	0.81	0.04
	Emotional Satisfaction	0.84	0.90	0.84	0.06
Attribute Satisfaction	Product Satisfaction	0.75	0.66	0.75	−0.09
	Delivery Satisfaction	0.73	0.69	0.73	−0.04
	Environment Satisfaction	0.73	0.71	0.73	−0.02
Social Satisfaction	Social Responsibility Satisfaction	0.77	0.79	0.77	0.02

Table 6. Multi-group comparison test for PCSI

Model	a chi-square	P
Measurement weights	2.72	0.74
Structural covariance	3.09	0.80
Measurement residuals	22.44	0.13

The results of comparison test indicate that the standardized factor loadings for PCSI performance model are not different in [Table 7]. Comparing unconstrained with constrained model for service quality, the difference in chi-square value of 1.83 (p=0.61) indicated that factor structure is indifferent across samples in [Table 8].

Table 7. Multi-group confirmatory factor analysis for PCSI performance

Dimension	Item	Total	S1	S2	Dif
School Performance	Recognition	0.85	0.87	0.83	0.04
	Advocacy	0.85	0.86	0.83	0.02
	Trust	0.80	0.80	0.79	0.01
Student Performance	Development	0.87	0.90	0.83	0.07
	Happiness	0.77	0.78	0.76	0.02

Table 8. Multi-group comparison test for PCSI performance

Model	a chi-square	P
Measurement weights	1.83	0.61
Structural covariance	3.25	0.78
Measurement residuals	14.34	0.22

The results of comparison test indicate that the standardized factor loadings for PCSI model are not different in [Table 9]. Comparing unconstrained with constrained model for service quality, the difference in chi-square value of 4.25 (p=0.99) indicated that factor structure is indifferent across samples in [Table 10].

Table 9. Multi-group confirmatory factor analysis for PCSI full model

Dimension	Item	Total	S1	S2	Dif
Service Product Quality	Benefits	0.80	0.79	0.81	−0.03
	Expertise	0.72	0.72	0.73	−0.01
	Innovativeness	0.63	0.65	0.63	0.02
Service Delivery Quality	Responsiveness	0.60	0.60	0.61	−0.01
	Support	0.76	0.76	0.75	0.01
	Empathy	0.76	0.75	0.78	−0.02
Service Environment Quality	Amenity	0.75	0.74	0.75	−0.01
	Convenience	0.87	0.86	0.88	−0.03
	Aesthetics	0.77	0.75	0.79	−0.04
Social Quality	Integrity	0.88	0.87	0.89	−0.01
	Publicness	0.80	0.79	0.80	−0.01
	Security	0.79	0.76	0.82	−0.06
PCSI	Overall Satisfaction	0.84	0.83	0.85	−0.01
	Attribute Satisfaction	0.85	0.86	0.84	0.01
	Social Satisfaction	0.80	0.80	0.80	0.00
School Performance	Recognition	0.86	0.87	0.85	0.02
	Advocacy	0.85	0.86	0.84	0.03
	Trust	0.77	0.78	0.76	0.03
Student Performance	Development	0.86	0.89	0.81	0.08
	Happiness	0.78	0.78	0.78	0.00

Table 10. Multi-group comparison test for PCSI full model

Model	a chi-square	P
Measurement weights	4.25	0.99
Structural covariance	25.00	0.98
Measurement residuals	59.24	0.61

2. Multi-group structural equation model

After the measurement model is satisfying, the structural model is evaluated for each of the two groups. For semester 1, the all paths from service quality to PCSI are not significant, as shown in [Table 11]. However, the all paths from service quality to PCSI are significant in semester 2. The path from PCSI to performances are significant in both semesters.

Table 11. Multi-group structural equation model

Path			S1	S2
Service Product Quality	→	PCSI	−0.08	0.16**
Service Delivery Quality	→	PCSI	−0.05	0.21**
Service Environment Quality	→	PCSI	0.11	0.31**
Social Quality	→	PCSI	−0.05	0.39**
PCSI	→	School Performance	0.82**	0.82**
PCSI		Student Performance	0.79**	0.82**

V. Conclusions

The purpose of this research is to develop a measurements of university satisfaction using PCSI. This research demonstrates validity and reliability of PCSI using test-retest method using MCSF. The results of this research indicate that the reliability and validity of the PCSI model is verified. Service quality, PCSI, and service performance are clarified to be appropriate components of the satisfaction survey. These results can be used to measure the satisfaction level of education at actual universities. It is expected that practical basic data can be obtained to improve the quality of university education.

This research contributes to the literature by providing a measurements of satisfaction index for university using PCSI model. University can indicate what determinants of quality influence on CSI and how CSI influences on performance. This research also gives guidance for university to manage and promote their students more successful. For methodologies, this research newly introduced the methodology of MCSF to conduct the test-retest method.

Although the results of this research have several contributions and implications, there were also

limitations, which need to be overcome in future works. Since this research was conducted only with an university, the results might not be directly applicable to other university. Second, the measurements of this research are only a few of many variables that might affect the full range of PCSI. It is suggested that more variables are necessary to develop a more precise PCSI for university.

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