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A Study on the Effect of the Quality of Intellectual Property Consulting Service on Consulting Performance

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ABSTRACT

The present study empirically analyzes how the quality of an intellectual property consulting service—a comprehensive service that introduces and applies intellectual property management to generate profits and performance through management strategies using intellectual property such as patents, brands, and designs as corporate assets—affects consulting satisfaction and performance of the service users, in this case, small and medium-sized enterprises (SMEs). This study utilized SERVQUAL, a consulting service quality model, to collect data through an online survey on IP Star businesses, which received intellectual property consulting services at 31 regional intellectual property centers across the nation. To examine the influential relationship between service quality and consulting satisfaction and performance, this study performs a multiple regression analysis. As for the hypothesis that the quality of intellectual property consulting service will impact consulting performance, the results of this study show that performance is significantly influenced by reliability, responsiveness, tangibles, empathy, and assurance in order of effect size from high to low. In addition, this study observed that consulting satisfaction mediates the relationship. These findings indicate that intellectual property consultants should be more flexible and active in raising their awareness of service quality to improve consulting satisfaction and performance. Further, this study suggests that central and local governments as well as other concerned agencies should develop policies to complement the current systems to nurture and support competent consultants and boost the effectiveness of the systems in order to enhance the quality of intellectual property consulting services.

Keywords: Intellectual Property Consulting, Service Quality, Satisfaction, Performance.

1. INTRODUCTION

If the 20th century was the era of industrialization in which capital and labor were the key production elements, the 21st century is the age of knowledge/information in which knowledge and information are

the key production elements driving the global economy. In this new age, the capacity to create and utilize knowledge and information is not only a key that determines business competitiveness and value, but is also a source of a national competitive edge.

Under these circumstances, the present study aims to empirically analyze how the quality of an intellectual property consulting service affects the SMEs satisfaction with the consulting as well as the performance. In this study, the consulting services were provided by regional intellectual property centers, which central and local governments have established to accomplish their policy goal of helping SMEs grow more competitively by improving their intellectual property management capabilities.

Through this analysis, this study attempts to recognize the importance of consulting service quality for achieving greater consulting satisfaction. Furthermore, this research attempts to identify ways to provide a more appropriate consulting service to promote capacity-building as well as the growth and development of service customers, thereby contributing to the growth of intellectual property service and consulting industries.

2. THEORETICAL BACKGROUND AND PREVIOUS RESEARCH

2.1. Theoretical Examination of Intellectual Property

2.1.1. Intellectual Property Overview

Intellectual property, which refers to all the rights arising from humans' intellectual activities, is an intangible asset from which businesses derive their value. Intellectual property can mean not only conventional property such patents, brands, designs, and trademarks, but also everything that can be useful for business activities including expertise involving technological and operational information.

2.1.2. Types of Intellectual Property

Generally speaking, an industrial property intended for the purpose of industrial development is categorized into four types—patents, utility models, designs, and trademarks—in addition to copyright and new intellectual property rights.

2.1.3. Current Status of Intellectual Property

In 2014, a total of 434,047 applications were submitted for industrial property, a 0.9% increase from 430,164 applications in 2013. In addition, the number of patent applications increased by 2.8% between 2013 and 2014 to record a total of 210,292 patents in 2014. As a result, Korea has retained its position as No. 4 in the world in terms of the number of industrial property and patent applications. This implies that, despite lingering uncertainty in the global economy, companies are striving to dominate new technology or brands preemptively by making future-oriented investment in R&D and other areas in order to secure a growth engine through their key assets of intellectual property.

Recently, there is a growing number of non-practicing entities (NPE), which exercise their patent rights through litigations and licensing negotiations instead of using the patents to create products or services. As a result, Korean businesses are facing more lawsuits these days.

2.1.4. Current Status of Intellectual Property Management

Based on business and national strategies to enhance competitiveness through changes in global environments and intellectual property, Korea has gradually expanded R&D investment and has become a nation that generates a large number of intellectual property patents. As a result, South Korea has made remarkable progress—in 2011, the country ranked No. 6 (No. 2, compared to GDP) in terms of public and private investment in R&D by making investments worth 49.89 trillion won in R&D; No. 4 in terms of the number of patent applications; and No. 11 (as of 2010) in terms of the number of scientific research papers newly submitted. With regard to the qualitative aspect, however, Korea has been lagging behind. Deficits in royalty earnings from intellectual property and other rights have continuously grown from 2.53 billion dollars in 2000 to 5.82 billion dollars in 2010.

This can be attributed to the fact that businesses in Korea are still more dependent on foreign technology than on core technology. Moreover, Korea has not strategically invested in business management as much as they have expanded investment in R&D and intellectual property.

2.2. Previous Research on Intellectual Property Consulting

2.2.1. Overview and types of Consulting

The nature of consulting lies in the creation, delivery, sharing, and application of knowledge about corporate management and business. Previous researchers have defined this nature as follows:

Milan Kubr (2012) claimed that consulting is the independent and professional acts of offering advice that help managers and organizations accomplish their goals by addressing management and business problems, discovering and utilizing new opportunities, providing more learning opportunities, and implementing changes.

Meanwhile, the Small and Medium Business Administration (2008) divided consulting into various categories of business services, including professional service, consulting service, independent service, temporary service, and commercial service.

2.2.2. Overview of Intellectual Property Consulting

According to the Intellectual Property Business Management Strategy Manuals (2011), intellectual property management refers to “all activities that increase the enterprise value by implementing management strategies to utilize intellectual property such as patent, design, and trademark as corporate assets.” Furthermore, the Manual expressed that intellectual property consulting is a comprehensive service designed to provide a methodology with which a firm can discover, review, and market its own intangible knowledge assets so that they can be used to commercialize a certain technology or develop a management strategy.

2.2.3. Current Status of Regional Intellectual Property (IP) Centers and IP Star Businesses

In order to meet the regional demands, as of the end of 2014, a total of 31 regional intellectual property centers were up and running to provide comprehensive consulting and civil complaints services regarding intellectual property issues such as patent, brand, and design, and to offer intellectual property seminars and training programs.

The size of the regional intellectual property creation support projects pursued by the regional intellectual property centers have steadily increased. For instance, the project expenses grew 5.7 times from 7.87 billion won in 2006 to 45 billion won in 2013. In addition, the number of intellectual property consultants, which was 95 in 2006, rose to 177-180 in 2013, thereby providing a wider range of professional intellectual property consulting services.

The promotion project for IP Star businesses was first launched in 2010 and has selected and supported a total of 846 promising local SMEs through 2014. The regional intellectual property centers work with local governments to choose local SMEs deemed to have growth potential. These companies should pass strict examination processes including IP-Spectrum reviews, on-site inspections, and face-to-face interviews before being selected as support beneficiaries. Firms that are selected as the support subjects receive comprehensive intellectual property-related support worth up to 70 million won per year (up to 200 million won for three years) for the following three years.

The project to promote RIPC's IP Star is shown in Figure 17.1.

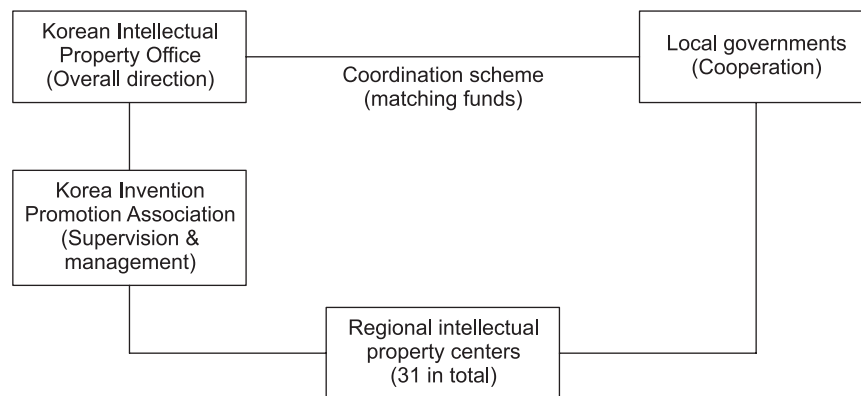


Figure 17.1: System of IP Star Promotion Project

2.3. Previous Research on Consulting Service Quality

2.3.1. Concept of Service Quality

Service, a concept that is generally used in contrast to the supply of goods or products, has a variety of types and even the same type of service can contain mutually disparate elements. Furthermore, there is a steady stream of newly developed services amid the market expansion and industrial development. Therefore, researchers have made various definitions of service according to their perspectives.

2.3.2. Service Quality Models

1. **SERVQUAL:** Parasuraman, et. al., (1988) presented the SERVQUAL model to assess service quality through the concept of “expectation-performance.” This model, which is designed to examine consumers’ expectations about a given service and their perceived performance of it, is built on the expectation disconfirmation paradigm. The researchers initially suggested a service quality model of 10 dimensions regarding consumer responses, and then performed an additional empirical study to lessen the service quality dimensions to five items (tangibles, reliability, responsiveness, assurance, empathy) and complete the SERVQUAL model.

2. **SERVPERF:** Cronin and Taylor (1992) stated that service quality could be conceptualized as an attitude and could be controlled with the “sufficiency-importance” model, an instrument often used to measure attitude. They believed, in particular, that not “expectation-performance” but only “perception about performance” determines service quality and, on such a “service quality-performance” premise, they suggested the use of SERVPERF, which focuses on performance only.
3. **EP:** Teas (1993) developed Evaluated Performance (EP) in order to overcome the issue of reciprocity, which appears on the “expectation-perceived” performance model when expectations about an attribute are recognized as outliers. EP’s key component is the definition of “expectation.”
4. **KS-SQI:** Korean Standard Service Quality Index (KS-SQI) is a composite index that Korean Standard Association and Seoul National University’s Center for Global Business and Research jointly developed by reflecting Korea’s service industry and customer characteristics. It shows the level of consumer satisfaction with the quality of the overall service industry.

2.3.3. *Developing Consulting Service Quality Model*

Table 17.1
Consulting service quality model

<i>Dimension</i>	<i>Description</i>
Reliability	The consulting service met the expectations. (expectation confirmation)
	The consulting service was provided sufficiently compared to the cost paid for it. (sufficiency)
	The consulting service provided enough to be effective. (effectiveness)
	The consulting service was provided by a consultant with expert knowledge. (expertise)
Responsiveness	The consulting service was provided when it was hoped for. (timeliness)
	During the consulting service, demands were responded to swiftly. (prompt response)
	Access to information on the consulting service was easy. (easy access)
	The consulting service was delivered in a convenient manner. (convenience)
Assurance	The consultant was kind and considerate. (kindness/consideration)
	The operation of the system was focused on giving active support to the business. (active support)
Tangibles	The place for consulting was in a physically good condition. (work facilities)
	Attire and appearances of the consultant looked neat and tidy. (neat appearance)
Empathy	The general consulting service was performed in a fair way. (fairness)
	The given consulting service is necessary for public purposes. (public necessity)

2.4. Previous Research on Consulting Satisfaction and Performance

2.4.1. *Previous Research on Consulting Satisfaction*

I.S. Kim (2008) studied the effect of consulting for SMEs and found that various characteristics of SMEs affect characteristics of consulting firms, including the client’s satisfaction, utilization, and performance. J.Y. Choi (2011) suggested that target companies can have greater satisfaction with consulting services if their needs and objectives regarding consulting are accurately identified and proper end products are offered to them. By following this product identification process, companies have more trust in consulting agencies’ expertise, capabilities, methodologies, operation systems, diligence, efforts, and follow-up management based on a better understanding of the given end products. H.S. Mun (2012) claimed that the participation

rate of SMEs in consulting affects the utilization of the service and the capability of consultants influences SMEs' satisfaction with consulting and utilization.

2.4.2. Previous Research on Consulting Performance

K.H. Lee and B.S. Yoon (2006) conducted a comparison analysis to examine the effect of patent activity on business performance by dividing companies into general and venture firms. They found that patent activities have “a more positive influence on general firms than on venture” firms and that patent activities positively impact profitability as well. S.C. Kil and S.M. Kang (2008), who examined 27 Korean metal companies to investigate the effect of patent management on management performance, suggested that “businesses’ intellectual property management should be considered in the perspective of business administration, not in the perspective of simple management.” They also analyzed the effect of patent management on growth, labor productivity, and profits to find that “when it comes to metal companies, the more active they are with patent management, the higher labor productivity they see.”

3. RESEARCH DESIGN

3.1. Research Overview

3.1.1. Research Subjects

The present study examined the effect of the quality of an intellectual property consulting service on its success. The study focused on how the consulting was performed and whether the client-consultant relationship was informed by customer satisfaction.

3.1.2. Research methods

This study reinterpreted previous research papers on consulting services based on the SERVQUAL model. In addition, this study considered attributes of consulting services that had previously been overlooked, like quality, satisfaction, and performance, by using rational and proper judging criteria and review factors.

3.2. Research model

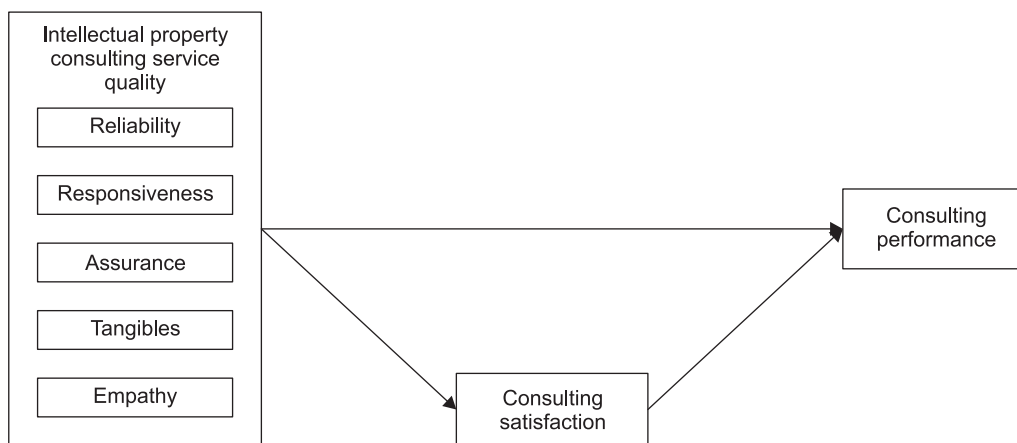


Figure 17.2: Research model

3.3. Hypotheses Establishment

Hypothesis 1: Quality of intellectual property consulting service will make a positive effect on consulting performance.

Hypothesis 2: Consulting satisfaction will act as a mediator between quality and performance of intellectual property consulting service.

3.4. Operational Definitions of Variables and Development of Questionnaire

3.4.1. Consulting Service Quality

Table 17.2
Survey questions on consulting service quality

<i>Dimension</i>	<i>Description</i>	<i>Name of SPSS variable</i>
Reliability	The consulting service met the expectations. (expectation confirmation)	QA1
	The consulting service was provided sufficiently compared to the cost paid for it. (sufficiency)	QA2
	The consulting service provided enough to be effective. (effectiveness)	QA3
	The consulting service was provided by a consultant with expert knowledge. (expertise)	QA4
Responsiveness	The consulting service was provided when it was hoped for. (timeliness)	QB1
	During the consulting service, demands were responded to swiftly. (prompt response)	QB2
	Access to information on the consulting service was easy. (easy access)	QB3
	The consulting service was delivered in a convenient manner. (convenience)	QB4
Assurance	The consultant was kind and considerate. (kindness/consideration)	QC1
	The operation of the system was focused on giving active support to the business. (active support)	QC2
Tangibles	The place for consulting was in a physically good condition. (work facilities)	QD1
	Attire and appearances of the consultant looked neat and tidy. (neat appearance)	QD2
Empathy	The general consulting service was performed in a fair way. (fairness)	QE1
	The given consulting service is necessary for public purposes. (public necessity)	QE2

3.4.2. Consulting Satisfaction

The questionnaire contained three questions on consulting satisfaction based on reliability, relevance, and fidelity. More specifically, the questions asked the respondents about the results of intellectual property consulting service and reliability of the service (QF1); about whether they were willing to keep participating in the intellectual property consulting service in the future (QF2); and about whether they would recommend others receive the intellectual property consulting service (QF3).

3.4.3. Consulting Performance

Based on the companies' knowledge level and utilization, three questions were developed for the intellectual property consulting service and satisfaction-led performance. The respondents were asked about whether they acquired knowledge or information on intellectual property through the consulting service (QG1);

about whether they faced less damage from conflicts related to intellectual property (QG2); and about whether they turned intellectual property into a management resource by actively utilizing intellectual property they already owned (QG3).

3.5. Sampling and Data Collection

This study conducted a survey on IP Star businesses that had received intellectual property consulting at a regional intellectual property center.

4. RESEARCH RESULTS

4.1. Testing of Validity and Reliability of Variables

4.1.1. Validity Testing

“Factor analysis” was performed to test the validity of the existing questionnaire construction by utilizing “Varimax,” which is a method often implemented for principal component analysis and factor rotation.

Table 17.3
Analysis of service quality factors

<i>Component</i>	<i>Reliability</i>	<i>Responsiveness</i>	<i>Empathy</i>	<i>Tangibles</i>	<i>Assurance</i>
Reliability 1	.767				
Reliability 2	.774				
Reliability 3	.857				
Reliability 4	.732				
Responsiveness 1		.743			
Responsiveness 2		.679			
Responsiveness 3		.723			
Responsiveness 4		.737			
Empathy 1			.782		
Empathy 2			.827		
Tangibles 1				.766	
Tangibles 2				.784	
Assurance 1					.800
Assurance 2					.874
Characteristic value	3.279	2.806	1.923	1.832	1.827
% of variance explained	23.424	20.041	13.736	13.086	13.049
% of cumulative variance	23.424	43.466	57.202	70.288	83.337
Kaiser-Meyer-Olkin measure of sampling adequacy					.920
Bartlett’s test of sphericity				Approx. Chi-Square	4179.289
				df	91
				Sig	.000

The KMO measure stood at a considerably high value of .920, and Bartlett’s test of sphericity yielded the *p*-value of < .001, which indicated they were adequate for factor analysis. Meanwhile, the factor analysis

presented the factor loadings of five factors, which were all above .6, proving the validity of the questions on service quality.

4.1.2. Reliability Testing

“Cronbach’s α coefficient,” one of the most widely used methods to estimate internal consistency, was adopted in this study to assess reliability of the measured values.

Table 17.4
Results of reliability testing

	<i>Measured variables</i>	<i>Number of measured items</i>	<i>Cronbach's α</i>
Service quality	Reliability	4	.903
	Responsiveness	4	.909
	Empathy	2	.901
	Tangibles	2	.897
	Assurance	2	.740
Satisfaction		3	.899
Performance		3	.894

Cronbach’s α coefficients regarding the reliability of the measuring tools used in this study turned out to be over 0.7 in all the questions, confirming that the explanatory items were all reliable.

4.1.3. Correlation Analysis and Multicollinearity

Table 17.5
Results of analysis of correlations between variables

<i>Classification</i>	<i>Mean</i>	<i>Standard deviation</i>	<i>Reliability</i>	<i>Responsiveness</i>	<i>Empathy</i>	<i>Tangibles</i>	<i>Assurance</i>	<i>Satisfaction</i>	<i>Performance</i>
Reliability	6.467	0.711	1						
Responsiveness	6.412	0.736	.734**	1					
Empathy	6.681	0.571	.608**	.685**	1				
Tangibles	6.609	0.570	.617**	.689**	.723**	1			
Assurance	6.586	0.600	.420**	.555**	.406**	.470**	1		
Satisfaction	6.410	0.775	.692**	.713**	.594**	.621**	.465**	1	
Performance	6.492	0.656	.740**	.748**	.655**	.688**	.507**	.806**	1

P < 0.001: *** P < 0.01: ** P < 0.05: *

The results of a correlation analysis showed that the correlation matrix lies between .406 and .806 and, therefore, the factors have a statistically significant correlation with each other.

According to the analysis of correlation between service quality and performance, reliability is correlated to performance at $r = .740(p < 0.01)$, responsiveness to performance at $r = .748(p < 0.01)$, empathy to performance at $r = .655(p < 0.01)$, tangibles to performance at $r = .668(p < 0.01)$, and finally assurance to performance at $r = .507(p < 0.01)$.

On the other hand, the analysis of correlation between service quality and satisfaction showed that reliability is correlated to satisfaction at $r = .692 (p < 0.01)$, responsiveness to satisfaction at $r = .713 (p < 0.01)$, empathy to satisfaction at $r = .594 (p < 0.01)$, tangibles to satisfaction at $r = .621 (p < 0.01)$, and finally assurance to satisfaction at $r = .465 (p < 0.01)$.

Taken together, the results suggest that the hypothesis that the quality of intellectual property consulting service quality will make a significant impact on consulting performance as well as the claim about the mediation effect of satisfaction could hold true.

The diagnosis of multicollinearity, which was performed prior to the multiple regression analysis, found that the tolerance limit stayed in the range of 0.312 to 0.676, all above 0.1, and the VIFs stood at 1.478 to 3.207, not surpassing the benchmark of 10, which suggested that there was no issue of multicollinearity. In addition, the analysis of residuals showed that the resulted value of Durbin Watson testing was 1.953, close to 2, which means there was no autocorrelation between the error terms of the model, therefore satisfying the assumption of normal distribution of residuals.

4.2. Hypothesis Testing

4.2.1. Hypothesis Testing (1)

Hypothesis 1: Quality of intellectual property consulting service will make a positive effect on consulting performance.

Table 17.6
Results of analysis of service quality and performance

<i>Independent/dependent variables</i>	<i>Standardized beta</i>	<i>t value</i>	<i>P value</i>	<i>R²</i>
Reliability/performance	.348	7.644	< .001	.675
Responsiveness/performance	.252	4.702	< .001	
Empathy/performance	.130	2.770	.006	
Tangibles/performance	.136	2.847	.005	
Assurance/performance	.104	2.860	.004	

The resulting regression coefficients regarding the effect of the independent variable of service on consulting performance stood at .104 – .348, proving a positive impact made by all of the variables, and both the *t* values and P values, which estimate the level of significance, present the results of significance.

In addition, the analysis yielded the R² value of 0.675 or the explanatory power of 67.5%. In other words, it showed that the quality of intellectual property consulting service (reliability, responsiveness, empathy, tangibles, and assurance) had a positive effect on consulting performance and, therefore, Hypothesis 1 was accepted.

4.2.2. Hypothesis Testing (2)

Hypothesis 2: Consulting satisfaction will act as a mediator between quality and performance of intellectual property consulting service.

In order to test Hypotheses 1 and 2 regarding the effect relationship between service quality and consulting performance and the mediation effect of satisfaction, respectively, a multiple regression analysis was conducted by utilizing the 3-step testing method developed by Baron and Kenny (1986).

Table 17.7
Results of analysis of mediation by consulting satisfaction

<i>Independent/ mediating/ dependent variables</i>	<i>Mediation testing steps</i>	<i>Standardized beta</i>	<i>t value</i>	<i>P value</i>	<i>R²</i>
Reliability/satisfaction/performance	Step 1	.692	18.360	< .001	.479
	Step 2	.740	21.073	< .001	.548
	Step 3 (independent)	.350	9.028	< .001	.713
	Step 4 (mediating)	.563	14.517	< .001	
Responsiveness/satisfaction/performance	Step 1	.713	19.502	< .001	.509
	Step 2	.748	21.607	< .001	.560
	Step 3 (independent)	.353	8.804	< .001	.710
	Step 4 (mediating)	.553	13.783	< .001	
Empathy/satisfaction/performance	Step 1	.594	14.137	< .001	.353
	Step 2	.655	16.615	< .001	.429
	Step 3 (independent)	.273	7.643	< .001	.697
	Step 4 (mediating)	.643	17.998	< .001	
Tangibles/satisfaction/performance	Step 1	.621	15.165	< .001	.385
	Step 2	.668	17.183	< .001	.446
	Step 3 (independent)	.288	7.755	< .001	.695
	Step 4 (mediating)	.636	17.271	< .001	
Assurance/satisfaction/performance	Step 1	.465	10.066	< .001	.216
	Step 2	.507	11.269	< .001	.257
	Step 3 (independent)	.169	4.988	< .001	.671
	Step 4 (mediating)	.727	21.474	< .001	

Regression coefficients in the first steps, which present the results of the effect of each independent variable of service quality on satisfaction, turned out to be .465 – .713, suggesting a positive impact. As for the coefficients in the second steps, or the results of the effect of each independent variable of service quality on consulting performance, the figures stood at .507 – .740. Finally, in the third steps regarding the effect of each independent variable of service quality and satisfaction on consulting performance, the coefficients were found to be .169 – .353 in terms of independent variables and to be .553 – .727 when it comes to mediating variables. Meanwhile, the *t* values and *P* values, which suggest the level of significance, yielded significant results in all of the first, second, and third steps (independent, mediating). Moreover, the effect of independent variables in the second steps was found to be greater than that in the third steps. Therefore, a partial mediation effect was confirmed while *R*² values demonstrated the explanatory power of 21.6% – 50.9% in the first steps, of 25.7% – 56.0% in the second steps, and of 67.1% – 71.3% in the third steps. Consequently, Hypothesis 2 is accepted here.

5. CONCLUSION

5.1. Summary and Implication of Research Results

To sum up the results, with regard to the hypothesis that the quality of intellectual property consulting service will have an effect on consulting performance, this study proved that the performance was indeed

affected by reliability, responsiveness, tangibles, empathy, and assurance in order of effect size of high to low, and it also confirmed that consulting satisfaction worked as a mediator in the relationship.

In addition, this study showed that the subject companies were satisfied with the quality of intellectual property consulting service provided through IP Star businesses' support project of the regional intellectual property centers. Therefore, these centers, operated by central and local governments to achieve a policy goal of helping SMEs secure a competitive edge through improved management capabilities, are succeeding in their efforts because the consulting services are, in fact, helping those SMEs. Thus, this study can be considered meaningful in that it verified the effect of the quality of intellectual property consulting service, which was designed for promoting intellectual property and intellectual property management, on consulting performance. Furthermore, this study can be utilized as an important tool to prove the mediation of consulting satisfaction in the relationship between the quality of intellectual property consulting service and consulting performance.

5.2. Research Limitations and Suggestions for Further Research

The present study has several limitations regarding measured items, variable construction, and sampling as it tried to analyze relationships of theoretical variables based on empirical studies.

This study empirically confirmed that when central or local governments offer intellectual property consulting services to businesses in order to improve their capabilities, performance of the consulting is affected by the quality of the consulting service and, in addition, satisfaction with the consultation has a mediation effect. As such, this study suggests that central and local governments as well as other concerned agencies should come up with policies to complement systems to nurture competent consultants and provide effective support. Such policies would enhance the quality of intellectual property consulting services, which, in turn, would improve the capabilities and competitiveness of SMEs.

Acknowledgments

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