

The Effect of Service Convenience and Mobile Apps on Consumer Re-Use in the Service Trade Market: A Focus on China Medical Tourist

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Abstract

Purpose – This study focused on the effect of mobile app information system quality on re-use intention in the medical service trade, and examined how the Chinese, currently the main consumer of Korea's medical service trade, obtained information through mobile apps, and the status of satisfaction felt by experiencing medical services.

Design/methodology – The survey period was from November 2018 to January 2019, and was conducted on Chinese who voluntarily experienced medical services. The collected data verified causality of the study model through the statistical program, SPSS.24. The results showed that the most popular medical institution through the medical service mobile app is dermatology, and the quality of the app's information system plays a mediating role in influencing re-use intention.

Findings – Overall, the current trade in medical services is first accessed and acquired through mobile apps, and as a result, consumers revisit medical institutions according to the reliability of information. Comments and likes, another new form of the word of mouth that has greatly influenced revisiting in the past, are seen to be spreading through the app's medical information.

Originality/value – The previous market for the medical services trade was formed by very conservative word of mouth, but now we believe that the app's information system actively influences the revisit effect. This means that apps can be used in diverse areas in the medical service trade market. In addition, the medical service market needs to further develop a mobile app environment that can reflect consumers' diverse needs, behaviors, and culture from time to time in order to revitalize the service trade. Such an app environment development will have tremendous promotional effects on the trade market and provide directions for expanding trade in medical services.

Keywords: Medical Service, Medical Tourists, Mobile App

JEL Classifications: I15, N75

1. Introduction

1.1. Background and Purpose

Recently, the medical service trade market has grown gradually with increasing interest in a health and happy life, and thus the scope of medical institution use purpose has expanded from treatment to prevention and health examination. In addition, more and more users are using medical institutions in other countries for self-satisfaction in skin and beauty. Korea is trying to meet the diverse medical service needs of foreign consumers by drawing up appropriate policies to suit foreigner use patterns. Each hospital is also trying to develop services that fit this background, and as a result, various needs for medical service are being

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created from a consumer-driven perspective. Fortunately, large hospitals, university hospitals, and professional hospitals are trying to fill the needs of medical consumers, but small and medium-sized hospitals are not adapting quickly to these changes. This creates a situation where small hospitals lose competitiveness and medical service quality. In this medical service trade market, hospitals strive to create service improvement strategies that enhance service for consumers and improve service quality. This prevents consumers from leaving the health service trade market, and leads to a competitive advantage among hospitals. This will proceed with unlimited competition according to autonomy, and business models will inevitably be created for each hospital.

The beginning of this study is that perceived convenience in medical services basically affects the human and physical service satisfaction of medical institutions, but consumers who shop between countries now have the intention of revisiting hospitals and show consumer loyalty, depending on the application configuration of each hospital. This application service provides information from a consumer perspective, benefiting consumers in price comparison, convenience, and quality. The high smartphone usage rate has made it easier to conveniently pursue information collection. From a hospital's perspective, these application services are a paradigm shift different from traditional buying behaviors, making the need for another approach to service convenience and the specific development of apps to express it. This will enable the subjective interpretation of consumption value through the importance of convenience of mobile services in hospitals. For this purpose, this study attempted to measure the convenience of hospital applications that were not present in the previous study, and focused on how the benefits of mobile apps significantly affect consumer satisfaction and repurchase behavior. In other words, based on prior research, we intend to study the usability and safety of the system quality characteristics of mobile applications. In addition, from a view of immediate connectivity, we will study accuracy, economy, and situation among information quality characteristics based on a theoretical background of service quality, and conduct research on the basis of mobile app characteristics, customer satisfaction, and intention to reuse. In summing up the preceding studies, it was found that the effect of medical service convenience leading to consumer loyalty comes with positive results, but an analytical study of the mediating factors, which is a positive influence here, is still insufficient. Therefore, it is necessary to identify and analyze medical service convenience and the willingness to reuse mobile apps.

Recently, China has seen a surge in reform, opening, and export volume (Lee Seo-Young, 2013). Unlike other capitalist countries, China has a very unique trading system (Park Suk-Jae, 2019). In this sense, the trade in services is not much different. To expand medical service trade market with China, through this research, we will present research implications and create practical implications that enhance competitiveness in the medical service trade by analyzing the impact of mobile app configuration on consumer usage intentions.

1.2. Scope and Method

Based on prior studies, this study was conducted from November 2018 to January 2019, and the preliminary survey was conducted in two sessions. Later, a full-scale investigation was carried out.

To reach the purpose of this study, we have studied antecedent literature and empirical studies. In the preceding study, a theory on hospital service convenience, information system, and behavior was summarized, and we made a composition of consumer service convenience, a research model, and research theory to proceed with this study. In addition, measurement models on decision-making convenience, access convenience, transaction convenience,

benefit convenience, and post-benefit convenience were constructed for hospital consumers. A questionnaire was created through preliminary surveys focusing on theoretical research at the pre-survey stage. Data statistics were studied through SPSS 24 to verify the causal relationship of the study model.

2. Service Convenience and Information Quality of Mobile Apps

2.1. The Concept of Service Convenience Type

Berry (2002) defined service convenience as the perceived time and effort of the customer as the expense, and minimizing these. Medical service has a growing market size, and countries are placing great importance on this sector for the reason that human attention is focused on a healthy and happy life (Kim Seong-Jin, 2018). The issue of global competitiveness in the medical sector, but with sluggish marketing strategies compared to advanced technologies, is being discussed (Shin Jae-Ki, 2013). It is therefore necessary for healthcare institutions to know the fact that they can survive only by improving customer service and service quality, and to make strategies for improving service (Kim Seong-Jin, 2017). Service convenience is not only used in information networks but also delivered to customers across the board through physical, human, and system services. Humans instinctively pursue convenience, and are increasingly inclined to purchase products or services that save time and effort than money (Berry, Seider and Grewal, 2002). Although the concept of service convenience varies from the perspective of the researcher, most views related to purchase were initially focused on the concept of marketing from a management aspect. Seo Hyun-Sook (2010) said that service convenience means 'a general preference in people or organizations for convenient goods and services' (Lee Sang-Ho, Kim Han-Ju and Jung Bong-Myeong, 2013).

Prior study of service convenience usually focused on the development of measures that classify product-focused convenience and represent each convenience. The study of convenience was conducted in theoretical rather than empirical studies, and Yale and Venkatesh (1986) classified convenience as time utilization, accessibility, portability, appropriateness, handiness and avoidance of unpleasantness. Based on this study, convenience is divided into five dimensions: time convenience, place convenience, purchase convenience, using convenience, and effect convenience (Brown, 1990), or classified as decision convenience, access convenience, transaction convenience, benefit convenience, and post-benefit convenience through the service use process.

2.1.1. *Decision Convenience*

Decision convenience is a concept related to consumer perception of expenditure on time and effort involved in the purchase and use of services. Recognizing the need for products or services, consumers face a choice of service delivery and provider, so they must spend time and effort making decisions. Consumers also make decisions based on the availability and quality of information on service providers and competitors when decision making is complex or difficult to evaluate (Seiders et al., 2007). Many factors play an important role in purchasing medical service applications as a whole. This is becoming increasingly fragmented by the diverse needs of consumers, allowing them to compare the diversity and differentiation of medical service applications.

2.1.2. *Access Convenience*

Access convenience is the concept of spending time and effort, as perceived by consumers, for initial service delivery, which is determined by easy access, such as the location of a service

provider, the hours of operation of a service provider, and how they may contact a service provider (Meuter et al., 2000). Access convenience that provides easy access to service information and helps make decisions is based on how much perceived time and effort consumers expend. Accessibility and speed of the service provider informs the buyer of convenience (Han Sang-Lin and Lee Sung-Ho, 2011). Kim Soo-Bae (2004) said, "The access convenience seen in hospitals is directly related to the consumer, depending on the behavior or circumstances that require the consumer's perceived time and effort to meet the service provider." In this view, access convenience is critical to customer satisfaction and purchasing behavior (Bitner et al., 1994).

2.1.3. Transaction Convenience

Transaction convenience is the concept of spending perceived time and effort in the course of a service transaction. An example is the waiting time for the payment process in a medical institution. This concept represents an effective and efficient transaction. Quick and easy payment related to the transaction convenience is ideal (Kim Seong-Jin, 2017). Information searching performed by consumer online affects purchases (Lee Hae-Na et al., 2015). The feature of this concept is that the user is involved in the transaction by making decisions to use a service and conduct online proceedings, and from this point on, the purchase of a service takes place. In relation to medical service, payment methods for large hospitals and smaller hospitals are different. Compared to large general hospitals that provide medical checkups and treatment after receiving money, small hospitals operate in the opposite way (Kim Seong-Jin, 2018).

2.1.4. Benefit Convenience

Benefit convenience is a concept related to the perceived expenditure of time and effort for the key benefit provided by a service (Berry et al., 2002). If consumers feel uncomfortable during the service process, there is a strong negative effect. This is because the burden of receiving benefits hinders the benefits of receiving services (Berry et al., 2002). In the case of medical services, benefit convenience includes the convenience of being guided by staff in the process of receiving services, the acquisition of information through sufficient dialogue with medical staff, and various other facilities. These days, the demand for profit convenience is increasing as information acquisition on the Internet is available in real time, and consultation with customers is also available online (Kim Seong-Jin, 2018).

2.1.5. Post-benefit Convenience

Post-benefit convenience is a concept that relates to a consumer's perception about the time and effort that occurs when the consumer meets a service provider. This mainly includes service complaints or failures, requests for repair, upgrades, and general service support, and provides involuntary processes to reduce the perceived time and effort spent in obtaining and consuming services (Berry et al., 2002). For example, when expected services are frustrating, simple and clear handling of this problem is important to maintain consumers. After a consumer uses a medical service, these post-benefit conveniences relate to subsequent reservation changes or post-processes in areas related to the reservation. Post-benefit convenience is critical to consumers, especially since post-process or side effect management is important in medical services.

2.2. Mobile App Service

The concept of mobile services is defined as a service that provides real-time necessary

information wirelessly, regardless of time and place, through a portable device. Robinson and Kalakota (2002) defined it as a service that helps consumers get information or products they want right away through a mobile device. The features of a mobile app service are as follows. First, updates are always fast with new information, and the information is received correctly. Second, it is possible to exchange bi-directional information. Third, except text, multimedia information such as images, voice, and video are always available. Fourth, the latest information can always be generated through virtual reality or augmented reality. Fifth, information is in-depth and vast. From this point of view, medical services have mobile characteristics that allow instant, anytime, anywhere access to desired information, without restrictions on city or space (Kim Dong-Won, Lee Tae-Min and Kang Myung-Soo, 2003). Under this background, the impact of mobile app information quality on the medical service market is growing very rapidly.

In terms of information delivery, Word of Mouth (WOM) is informal oral communication. Thus, the reliability of oral information has a direct positive effect on intention to purchase and online oral communication (Kim Yoon-Sik and Jung Kyu-Up, 2009). Thus, understanding oral communication is very important, and Anderson (1994) stressed the importance of oral communication, saying that consumers who are satisfied with service are the best salespeople. WOM, which is the beginning of such communication, can be seen as being transformed in the modern era, such as in reviews written by customers. In order to maximize performance from mobile app use, importance is emphasized for research on the information quality factors of mobile apps. The quality provided here by the information system of applications are classified into information quality, system quality and service quality, as described in detail below.

2.2.1. Information Quality

Orr (1998) defined quality of information as the degree of correspondence between the information expressed by an information system, and the same information that exists in the real world. That is, information quality means that information in the system is the same as it is in reality. In addition, Giri (1998) defined quality of information as usability. This should be appropriate for presentation as well as content of information during use. From a consumer's point of view, various elements of information quality have been constructed, which vary depending on the social and cultural environment. Information quality focuses on the value and usefulness, or relative importance, of the output produced by an information system (DeLone and McLean, 1992). DeLone and McLean (1992) evaluated the success scale of information systems in six areas, presenting information quality as one of the success measures of an information system. Many studies later presented 14 measurement tools for assessing information quality. The definition of information quality varies from researcher to researcher, but in this study, 15 properties of information quality derived were used from a study by Lee, Jung-Woo, Yoon Seong-Cheol and Lee Seul (2003).

2.2.2. System Quality

System quality usually refers to the operational efficiency of information system functions, and to the stable and efficient use of consumers. The measurement of the performance of system quality is focused on whether an information system is economically developed and used for purposes, and the level of efficiency. In a preceding study, Bailey and Pearson (1983) organized measurement variables by classifying and measuring a system's integration and response times into items with access convenience and flexibility of the system. DeLone and McLean (1992) also compiled this content, which included Convenience, Flexibility, Inte-

gration, Response, Reliability, Usefulness, Utilization, and Accessibility Tools.

2.2.3. Service Quality

Parasuraman, Zeithamal and Berry (1988) defined the concept of service quality as a judgement or attitude on service excellence, where the quality of service is determined through a performance evaluation on expectations. This assessment was carried out with SERVQUAL, a quality measurement tool of 22 items, and later modified to 5 dimensions. Kettinger et al. (1994) measured the quality of information system services for the first time among American business school students using the SERVQUAL model developed by Parasurman concept. Following Park Jong-Sung (2003), the five SERVQUAL lines have been reduced to four, and the 13 questions have resulted in a measuring instrument called the IS-version SERVQUAL.

2.3. Behavioral Intention and Re-Use Purchase

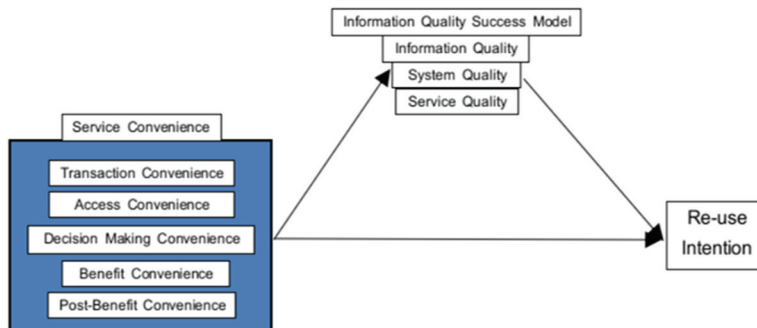
Behavior intention is divided into economic and social behavior (Bendall-Lyon, Dawn and Powers, 2004). Economic behavior is a diversionary behavior that affects the financial aspects of an entity, such as customer repurchase behavior, premium payment intent, and conversion behavior, and social behavior refers to behaviors such as customer dissatisfaction (Park Han-Su, 2014) or negative oral behaviors that affect the opinions of potential customers (Szymanski, David and Henard, 2001). Customer satisfaction with repurchase behavior, along with economic behavior, plays an important role in future consumer behaviors, particularly in repeat purchase decisions (Kim Kuk-Seon and Lee Jong-Ho, 2012). A service experience creates a halo effect for a business when customers are satisfied (Do Kyu-Hwan and Kim Seong-Jin, 2018), and in particular, the oral communication method of the internet has become mobile and faster than before. Re-use behavior refers to consumer intention to purchase a service or product repeatedly. Re-use behavior is an important factor that continues to generate corporate profits or outcomes from a long-term perspective, and at the same time is a measure of customer maintenance and re-use (visit) behavior; it is also the most important concept in marketing (Kwon Dong-Geuk, 2011).

3. Research Methodology

3.1. Research Model

The basic research goal is to study whether medical service convenience via mobile apps leads to re-use in medical services. It is also about understanding whether the information system quality of apps plays a mediating role, and whether these mobile apps will be useful. The performance of the service trade through reuse will be measured. Based on the theories presented by Berry et al. (2002) to measure medical service convenience, the scope and types of service convenience were largely reconstructed into five sections. In the relationship between service convenience and re-use, we try to study the mediating role of the quality of mobile app information. De Lone and McLean (2003) classified the revised information quality model into three components: information quality, system quality, and service quality. We study whether these three factors affect re-use intention. In this case, re-use intention is composed of a single factor based on a study by Rosman et al. (2013). A research model, Fig. 1 illustrates the result of the research re-use intention. This research model was designed to examine and analyze the causal relationship between the convenience of medical service users, the quality of information, and re-use intention.

Fig. 1. Research Model



3.2. Research Hypothesis

3.2.1. Relationship between Service Convenience and Re-Use Intention

A study by Byun Jung-Woo and Seo Hyun-Sook (2010) validated the causal relationship between service convenience and behavioral intention, and revealed that most service convenience has causality. It studied the impact of medical service users on service convenience and revisit intention, and found that service convenience affects the degree of revisit intention.

Based on these prior studies, this study sets the following assumptions on service convenience and re-use intention.

- H1: There will be no difference Service Convenience affects Re-use Intention.*
H1-1: There will be no difference Transaction Convenience affects Re-use Intention.
H1-2: There will be no difference Access Convenience affects Re-use Intention.
H1-3: There will be no difference Decision Making Convenience affects Re-use Intention.
H1-4: There will be no difference Benefit Convenience affects Re-use Intention.
H1-5: There will be no difference Post-Benefit Convenience affects Re-use Intention.

The independent variable is Service Convenience.

The sub-variables are Transaction Convenience, Access Convenience, Decision Making Convenience, Benefit Convenience affects, and Post-Benefit Convenience.

The dependent variable is Re-Use Intention. Information System Quality is to act as an intermediary between the independent and dependent variables.

The parameters are sub-factors of Information Quality, System Quality and Service Quality.

3.2.2. Research Hypotheses on the Mediating Role of Information System Quality

The information quality of corporate blogs was found to be a leading factor in online loyalty (Jeong Eun-Bok, 2010). In a study by Park Kyu-Il and Shin Geon-Kwon (2012), perceived accounting information quality influenced user intentions by mediating perceived usefulness and user satisfaction. The effect of SNS information quality on customer loyalty affected information quality satisfaction and customer loyalty, and this effect appeared more as confidence grew. Based on these prior studies, in this study, the hypotheses for the mediating

role of information quality are set as follows.

- H2: There will be no difference Information System Quality will have a Mediating Effect in Service Convenience and Re-use Intention.*
- H2-1: There will be no difference Information Quality will have a Mediating Role in Transaction Convenience and Re-use Intention.*
- H2-2: There will be no difference Information Quality will have a Mediating Role in Access Convenience and Re-use Intention.*
- H2-3: There will be no difference Information Quality will have a Mediating Role in Decision Making Convenience and Re-use Intention.*
- H2-4: There will be no difference Information Quality will have a Mediating Role in Benefit Convenience and Re-use Intention.*
- H2-5: There will be no difference Information Quality will have a Mediating Role in Post-Benefit Convenience and Re-use Intention.*
- H3: There will be no difference System Quality will have a Mediating Effect in Service Convenience and Re-use Intention.*
- H3-1: There will be no difference System Quality will have a Mediating Role in Transaction Convenience and Re-use Intention.*
- H3-2: There will be no difference System Quality will have a Mediating Role in Access Convenience and Re-use Intention.*
- H3-3: There will be no difference System Quality will have a Mediating Role in Decision Making Convenience and Re-use Intention.*
- H3-4: There will be no difference System Quality will have a Mediating Role in Benefit Convenience and Re-use Intention.*
- H3-5: There will be no difference System Quality will have a Mediating Role in Post-Benefit Convenience and Re-use Intention.*
- H4: There will be no difference Service Quality will have a Mediating Effect in Service Convenience and Re-use Intention.*
- H4-1: There will be no difference Service Quality will have a Mediating Role in Transaction Convenience and Re-use Intention.*
- H4-2: There will be no difference Service Quality will have a Mediating Role in Access Convenience and Re-use Intention.*
- H4-3: There will be no difference Service Quality will have a Mediating Role in Decision Making Convenience and Re-use Intention.*
- H4-4: There will be no difference Service Quality will have a Mediating Role in Benefit Convenience and Re-use Intention.*
- H4-5: There will be no difference Service Quality will have a Mediating Role in Post-Benefit Convenience and Re-use Intention.*

3.3. Research Method

3.3.1. Operational Definition of Variables

a) Service Convenience

The five elements for measuring service convenience are decision making convenience, access convenience, transaction convenience, benefit convenience, and post-benefit convenience. Decision making convenience is the convenience associated with the minimum amount of time and effort required to make a decision when a customer purchases a service. Access convenience is the concept of expenditure of perceived time and effort in the delivery

Table 1. Service Convenience Measurement Details

Service Convenience
<p>Transaction Convenience 3</p> <p>It is easy to reserve medical service treatment with medical mobile app. With medical mobile app, appointment of medical treatment can be completed quickly. Medical mobile apps are convenient for mobile payment.</p>
<p>Access Convenience 3</p> <p>Medical mobile apps are available at any time. Medical mobile apps are easy to access because they are portable. The medical mobile app is well-guided.</p>
<p>Benefit convenience 3</p> <p>Booking through a medical mobile app saves time than booking offline. Using the medical mobile app, it seems that knowledge in the medical field grows. Medical mobile apps are more likely to benefit from a variety of services than offline.</p>
<p>Decision Making Convenience 5</p> <p>The medical mobile app makes it easy to choose the necessary examination subjects and hospital information. Medical mobile apps make comparison decisions with other products(medical institutions). The medical mobile app is convenient for foreigners as it offers them a place to go next. The medical mobile app is easy to determine because its hospitals and locations are well organized. The medical mobile app is well organized with professional information(technical skills, academic background) so that I can easily find the specialist I want.</p>
<p>Post-Benefit Convenience 9</p> <p>With the medical mobile app, it is easy to cancel a medical institution's reservation. Medical mobile apps are simpler and faster to use bulletin boards than to make direct phone calls or direct visits when a problem occurs. Medical mobile apps notify you of progress by text message or e-mail when a problem occurs. The medical mobile app uses a mobile device to easily inform you the patient's status, further diagnosis, and the next appointment. The medical mobile app can deliver hospital reviews to friends quickly through sharing. The medical mobile app's notification service makes it easy to find out the next reservation. Medical mobile apps make information easy to use. The next reservation function of the medical mobile app is convenient. Electronic prescriptions provided by medical mobile apps are really convenient.</p>

Source: Kim Seong-Jin (2018).

process between service users at the beginning of the service as determined by concepts such as location, operation time, and how to contact the service provider (Berry, Seider and Grewal, 2002). Transaction convenience relates to minimizing the perceived cost relative to the customer's perceived time and effort required for a transaction (Berry et al., 2002). Benefit convenience is the key convenience provided by the service. This is the concept associated with a consumer's perceived expenditure of time and effort (Berry et al., 2002), which relates to the consumer's perception of the time and effort that occurs when the consumer re-contacts the service provider after using a service with post-benefit convenience. In this study, service convenience is the stage of consumer behavior during the course of purchasing or

using a service (Seo Hyun-Sook, 2010), and based on a study by Berry et al. (2002), this study defines this service as cost minimizing, which is the perceived time and effort of the customer resulting from the purchase of the service. After translating the items as presented in the study of Seiders et al. (2007) and Colwell (2008), the items were organized into five sections: decision making convenience (5 questions), access convenience (3 questions), transaction convenience (3 questions), benefit convenience (3 questions), and post-benefit convenience (9 questions). A 5 point Likert scale was used (1=Not at all, 3=Normal, 5=Very much so).

b) Information of Medical Service Mobile Apps

According to the DeLone and McLean's information system success model, the quality of an information system appears to affect perceived usefulness and user satisfaction. In other prior studies, the quality of an information system also affects the usage intention and satisfaction in the modified information system success model. Based on this, we apply this to medical tourism, one of the areas of the service trade. DeLone and McLean's model was applied to this study to organize measurement items in three categories with four questions each: information quality, system quality, and service quality on a scale of 1 to 5 (1=Not at all, 3=Normal, 5=Very much so).

Table 2. Information Quality Success Model

Information Quality Success Model

Information 6

Information provided by the medical mobile app is useful.

The medical mobile app is connected to the Internet so you can access it right away.

The information provided by the medical mobile app is professional and systematic.

Information on medical mobile apps is easy to understand.

The medical mobile app provides all the information I need.

Information on medical mobile apps is based on the latest data.

System Quality 5

Medical mobile apps are fast in process.

The medical mobile app is well organized.

Errors are rare in medical mobile apps.

The services of the medical mobile app are organically linked to each other.

Medical mobile apps are reliable enough to be trusted and used.

Service Quality 3

Medical mobile apps are easy to contact an administrator.

The medical mobile app reliably provides the services I expect.

Medical mobile apps have a strong will to help users.

Source: Kim Seong-Jin (2018).

c) Re-use Intention

Re-use intention is an indicator of how hard an individual tries to implement a particular action to continue, and according to literature, actual behavior can be predicted by the intention that an individual is willing to act. Thus, based on a study by Rosman et al. (2013),

four questions were constructed on the re-use intention with a 5 point Likert scale (1=Not at all, 3=Normal, 5=Very much so).

Table 3. Re-Use Intention

Re-Use Intention
I am planning to use the medical facilities through the app next time.
I will receive medical services through the app.
I am thinking of using medical facilities through mobile apps constantly.
I'll take advantage of the medical facilities where apps are available next time.
I intend to introduce and use these medical services with others.

Source: Kim Seong-Jin (2018).

3.4. Data Collection and Measurement Method

3.4.1. Data Collection

We commissioned an online research company to verify the research theories and target the users of medical services. The survey period was from November 2018 to January 2019, and 350 copies were collected. A total of 322 copies were applied to the analysis, except for questionnaires with insufficient responses.

3.4.2. Measurement Method

Data collected were analyzed through SPSS 24.0. First, frequency analysis was used to report demographic characteristics. Second, Cronbach's Alpha was measured for the technical statistical analysis of each measurement item and verification of reliability, which is internal consistency. Third, unnecessary variables were removed, and Elemental Factor Analysis (EFA) was performed to verify the validity of the measured items. Fourth, correlations and multicollinearity between variables were identified through a Pearson Correlation Analysis. Fifth, the causal relationship between variables was analyzed with SPSS24.0 to verify the study theory.

4. Empirical Analysis Results

4.1. Sample Characteristics

Demographic characteristics are shown in Table 4. There were 121 men (37.6%) and 201 women (62.4%) of the total respondents. Of the total respondents, 6 were aged between 10 and 19 years old (1.9%), 174 people were 20 to 29 (55.3%), 114 people were 30 to 39 (35.4%), 24 people were 40 to 49 (7.5%), and 62 people were 50 or older. There were 2 high school graduates (0.6%), 74 college students or graduates (23%), 136 university students or graduates (42.2%), and 110 graduate students (34.2%). 4 people were employees (1.2%), 63 people were students (19.6%), and 255 people were engaged in other occupations (79.2%). 235 people were unmarried (73%), and 87 people were married (27%). 213 people used dermatology (66.1%), 28 people used dentists (8.7%), 9 people used ophthalmology (2.8%), 29 people used internal medicine (9%), 9 people used ob-gyn services (2.8%), and 34 people used plastic surgery (10.6%) through medical service applications.

Table 4. Basic Statistics

		Frequency	%	Valid %	Accumulated %
Sex	Male	121	37.6	37.6	37.6
	Female	201	62.4	62.4	100.0
Age	10-19	6	1.9	1.9	1.9
	20-29	178	55.3	55.3	57.1
	30-39	114	35.4	35.4	92.5
	40-49	24	7.5	7.5	100.0
Academic Background	Highschool	2	0.6	0.6	0.6
	College	74	23.0	23.0	23.6
	University	136	42.2	42.2	65.8
	Graduate School	110	34.2	34.2	100.0
Job	Company man	4	1.2	1.2	1.2
	Student	63	19.6	19.6	20.8
	Others	255	79.2	79.2	100.0
Marriage	Unmarried	235	73.0	73.0	73.0
	Married	87	27.0	27.0	100.0
Department Usage	Dermatology	213	66.1	66.1	66.1
	Dentist	28	8.7	8.7	74.8
	Ophthalmology	9	2.8	2.8	77.6
	Internal Medicine	29	9.0	9.0	86.6
	Ob-Gyn	9	2.8	2.8	89.4
	Plastic Surgery	34	10.6	10.6	100.0

4.2. Feasibility Analysis

4.2.1. Factor Analysis and Reliability Analysis

Table 5 below is a factor analysis of service convenience, information system quality, and re-use intention. Commonality can be said to be the ratio explained by the factors extracted. It is recommended to exclude variables with commonality, typically below 0.4, from factorial analysis. The analysis results show that all are above 0.6. Each of the factors is as follows. The loaded factors are marked with A (post-benefit convenience), B (behavioral intention), C (information quality), D (decision-making convenience), E (system quality), F (access convenience), G (transaction convenience), H (service quality), and I (benefit convenience). The overall reliability of the factor analysis shows a very high value (0.981). Based on prior research, five factors related to service convenience were extracted. Nine questions were loaded for post-benefit convenience. The reliability of post-benefit convenience was 0.957. The behavioral intention factor is a single factor, loaded with five questions. It showed a reliability level of 0.937. Six questions on information quality showed a reliability of 0.949. The five questions concerning decision-making convenience showed a reliability level of 0.945. System quality has five questions, showing a reliability level of 0.932. Access convenience has a reliability of 0.920 with three questions. Transaction convenience represents a reliability of 0.900 with three questions. Service quality has three questions, showing a reliability of 0.922. Finally, the three questions on benefit convenience represent a reliability level of 0.913.

Table 5. Demographic Characteristics

Question	Rotated Component Matrix									Cronbach α
	Component									
	Factor 1 A	Factor 2 B	Factor 3 C	Factor 4 D	Factor 5 E	Factor 6 F	Factor 7 G	Factor 8 H	Factor 9 I	
sc26	0.703	0.078	0.229	0.404	0.143	0.226	0.110	0.108	0.090	0.957
sc28	0.702	0.170	0.304	0.307	0.159	0.207	0.187	0.128	0.072	
sc30	0.657	0.246	0.260	0.148	0.298	0.180	0.151	0.052	0.254	
sc27	0.655	0.287	0.233	0.129	0.195	0.117	0.150	0.179	0.258	
sc25	0.637	0.219	0.175	0.325	0.123	0.195	0.141	0.263	0.247	
sc31	0.633	0.207	0.285	0.248	0.287	0.222	0.036	0.087	0.235	
sc22	0.622	0.204	0.156	0.228	0.109	0.094	0.270	0.389	0.190	
sc29	0.612	0.199	0.262	0.337	0.144	0.252	0.181	0.142	0.119	
sc23	0.582	0.168	0.197	0.436	0.029	0.192	0.139	0.330	0.187	
i5	0.168	0.850	0.210	0.065	0.211	0.167	-0.025	0.043	0.078	
i6	0.142	0.843	0.251	0.116	0.184	0.056	0.072	-0.001	0.055	
i4	0.196	0.837	0.217	0.109	0.120	0.070	0.076	0.146	0.106	
i1	0.189	0.666	0.212	0.179	0.296	0.148	0.196	0.241	0.093	
i2	0.204	0.656	0.264	0.172	0.319	0.123	0.244	0.198	0.071	
IQ6	0.166	0.227	0.718	0.145	0.179	0.245	0.189	0.203	0.189	0.949
IQ7	0.337	0.336	0.707	0.165	0.231	0.110	0.173	0.070	0.160	
IQ8	0.252	0.289	0.704	0.188	0.238	0.055	0.168	0.103	0.161	
IQ10	0.275	0.237	0.703	0.102	0.235	0.220	0.007	0.169	0.136	
IQ13	0.193	0.326	0.696	0.216	0.094	0.106	0.255	0.178	0.209	
IQ14	0.315	0.283	0.669	0.257	0.252	0.148	0.098	0.169	-0.006	
sc8	0.258	0.077	0.192	0.755	0.132	0.261	0.132	0.186	0.179	0.981
sc7	0.236	0.092	0.160	0.749	0.174	0.266	0.144	0.207	0.202	
sc10	0.344	0.175	0.160	0.713	0.214	0.181	0.209	0.090	0.135	
sc11	0.300	0.193	0.153	0.688	0.263	0.247	0.067	0.106	0.191	
sc12	0.380	0.262	0.216	0.666	0.084	0.128	0.282	0.078	0.179	
IQ5	0.218	0.300	0.289	0.125	0.671	0.167	-0.034	0.234	0.133	0.932
IQ2	0.081	0.456	0.202	0.248	0.667	0.078	0.152	0.035	0.162	
IQ3	0.314	0.328	0.235	0.207	0.640	0.135	0.188	0.219	0.107	
IQ4	0.240	0.382	0.326	0.146	0.615	0.089	0.058	0.281	0.186	
IQ1	0.234	0.301	0.259	0.263	0.602	0.081	0.203	0.224	0.204	
sc5	0.286	0.074	0.125	0.265	0.142	0.771	0.125	0.117	0.139	
sc4	0.222	0.192	0.179	0.258	0.167	0.753	0.228	0.058	0.080	0.920
sc6	0.196	0.166	0.192	0.276	0.036	0.704	0.329	0.172	0.113	0.900
sc2	0.241	0.093	0.212	0.267	0.161	0.307	0.751	0.105	0.100	
sc1	0.257	0.181	0.215	0.216	0.143	0.313	0.734	0.075	0.157	
sc3	0.222	0.163	0.244	0.234	0.024	0.515	0.559	0.170	0.201	
IQ12	0.328	0.208	0.278	0.236	0.292	0.188	0.064	0.660	0.056	
IQ11	0.300	0.174	0.298	0.227	0.307	0.121	0.200	0.656	0.190	0.922
IQ9	0.300	0.190	0.255	0.258	0.334	0.220	0.079	0.602	0.186	0.913
sc17	0.351	0.203	0.237	0.285	0.215	0.152	0.180	0.104	0.691	
sc16	0.355	0.141	0.251	0.257	0.235	0.151	0.109	0.148	0.688	
sc18	0.282	0.080	0.202	0.388	0.165	0.180	0.151	0.146	0.649	

Notes: 1. extraction method: principal component analysis.
2. rotation method: varimax with kaiser normalization.

4.2.2. Correlation Analysis

Table 6 is a correlation analysis that verifies whether the relationship between independent variables is significant. In other words, it is intended to identify the relationship between quantitative variables. It is used in Pearson's method, which is most commonly used in this variable analysis. Pearson's coefficient of correlation has a value from 0 to 1. The closer it is to zero, the less it has correlation; the closer it is to one, the more it has correlation. A is transaction convenience, B is access convenience, C is decision-making convenience, D is benefit convenience, E is post-benefit convenience, F is behavioral intention, G is information quality, H is system quality, and I is service quality. The highest correlation is that of decision-making convenience and post-benefit convenience, with a strong correlation coefficient of .794. The lowest correlation is access convenience and behavioral intention. It has a correlation coefficient of .463.

Table 6. Correlation Analysis

	A	B	C	D	E	F	G	H	I
A	1								
B	.753**	1							
C	.671**	.685**	1						
D	.614**	.574**	.731**	1					
E	.677**	.669**	.794**	.770**	1				
F	.490**	.463**	.517**	.501**	.608**	1			
G	.622**	.571**	.631**	.658**	.743**	.697**	1		
H	.535**	.520**	.640**	.657**	.702**	.756**	.746**	1	
I	.600**	.580**	.678**	.682**	.771**	.584**	.724**	.777**	1

Note: Correlation is significant at the 0.01 level (both).

4.3. Hypothesis Verification

4.3.1. Regression Analysis

The description of Table 7 is as follows. It has been confirmed that the significance of the regression equation is .000, less than .05, which affects re-use intention by service convenience. In other words, service convenience has been shown to affect re-use intention as a whole. We have marked A (transaction convenience), B (access convenience), C (decision-making convenience), D (benefit convenience) and E (post-benefit convenience). The regression model figure was also found to have explanatory power of .383. This is independent because Durin-Watson's figure is 1.733, close to 2. However, when examining this in detail, the significant probability was 0.117, which was higher than 0.05 under the assumption that transaction convenience would affect re-use intention. The significant probability for access convenience was 0.701, higher than 0.05, decision-making convenience was 0.752, and benefit convenience was 0.569. However,, that post-benefit convenience was 0.000. It was found that only post-benefit convenience influenced re-use intention.

Table 7. Regression Analysis

	Nonstandardization		Standardization		t	P	VIF	R ²	P	Durbin-Watson
	Coefficient		Coefficient							
	B	Standard Error	β							
(Constant Value)	0.612	0.173			3.539	0.000				
A	0.116	0.074	0.115		1.572	0.117	2.733			
B	0.029	0.076	0.028		0.385	0.701	2.726	0.383	.000	1.733
C	0.026	0.081	0.026		0.316	0.752	3.374			
D	0.043	0.076	0.042		0.570	0.569	2.760			
E	0.520	0.096	0.459		5.395	0.000	3.711			

Note: Dependent Variable - Reuse Intention.

4.3.2. Mediating Role Verification

The description of Table 8 is as follows. The mediating variable is a variable between the independent and the objective variables in terms of order, although it affects the dependent variable in the same way as an independent variable. In other words, this refers to a variable that affects dependent variables while being affected by independent variables. The method for analyzing the mediating effects with SPSS is as follows. First, service convenience (independent variable) and information system quality (mediating variable) should be tested. It should show a significant relationship. Second, there should be a significant relationship in testing the significance between information system quality and re-use intention. Finally, the significance between service convenience (independent variable), information system quality (mediating variable), and re-use intention (dependent variable) should be tested. This should also have a significant relationship. In comparison with the final beta value, any change in the beta value is recognized for a mediating effect.

The test results of the hypotheses are as follows. Regression analysis was performed to verify the hypothesis that information system quality would play a mediating role in the impact of medical service convenience on re-use intention. The following is a result of validating the hypothesis that information quality will play a mediating role. The significant probability results of transaction convenience Models I and II show that both have significant relationships. The comparison result of the Beta used in both models was [Model I=.490 > Model II=.091]. There was a change in beta value. Thus, information quality has a mediating effect. The significance results of Model I and Model II in relation to access convenience indicate that neither is significant. The comparison result of the Beta used in both models was [Model I=.463 > Model II=.097]. Because the change in beta value is not significant, there is no mediating effect. The comparison result of the Beta used in Models I and II for decision-making convenience was [Model I=.517 > Model II=.129]. There is a change in the beta value. The comparison result of the Beta used in Models I and II for benefit convenience was [Model I=.501 > Model II=.075]. There was a change in beta value. Finally, the comparison result of the Beta used in Models I and II on post-benefit convenience was [Model I=.608 > Model II=.201]. There was a change in beta value. Therefore, we can say that information quality has a mediating effect.

Table 8. Information Quality Mediating Effect Verification

Model		Nonstandardization Coefficient		Standardization Coefficient	t	P
		B	Standard Error	β		
I	(Constant Value)	1.406	0.157		8.973	0.000
	A	0.495	0.049	0.490	10.045	0.000
II	(Constant Value)	0.612	0.143		4.276	0.000
	A	0.092	0.052	0.091	1.791	0.074
	IQ	0.665	0.053	0.640	12.559	0.000
I	(Constant Value)	1.420	0.166		8.540	0.000
	B	0.480	0.051	0.463	9.356	0.000
II	(Constant Value)	0.576	0.148		3.883	0.000
	B	0.100	0.050	0.097	1.990	0.047
	IQ	0.666	0.050	0.642	13.209	0.000
I	(Constant Value)	1.238	0.161		7.693	0.000
	C	0.514	0.048	0.517	10.817	0.000
II	(Constant Value)	0.553	0.145		3.801	0.000
	C	0.128	0.051	0.129	2.514	0.012
	IQ	0.639	0.053	0.616	12.024	0.000
I	(Constant Value)	1.308	0.161		8.111	0.000
	D	0.520	0.050	0.501	10.355	0.000
II	(Constant Value)	0.630	0.145		4.362	0.000
	D	0.077	0.055	0.075	1.404	0.161
	IQ	0.673	0.055	0.648	12.201	0.000
I	(Constant Value)	0.747	0.163		4.579	0.000
	E	0.689	0.050	0.608	13.712	0.000
II	(Constant Value)	0.469	0.148		3.167	0.002
	E	0.228	0.067	0.201	3.414	0.001
	IQ	0.568	0.061	0.548	9.290	0.000

Note: Dependent Variable: Re-Use Intention.

The verification of the mediating role of system quality is shown in Table 9. Seeing the significant probability results of transaction convenience in Model I and II, both have a significant relationship. The comparison result of the Beta used in Models I and II was [Model I=.490 > Model II=.119]. There was a change in beta value. This shows system quality has a

Table 9. System Quality Mediating Effect Verification

Model		Nonstandardization Coefficient		Standardization Coefficient	t	P
		B	Standard Error	β		
I	(Constant Value)	1.406	0.157		8.973	0.000
	A	0.495	0.049	0.490	10.045	0.000
II	(Constant Value)	0.431	0.131		3.287	0.001
	A	0.121	0.043	0.119	2.787	0.006
	System Q	0.703	0.044	0.692	16.147	0.000
I	(Constant Value)	1.420	0.166		8.540	0.000
	B	0.480	0.051	0.463	9.356	0.000
II	(Constant Value)	0.446	0.135		3.293	0.001
	B	0.100	0.044	0.097	2.273	0.024
	System Q	0.716	0.043	0.706	16.582	0.000
I	(Constant Value)	1.238	0.161		7.693	0.000
	C	0.514	0.048	0.517	10.817	0.000
II	(Constant Value)	0.533	0.132		4.050	0.000
	C	0.057	0.047	0.057	1.198	0.232
	System Q	0.730	0.048	0.719	15.117	0.000
I	(Constant Value)	1.308	0.161		8.111	0.000
	D	0.520	0.050	0.501	10.355	0.000
II	(Constant Value)	0.598	0.131		4.584	0.000
	D	0.008	0.050	0.008	0.156	0.876
	System Q	0.762	0.049	0.751	15.446	0.000
I	(Constant Value)	0.747	0.163		4.579	0.000
	E	0.689	0.050	0.608	13.712	0.000
II	(Constant Value)	0.388	0.136		2.858	0.005
	E	0.173	0.057	0.153	3.013	0.003
	System Q	0.658	0.052	0.649	12.775	0.000

Note: Dependent Variable: Re-use Intention.

mediating effect in this area. The comparison result of the Beta used in Models I and II for access convenience was [Model I=.463 > Model II=.097]. There was a change in beta value. System quality also has a mediating effect in the area. The comparison result of the Beta used

in Models I and II for decision-making convenience was [Model I=.517 > Model II=.057]. There was a change in beta value. However, the change is not significant and there is no mediating effect in this area. The comparison result of the Beta used in Models I and II on benefit convenience was [Model I=.501 > Model II=.008]. There was a change in beta value. However, the change is not significant and there is no mediating effect in this area. Finally, the comparison result of the Beta used in Models I and II for post-benefit convenience was [Model I=.608 > Model II=.153]. There was a change in beta value. Therefore, we can say that system quality has a mediating effect.

Lastly, the verification of the mediating role of service quality is shown in Table 10. Seeing the significant probability results of transaction convenience in Models I and II, both have a significant relationship. The comparison result of the Beta used in Models I and II was [Model I=.490 > Model II=.217]. There was a change in beta value. This shows service quality has a mediating effect in this area. The comparison result of the Beta used in Models I and II for access convenience was [Model I=.463 > Model II=.188]. There was a change in beta value. System quality also has a mediating role in the area. The comparison result of the Beta used in Models I and II for decision-making convenience was [Model I=.517 > Model II=.225]. There was a change in beta value. The comparison result of the Beta used in Models I and II for benefit convenience was [Model I=.501 > Model II=.191]. There was a change in beta value. The comparison result of the Beta used in Models I and II on post-benefit convenience was [Model I=.608 > Model II=.389]. There was a change in beta value. Therefore, we can say that service quality has a mediating effect.

Table 10. Service Quality Mediating Effect Verification

Model		Nonstandardization Coefficient		Standardization Coefficient	t	P
		B	Standard Error	β		
I	(Constant Value)	1.406	0.157		8.973	0.000
	A	0.495	0.049	0.490	10.045	0.000
II	(Constant Value)	0.804	0.160		5.013	0.000
	A	0.220	0.056	0.217	3.913	0.000
	SVQ	0.464	0.057	0.454	8.187	0.000
I	(Constant Value)	1.420	0.166		8.540	0.000
	B	0.480	0.051	0.463	9.356	0.000
II	(Constant Value)	0.800	0.166		4.825	0.000
	B	0.194	0.057	0.188	3.427	0.001
	SVQ	0.486	0.056	0.476	8.684	0.000
I	(Constant Value)	1.238	0.161		7.693	0.000
	C	0.514	0.048	0.517	10.817	0.000
II	(Constant Value)	0.816	0.161		5.072	0.000
	C	0.223	0.060	0.225	3.713	0.000
	SVQ	0.442	0.062	0.432	7.148	0.000

Table 10. (Continued)

Model		Nonstandardization Coefficient		Standardization Coefficient	t	P
		B	Standard Error	β		
I	(Constant Value)	1.308	0.161		8.111	0.000
	D	0.520	0.050	0.501	10.355	0.000
II	(Constant Value)	0.862	0.161		5.357	0.000
	D	0.199	0.064	0.191	3.129	0.002
	SVQ	0.464	0.063	0.454	7.418	0.000
I	(Constant Value)	0.747	0.163		4.579	0.000
	E	0.689	0.050	0.608	13.712	0.000
II	(Constant Value)	0.626	0.162		3.871	0.000
	E	0.440	0.077	0.389	5.728	0.000
	SVQ	0.291	0.069	0.285	4.190	0.000

Note: Dependent Variable: Re-Use Intention.

5. Conclusion

Recently, the importance of Chinese consumers in the worldwide market of the medical service trade has emerged, and efforts to maximize the service trade market through the convenience of medical mobile applications and quality of information aimed at these consumers have boosted market. This study classifies and validates the actual usage behavior of consumers on the convenience of medical service mobile apps and the importance of quality of app information. The data is intended to be provided as a tool to derive marketing measures to help with actual reuse. It analyzed the patterns that Chinese people use mobile medical services in Korea and suggests ways to expand trade between the two countries.

In summary, the results of this study are as follows.

First, on gender differences, women outnumber men. In particular, there are far more women in the age range of 20-50. This is proportional to the age of the users of the app. The most frequently used medical area was dermatology. Perhaps due to the influence of medical service coupons and the Korean wave, Chinese people are seen as having significant interest in dermatology.

Second, looking at the impact of mobile app service convenience on re-use intention, transaction convenience did not affect re-use intention and neither did access, decision making, nor benefit convenience. However, post-benefit convenience influenced re-use intention.

Third, the results of whether the quality of information services of mobile apps plays a mediating role are as follows.

As mentioned earlier, service convenience has largely not affected re-use intention. However, if the information system, which is a medium factor, is put in the middle, the story will change. Information quality, system quality, service quality responded to re-use intention.

In more detail, quality of service has responded entirely without rejection. If service

convenience affects the intention of re-use, and convenience is meaningful only when the service quality of an app is good. This supports Kim Seong-Jin research (2018) on service convenience. Quality is basic for convenience. However, it has been judged that there is no mediating effect for transaction and benefit convenience because the results of the study are below than significance level. That is, transactions and profits are perceived as different issues from information in a medical service application.

It has also been judged that there is no mediating effect for decision making and profits in the quality of a medical service app because the results of the study about them are below than significance level, indicating that the quality of the application's system does not significantly affect the quality of decision making. As a result, medical services are highly related products, meaning that if someone decides to go abroad for medical tourism, he does not take into account the problems of the app's system. It is also believed that he does not pay much attention to the benefits he seeks from the app. Focusing more on information and system quality rather than the quality of service will increase the role of apps in the service trade. In the future, many people will see the medical service market in Korea through via apps. For easy communication of the service trade, apps in Chinese or English should be activated for marketing.

Based on the results of this study, some practical implications are provided. First of all, to maximize the efficiency of an application, services that automatically update a patient's desired hospital list and treatment information, and analyzes the data, should be implemented. Second, it organizers should ensure the speed of information by allowing real-time visibility in the application. Third, a system in which an application can assist in decision making should be serviced. Finally, as the quality of information in an application is important, it should be sensitive to security, risk, and privacy. This is even more important when applications realize strategic business objectives. If these security issues occur, they affect the medical institution. Medical service-related applications require ethical guidelines.

A future research is that foreign language information should be provided in a specific and effective marketing strategy for the international service trade market. That is, in the past, highly educated people used to be an important factor in international trade services. This means that human resources have had an impact on performance. Now, diverse and fast information is an important key to success. Thus, the academic implications of this study can help prepare basic data that require active research into the quality and convenience of information. In addition to efforts to expand the medical service trade in hospitals, the efforts of public enterprises and private companies to operate and act are ultimately needed. If such research is actively carried out, it will maximize the activation of the medical service trade.

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