Importance-Performance Analysis (IPA) of Service Quality for Virtual Reality Golf Center

Jaeyoon Kwon[1] & Taerin Chung[2]

[1] Sangmyung University, Seoul, Republic of Korea

[2] Kongju National University, Kongju, Republic of Korea

Correspondence: Taerin Chung, Kongju National University, Kongju, Republic of Korea.

Abstract

The purpose of this study was examine service quality of virtual reality golf center using Importance and Performance Analysis (IPA), from September to November 2017, adult participants who participated in virtual reality golf center in Korea were selected as subjects. The collected data were analyzed and interpreted using SPSS program, frequency analysis, exploratory factor analysis, reliability analysis, and Importance-Performance Analysis. The results of this study were as follows. First, quadrant 1 included six items: convenient facilities provide the latest equipment, customized response, understanding the needs of customer, interior atmosphere, and modernized facilities. Second, quadrant 2 included five items: kindness of employees, employees' expertise, resolve immediately if a problem occurs, quickly respond to customer needs, and employee credibility. Third, quadrant 3 included six items: customer individual interest, notice of service, employees' dress and appearance, employees' positive attitude, provide voluntary help, and promised time and service. Fourth, quadrant 4 included 3 items: provide safe service, thinking in terms of customer, and voluntary response.

Keywords: service quality, virtual reality golf center, IPA

1. Introduction

The modern society in which we live is changing from 'work-oriented society' to 'leisure and health-oriented society'. Because of these social changes, leisure is recognized as an important part of an active and creative life that contributes to the stability of life, not merely diversion or relaxation (Wallhead, Garn, &Vidoni, 2014). Among them, golf has become a very familiar sport for a short time, and it is attracted to modern people because it is a nature-friendly sport and leisure activity that promotes mental and physical development (Funk, Beaton,& Pritchard, 2011). Golf is one of the most popular sports in South Korea. However, most of the golf courses are far from the city, and a lot of them are expensive. Therefore, instead of going to an actual golf course, people like playing at a place called 'virtual reality golf' or 'screen golf'. It basically lets you play with a virtual reality golf simulator. In South Korea, the leading country in virtual golf simulator systems, there are about 6000 virtual reality golf centers for golf simulator play. 15,000 virtual golf simulator systems in operation more than 1.27 million yearly virtual golf simulator players and the total gross in the golf simulator industry exceeds US$1 billion (Moon, 2010). In particular, virtual reality golf can check ball pitch, direction, distance, head speed, ball spin, swing trajectory, and ball trajectory. In addition, the number of users is increasing due to the advantage of being able to feel like rounding (Han, Hwang, & Woods, 2014). In this situation, the quality of service provided by virtual reality golf center is very important (Goung, Yang, Kim, & Lee, 2015). The virtual reality golf center is faced with the need to offer a variety of services to meet the needs of a broader range of customers than ever before.

The background to which virtual reality golf has become a new sport can be explained in terms of economic advantage and skill acquisition. First, the economic reality of virtual reality golf costs around 30,000 won is one tenth of the total number of golf courses in Korea (Han, Back, Lee, & Huh, 2014). Secondly, in the field, the skill is largely dependent on the career, and at least three years after the start of the golf course, scratches can be played with stroke play, but virtual reality golf is about one year long. I have never been to the field, but virtual reality golf is more competitive than field golf, as there are some golfers who play singles, and because it takes a short period of time to get to the advanced level, it can naturally induce competition between each other and compete with anyone.

The system, which is considered as the best advantage of virtual reality golf, can set the difficulty level according to the skill of the user before each rounding starts. Depending on the difficulty, the swing sensor, the weather condition of the selected golf course, wind, fairway, rough, bunker (Han, Yoon, & Woods, 2016). In this paper, we propose a method to simulate a golf course by simulating virtual reality, three dimensional (3D) and ICT (Information and Communication Technology). In reality, the virtual reality golf center is equipped with a tee shot, a rough shot, a bunker shot, a fairway shot, and a putting space (Parchmann & McBride, 2011) to deliver the impression of a golf course, The advantage of this virtual reality golf is that it creates an environment that allows you to enjoy the sporting activities of golf as a game, making it more interesting, more popular with fun, and expanding the market.

Virtual reality golf, a new experience and fun that you have never experienced before in these fields, has become a form of leisure sports enjoyed by the masses and has become a new trend (Han, Hwang, & Woods, 2014). Virtual reality golf center service is the most important service in that it is very important to have competitiveness of virtual reality golf in this social flow and it is a comprehensive service industry that requires both human and physical services it can be said to be competitive. In addition, virtual reality golfers 'marketing strategies are becoming more and more important as virtual reality golfers' desires are becoming increasingly diverse and individualized (Lee, Chung, & Lee, 2013). In particular, it should be noted that most of the virtual reality golf centers are operated indiscriminately without analysis of facilities, management strategies, and systematic marketing, so that successful management is not achieved. According to Bitner& Brown (2008), service contact is an important factor in determining the first impression of a service company. If a customer has a positive experience at a service contact point, the result will be a good image of the company and service, , It is necessary to grasp the empirical factors of the customers in order to satisfy the service satisfaction. Therefore, there is a need to conduct studies that can provide strategic implications for service management by identifying the positive and negative aspects of virtual reality golf center facility users' service experience.

Previous study focus on virtual reality golf service satisfaction, repeat intentions and intention (Han, Yoon, & Woods, 2016; Lee & Jee, 2016), brand choice of virtual reality golf users on the psychological desire of service quality and customer satisfaction (Han, Hwang, & Woods, 2014; Shin & Yoon, 2010). However, most of the researches are one-dimensional analysis of the relationship between service quality attitude and service quality satisfaction. In other words, it is considered that there is a need to approach the attitudes of customers toward the essence of service quality provided by virtual reality golf center from various aspects.

Therefore, the purpose of this study is to evaluate the importance and satisfaction of service quality for customers using virtual reality golf center and to provide basic data for service improvement in virtual reality golf related company in the future. Through these service improvements, virtual reality golf center users will be able to perceive related facilities as places that they would like to find repeatedly, and comprehensively determine what ideal points they think they are, it is meaningful to provide data.

2. Literature Review

2.1 Golf Simulation System

A golf simulator allows golf to be played on a graphically or photographically simulated driving range or golf course, usually in an indoor setting. It is a technical system used by some golfers to continue their sport regardless of weather and time of day in converted premises (Lee, Chung, & Lee, 2013). Simulators have been available since the early 1970s, and systems range in cost from compact units costing well under $200 that work with a computer or video game console, to sophisticated ones costing tens of thousands of dollars. Advanced systems may utilize a dedicated room, hitting screen, projector and other paraphernalia (Han, Hwang, & Woods, 2014). An example is Wilding Golf in Bangkok, Thailand which uses sophisticated technology to analyze the spin, projection and contact of the ball. It even films the swing for analysis with a professional, and one can play courses from all over the world. In South Korea, which has the largest number of golf simulators in the world, simulator design is perhaps the most advanced (Shin & Yoon, 2010). In addition to tracking and analyzing factors such as projection and contact information of ball and club, simulators are now able to fully automate ball retrieval and tee height. Other unique capabilities of the Korean simulators include multi-directional slope sensing that synchronizes the angle of the golfer's hitting position with the slope of the lie on a 3D interactive golf course. Simpler simulators typically do not possess built-in software, but measure the movement of the hand-held sensor and feeds the information to the video game. The information received is then translated into an action of some sort, usually hitting the ball. More advanced simulators often come with their own software, allowing the user to use the system as if they were on a driving range (Kim, Kim, Moon, & Chang, 2014). Relying on a battery of environmental sensors, the software tracks each shot and represents the entire shot, from

impact to how the ball bounces visually on screen. In this way, the golfer has a detailed analysis of the entire flight of the ball which can be used for practice or training. It utilizes a projected landscape, sometimes with natural images. A computer calculates the expected trajectory of the golf ball from data gathered on the swing, and the image of the golf ball flight is then simulated on the screen via a projector. Golf simulators need to present club speed, club path, club face angle at impact, ball speed, ball path, horizontal and vertical launch angle and spin. There are several types of measurement system used in golf simulation to achieve this, such as simulator mats, sonic sound systems, optical sensor arrays, radar and camera ball tracking systems and so on.

Figure 1. Golf simulation system at an indoor virtual reality golf center

2.2 Advantage of Golf Simulator

The principal advantage of a golf simulator is the ability to conveniently play and practice in a controlled ambience. Often this means the ability to play without any pressure, green fees, or tee times; however, the advent of 'indoor golf centers', which provide simulators for commercial play, bring many of these competitive and social aspects into the simulated game. For those who live in wintry climes or urban settings, golf simulators offer the ability to play and practice year-round or within the confines of their locale. The space requirements can range from just needing an 8-foot (2.4 m) ceiling to an entire wall upon which the game's screen is attached (Lee, Chung, & Lee, 2013). The next important advantage is the player's ability to see each facet of their swing. Many golf simulators measure: angle of attack, angle of the club face, club head speed, spin, club path (inside out or outside in), and more. These measurements help both students and teaching professionals identify exactly what a player needs to know to improve their swing (Shin & Yoon, 2010).

2.3 Virtual Reality Simulation

Virtual reality simulation has also received much attention in media research. Research-based evidence across sports genres showed the positive effects of the sports simulation utilizing motion detection systems or natural game controllers (e.g., tennis rackets and golf clubs) on motor mechanics and kinetics (Bideau, Kulpa, Vignais, Brault, Multon, & Craig, 2010). Several studies using sports games of virtual reality simulation found that the virtual reality simulators enhanced anticipatory judgments and behaviors in sporting scenarios by facilitating in-depth analyses for the player and opponents' behaviors in real time (Bideau, Multon, Kulpa, Arnaldi, &Delamarche, 2004). Recent findings on young participants show that virtual reality training enhances mood, thus, increasing enjoyment and energy. Additionally, for older adults virtual, interactive environments can influence postural control and fall events by stimulating the sensory cues that are responsible in maintaining balance and orientation (Bruin, Schoene, Pichierri, & Smith, 2010). Other studies regarding golf games found that the virtual golf simulators improved overall golf performance, including golf shot accuracy and motor timing (Lee, Chung, & Lee, 2013).

2.4 Service Quality

Service quality performance is built up by customer expectation before consumption and consumer experience after consumption (Johnson & Mathews, 1997). SERVQUAL is a multi-dimensional research instrument, designed to capture consumer expectations and perceptions of a service along the five dimensions that are believed to represent service quality. SERVQUAL is built on the expectancy-disconfirmation paradigm, which in simple terms means that service quality is understood as the extent to which consumers' pre-consumption expectations of quality are confirmed or disconfirmed by their actual perceptions of the service experience. When the SERVQUAL questionnaire was first published in 1988 by a team of academic researchers,

Parasuraman, Zetihaml& Berry (1985) aimed to investigate the service quality expectations of customers and perceived that the differences between the scope of customers' expectations and actual experiences are in the ability of service providers to meet customer expectations. Berry, Parasuraman&Zeithaml (1988) argued that service quality is a cognitive quality of a product or service. The concept of service quality is derived from the concept of physical product quality. Compared to physical products, service features are invisible, and the production and sale occurs simultaneously. As service occurs, customers also play a role in co-production (Izogo & Ogba, 2015), so it is not easy to measure the performance of service. Parasuraman et al. (1985) proposed the concept of the service quality model, and established consumer perceptions of service quality systems. These perceptions are based on the gap between expectations for customer service and perceived service. Ten service quality dimensions were determined. These factors constitute the gap between customers' expected service and perceived service. Furthermore, service quality dimensions measure the relationship between service quality models. Berry et al. (1988) simplified the measurement of service quality in 1985. The ten dimensions were reduced to five. They also developed the SERVQUAL model, composed of the 22 service quality items, including its dimensions: tangible, reliability, responsiveness, assurance and empathy. SERVQUAL, introduced by Parasuraman et al. in 1988 as a way of handling service quality measure, now has many fields of application in service science issues.

2.5 The IPA Framework

Importance-Performance Analysis (IPA) has been a popular tool for understanding customer satisfaction and prioritizing service quality improvements since Martilla and James (1977) first demonstrated this simple technique. For a consider-able period of time, IPA has been used as a tool for understanding customers' needs and desires so as to develop marketing strategies to respond to them. IPA is widely used in many areas in which customer satisfaction is a key to a thriving business including higher education, tourism (Taplin, 2012), government service (Seng Wong, Hideki, & George, 2011), convenience store (Shieh & Wu, 2009) and bank service. Since customer satisfaction is a function of customer perceptions, it involves the quality of the organization's product or service and customer expectations. Therefore, IPA measures the satisfaction from customer satisfaction surveys based on two components of product or service attributes: the importance of a product or service to a customer and the performance of organization in providing that product or service (Yee, Yeung, & Cheng, 2010). The four quadrants are typically identified as 'keep up the good work' (Q1), 'concentrate here' (Q2), 'possible overkill' (Q3) and 'low priority' (Q4) for a quadrant divided by the center point (Hosseini & Bideh, 2014; Rial, Rial, Varela, & Real, 2008). IPA quadrants were shown in Figure 1.

The first quadrant, 'keep up the good work,' represents major strengths and potential competitive advantages of a product or service. The attributes situated in this quadrant are considered to be performing well and need continued investments. On the other hand, Quadrant 2, the 'possible overkill' area, contains attributes of low importance to customers, which are performing strongly, indicating possible waste of limited resources that are inefficiently used and could be reallocated elsewhere. The attributes that fall into the 'low priority' area, Quadrant 3, are not performing exceptionally well, but are considered to be relatively unimportant to customers; therefore, managers should not be overly concerned with these attributes. They represent minor weaknesses and poor performance is not a major problem. The most crucial region in the plot is Quadrant 4: the 'concentrate here' area. Attributes situated in this quadrant are considered to be underperforming and, as such, represent the product's major weaknesses and threats to its competitiveness. These attributes have the highest priority in terms of investments (Boley, McGehee, & Hammett, 2017).
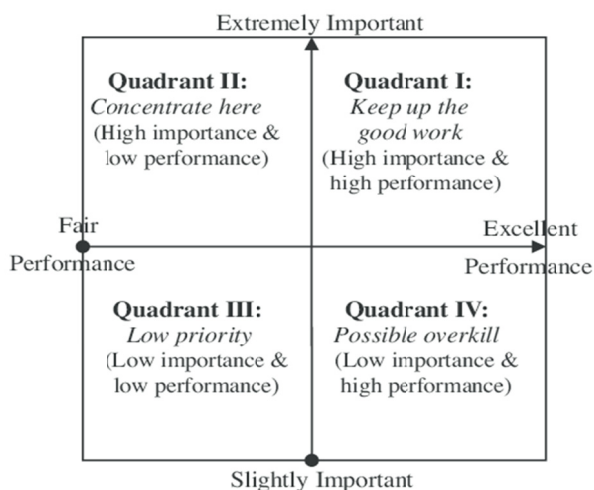
Figure 2. The Importance-Performance Analysis (IPA) matrix (Boley, McGehee, & Hammett, 2017).

3. Method

3.1 Participants and Procedure of the Study

To examine service quality of virtual reality golf center using importance and performance analysis, from September to November 2017, adult participants who participated in virtual reality golf center in Korea were selected as subjects. Questionnaires are distributed and gathered from the participants after the explanation about the purpose of the study. The researcher requested the participants to fill in the survey on voluntary basis and the participants completed the survey for approximately 10 minutes. Completed surveys were immediately collected. A total of 380 questionnaires were distributed to virtual reality golf center participants. A self-administration method was used to fill out the questionnaires. And of these, 9 were eliminated based on a lack of information and low validity. Finally, data in 371 questionnaires were analyzed. A summary of the general characteristics of the study is shown in Table 1.

Table 1. Demographic characteristics of participants

Demographic variables		Frequency (N)	Percent (%)
Gender	Male	251	67.7
	Female	120	32.3
Age	20-29	52	14.0
	30-39	107	28.8
	40-49	142	38.2
	Above 50	70	19.0
virtual reality golf Career	Below 1 year	50	13.5
	1 year – 2 years	84	22.6
	2 years – 3 years	98	26.4
	3 years – 4 years	53	14.3
	Above 4 years	86	23.2
Purpose of Visit	To improve golf skills	73	19.7
	For leisure	112	30.2
	For friendship	174	46.9
	Etc.	12	3.2
Consideration	System Specifications	95	25.6
	Accessibility and parking	118	31.9
	Comfortable atmosphere	67	18.1
	Price	73	19.6
	Etc.	18	4.8
Transportation	Own car	213	57.5
	Public transport	89	23.9
	On foot	69	18.6
Total		371	100

3.2 Measurements

The primary research method adopted in this study was the questionnaire method (survey). Table 1 outlines characteristics of the questionnaire. The questionnaire method was the research method used in this study. This method was used to examine the importance and performance of service quality for virtual reality golf center participants. First, to analyze the basic demographic characteristics, a questionnaire was disseminated that examined six factors; gender, age, golf career, purpose of visit, considerations, transportation. Second, importance and performance of service quality variables are composed with empathy, employee, responsiveness, tangibility, responsibility. 20 items assessed service quality based on study by Parasuraman, Zeithaml& Berry (1988) and Caruana (2000) was translated and modified for this study. Questionnaires were measured on a five-point Likert scale ranging from 'Strongly disagree' (1) to 'Strongly agree' (5).

3.3 Data Analysis

The complete data were analyzed after coding, using the programs SPSS for Windows. The procedure for data analysis is as follows. First, to define demographic information for the respondents to the questionnaire, a frequency analysis was conducted. Second, to test the reliability of the scales, Cronbach'sα coefficient, which is a measure of internal consistency between questions, was calculated. All alpha coefficients were above the cut-off point of 0.7, indicating an acceptable level of reliability for each construct. Third, to test construct validity, exploratory factor analysis was conducted. Table 2 provides the results of the exploratory factor analysis. Fourth, to verify the importance and performance of virtual reality golf centers service quality through IPA matrix.

Table 2. Results of the validity test: importance and satisfaction factors of service quality

Factor	Variable	Factor loading	Eigen-value (% of Variance)	α
Empathy	Customized response	.814	3.612 (18.219)	.891
	Customer individual interest	.803		
	Understanding the needs of customer	.798		
	Thinking in terms of customer	.718		
Assurance	Employees' positive attitude	.820	3.279 (17.237)	.873
	Employees' expertise	.776		
	Kindness of employees	.754		
	Employees' dress and appearance	.729		
Responsiveness	Notice of service	.815	3.148 (16.551)	.839
	Quickly respond to customer needs	.806		
	Voluntary response	.761		
	Provide voluntary help	.728		
Tangibility	Interior atmosphere	.796	2.918 (15.708)	.785
	Modernized facilities	.787		
	Provide the latest equipment	.725		
	Convenient facilities	.711		
Responsibility	Resolve immediately if a problem occurs	.801	2.731 (11.392)	.731
	Provide safe service	.797		
	Promised time and service	.735		
	Employee credibility	.712		

4. Results

4.1 Importance-Satisfaction and Priority Analysisof Service Quality

The service quality of importance-performance analysis and priority results were shown in Table 3. The average importance of tangibility was 3.87 which was the most importance, followed by assurance (3.58), responsibility (3.43), empathy (3.41), and responsiveness (3.13). Specifically, 'convenient facilities' was the highest in tangibility, followed by 'kindness of employees' in assurance, 'employee credibility' in responsibility, 'customized response' in empathy, and 'quickly respond to customer needs' in responsiveness. Satisfaction of tangibility was the highest in the average 3.47, followed by empathy (3.39), responsibility (3.19), responsiveness (3.06), and assurance (3.00). Specifically, 'interior atmosphere' in tangibility, 'understanding the needs of customer' in empathy, 'provide safe service' in responsibility, 'voluntary response' in responsiveness, and 'employees' positive attitude' in assurance.

Table 3. Importance-satisfaction and priority analysis of service quality

Factor	Questionnaires	Importance		Satisfaction	
		Rank	$M \pm SD$	Rank	$M \pm SD$
Empathy	Customized response	4	3.97 .918	2	3.62 1.012
	Customer individual interest	13	3.12 .924	13	3.05 .975
	Understanding the needs of customer	9	3.77 .931	1	3.64 .879
	Thinking in terms of customer	18	2.78 1.057	9	3.24 .868
Assurance	Employees' positive attitude	16	3.02 1.025	20	2.85 .913
	Employees' expertise	5	3.91 .878	11	3.13 .933
	Kindness of employees	1	4.35 .949	14	3.03 .892
	Employees' dress and appearance	15	3.05 1.231	16	3.00 1.031
Responsiveness	Notice of service	14	3.08 1.013	15	3.01 .956
	Quickly respond to customer needs	7	3.82 .965	19	2.95 .908
	Voluntary response	20	2.65 .897	8	3.31 .964
	Provide voluntary help	17	2.97 .1011	17	2.99 .852
Tangibility	Interior atmosphere	10	3.74 .998	3	3.58 .906
	Modernized facilities	11	3.63 .889	4	3.51 .908
	Provide the latest equipment	3	3.98 .903	7	3.34 .946
	Convenient facilities	2	4.12 .868	5	3.48 .961
Responsibility	Resolve immediately if a problem occurs	6	3.84 1.101	18	2.97 1.213
	Provide safe service	12	3.35 1.002	6	3.47 1.123
	Promised time and service	19	2.74 1.008	10	3.22 .992
	Employee credibility	8	3.80 1.023	12	3.12 .986
Total			3.485		3.226

4.2 IPA Matrix Analysis of Service Quality for Virtual Reality Golf Center

IPA was used to compare and analyze the relative importance and satisfaction of each characteristic through the importance and satisfaction of service quality for virtual reality golf center. In this study, the method of setting the center point of the axes is based on the median of the maximum and minimum values of the whole averages, and the IPA intersection points are set. The horizontal axis is the satisfaction level and the vertical axis is the importance level (Duke & Persia, 1996; Martilla& James, 1997). The results of the analysis were shown in Figure 3 and Table 4.
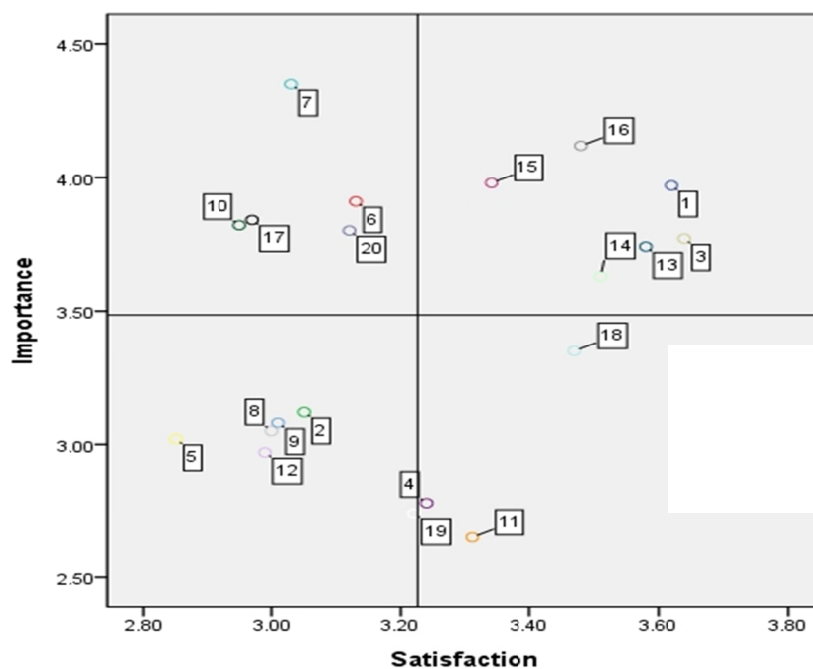

Figure 3. IPA matrix of virtual reality golf center's service quality

Table 4. IPA matrix results virtual reality golf center's service quality

Quadrant	Items
Quadrant 1	Convenient facilities, provide the latest equipment, customized response, understanding the needs of customer, interior atmosphere, modernized facilities
Quadrant 2	Kindness of employees, employees' expertise, resolve immediately if a problem occurs, quickly respond to customer needs, employee credibility
Quadrant 3	Customer individual interest, notice of service, employees' dress and appearance, employees' positive attitude, provide voluntary help, promised time and service
Quadrant 4	Provide safe service, thinking in terms of customer, voluntary response

5. Discussion and Conclusion

The purpose of this study was to investigate the quality of service which should be improved by analyzing the importance and satisfaction of service quality provided by virtual reality golf center. In this study, we analyzed the customers who have experienced using virtual reality golf center and obtained the following results. First, quadrant 1 included six items: convenient facilities provide the latest equipment, customized response, understanding the needs of customer, interior atmosphere, and modernized facilities. These six items showed both high importance and satisfaction, these items indicating that management and operation are adequate at present for appropriate climate. These results showed that the services such as convenient facilities, atmosphere, and response to customer requirements were satisfactory. These results were with the study by Jeng, Pai, &Yeh (2017) and Suki & Suki (2015) that customer can expect stable operation through customer management and revisit inquiry. Therefore, companies should strive to give their customers an environmental satisfaction, and ultimately, loyalty will lead to a revisit. Most of the customers of the virtual reality golf center have already had the opportunity to acquire experience and information about virtual reality golf from the internet or from nearby people. Therefore, the executive of the virtual reality golf center needs to provide sufficient satisfaction in terms of these services in order to build trust with customers. In this regard, especially in the virtual reality golf center, various situations of the service environment have suggested that it is a way to convey positive experiences to customers (Tynan, McKechnie, & Hartley, 2014), ventilation facilities, It is necessary to pay attention to the environmental aspect that can provide a pleasant environment such as an insole at which a safety distance is secured and securing a rest space.

Second, quadrant 2 included five items: kindness of employees, employees' expertise, resolve immediately if a problem occurs, quickly respond to customer needs, and employee credibility. These five items showed high importance and low satisfaction, indicating that intense efforts are required at present. These results showed that trust in human services such as employee friendliness and professionalism in selecting a virtual reality golf center is a fundamental factor in improving user satisfaction. According to Lee & Jee (2016), users are basically satisfied with their personal service, such as knowledge of the program, speed, and individual attention. This is rarely the case for users who have a personal practice at a regular golf practice, but virtual reality golf has a relatively large number of employee calls and help requests. Managers therefore need to work on individual concerns and on the needs of their customers. Virtual reality golf center In order to improve the satisfaction of users, much effort is needed to manage physical facilities and update updated programs. It is important to make every effort to provide human services such as speed, kindness, and understanding of the program.Especially, due to the nature of the virtual reality golf center, the friendly service of the staff plays an important role in customer satisfaction. Unlike field golf course or general golf driving range, it is a screen golf course using computer program. Therefore, when there is any problem such as program error, the promptness and kindness of the staff will enhance the satisfaction of users. During virtual reality golf rounding the problem with the program is that the rounds suddenly stop, and the users are displeased (Lee, Chung, & Lee, 2013). Therefore, employees should have the knowledge and ability to cope with the relevant programs.

Third, quadrant 3 included six items: customer individual interest, notice of service, employees' dress and appearance, employees' positive attitude, provide voluntary help, and promised time and service. These six items showed low importance and high satisfaction, indicating that these are not priority considerations. Marchington, Wilkinson, Donnelly & Kynighou (2016) and Taylor, Doherty & MacGraw (2015) reported that sport organizations and facilities are more satisfied with human services than human environments, such as ease of use. This result implies that the virtual reality golf center in a narrow space is satisfactory in terms of facilities. Virtual reality golf center executives provide quality service quality to customers through the development of new service programs and training of employees because customers are more satisfied with service quality when they are satisfied with service quality.

Fourth, quadrant 4 included 3 items: provide safe service, thinking in terms of customer, and voluntary response. At present, these items should be reconsidered. The most noteworthy aspect is safety. According to Tynan, McKechnie & Hartley (2014), indoor ventilation and smoking and drinking of virtual reality golf center showed negative experience, which is crucial for improving service quality. Virtual reality golf, most of which is done indoors, is a direct cigarette problem, and the result of secondhand smoke should be eradicated, as it can cause discomfort and systemic damage caused by inhaling the contaminated air. Yi (2008) stated that virtual reality golf center, which is a simulation sports facility, is included in the golf practice field in accordance with the facility law, but the golf practice field is not allowed to play games or entertainment, and is used only for one practice field. In addition, safety issues can be identified through a variety of accident cases in the virtual reality golf center. According to Lee & Jee (2016), if a bounced ball in a virtual reality golf center booth strikes a part of the body of a person or a colleague, the safety issue in the cramped booth must be pointed out, such as when the driver is fitted with a backswing practice motion. Virtual reality golf is a material that is vulnerable to heat, such as artificial turf and soundproofing inside a virtual reality golf center. Therefore, the center manager should pay special attention to solve such problems as safety accidents. It should be able to play a positive role in popularizing screen golf.

Finally, recommendations for future studies are as follows. First, this study was conducted on customers who are interested in a single item of service quality of virtual reality golf center. Indeed, virtual reality sports exist in a variety of forms, including golf, horseback riding, and baseball. Therefore, in future studies, it will be possible to obtain more objective marketing results if we study the characteristics of these items. Second, this study is one of the quantitative research methods using IPA technique, and it is advantageous to examine visitor experience of service quality through simple average value, and to examine the influence between factors or structure between factors. However, there are limitations in exploring impressive experiences. Therefore, in future research, qualitative research method should be applied and tried with qualitative verification.

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