Relationship of Influence among Big Data-based Aviation Service Quality, Satisfaction, and Reuse Intention

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Abstract

The level of the domestic aviation industry is insufficient compared to the overseas aviation industry, and it is time to prepare preemptive and active countermeasures for domestic airlines to create future growth engines and improve productivity through the use of big data, as well as through mid-to long-term strategies to cope with changes in industrial paradigm. A lot of studies dealing with this subject are proceeding at the level of nation and academia. However, the utilization of big data is still low, and the discussion applied to the aviation service field is insufficient. This study aims to conduct more dense research on the effects of big data-based services on the development of the domestic aviation industry, corporate image enhancement, and repurchase intention. To meet the purpose of this study, the theoretical basis of big data technology, aviation service, service quality, satisfaction, and repurchase intention is pursued through domestic and foreign literature and previous studies. And based on a theoretical basis, the research model and research hypothesis are set up and verified through empirical research. The empirical study surveyed those who received big data-based aviation services provided by domestic airports and airlines. The collected questionnaire data were used as basic data for empirical analysis, and demographic analysis, validity and reliability analysis, correlation analysis, and structural equation path analysis were conducted using the statistical program SPSS and AMOS. The academic implications of this study are that it presented an integrated model that explains the positive impact relationship in big data-based aviation services through the medium of service quality and satisfaction, and that practical research on users of big data-based aviation services was conducted. And as shown in the results of the mediating effect analysis, it is suggested that satisfaction should be considered more than any other service factors such as economic efficiency among the service provisions of airports or airlines. Therefore, if comparative studies including the users who received the services of overseas airports or overseas airlines are conducted in future studies, it will be helpful to suggest a more realistic and practical direction concerning satisfaction.

Keywords: Big data, Aviation services, Service quality, Satisfaction, Repurchase intention

1. Introduction

The aviation industry is not only a labor-intensive period industry that creates high added value, but also a technology-intensive industry that includes high-tech technology. It is necessary to actively introduce fourth industrial revolution technologies such as big data and

artificial intelligence. Through the introduction of big data technology, which is the core of the fourth industrial revolution technology, the aviation industry will be able to analyze and organize customers' tastes and provide customized services. This enhances customer satisfaction, thereby enhancing competitiveness and efficient aviation work. In addition, information produced in each sector such as aircraft maintenance, safety, and navigation can be analyzed with big data technology to do predictive maintenance, make efficient use of fuel, and optimize air routes.

However, the level of response in the domestic aviation industry is insufficient compared to the overseas aviation industry, and it is time to prepare mid-to long-term strategies in industrial paradigm as well as preemptive and active countermeasures for domestic airlines through productivity improvement and creation of future growth engine through the use of big data [1]. In addition, in the modern society where a huge amount of information is studded every day due to the activation of social networks, even the tourism industry is also interested in big data analysis to process large-scale data and extracts information. A lot of studies dealing with this subject are proceeding at the level of nation and academia. However, the utilization of big data is still low, and the discussion applied to the aviation service field is insufficient.

Therefore, this study aims to conduct more dense research on the effects of big data services on the development of the domestic aviation industry, corporate image enhancement, and repurchase intention. In addition, the following research purposes are presented to suggest ways to improve the efficiency and diversity of big data-based aviation services.

First, the study classified the quality of aviation service based on big data as the main factor of corporate image enhancement and tried to confirm whether each factor has a significant effect on service satisfaction. In addition, the importance of satisfaction with aviation services based on big data is recognized and it is intended to contribute to positive recognition and improvement of repurchase intention in the future.

Second, by examining the difference between satisfaction with aviation service quality based on big data and the effect on repurchase intention, the study intends to suggest the major matters necessary to suggest some directions of improvement and development regarding aviation service quality and ways to secure corporate competitiveness and positive perception of corporate image by improving the aviation service quality.

2. Theoretical background

2.1. Big data

Big data is a combination of 'Big' and 'Data' in English, meaning large and massive data as the word means, but it does not simply mean 'quantitatively massive.' It means structured and unstructured data that are more diverse than existing data and are difficult to collect, store, analyze with existing methods or tools.

The phenomenon of big data is rapidly spreading due to explosive increase of multimedia contents, activation of SNS due to spread of smartphones, expansion of communication network, and increase of customer data collection activity of companies. Although data processing has been discussed before, a currently rising concern is that a large amount of data that can be used for processing and analysis has been accumulated as electronization and automation of various industries using IT have been greatly advanced [2].

In 2011, McKinsey & Company, a global consulting firm, defined Big Data as "data that exceed the scope of storage, management, and analysis through traditional database

software." He also stated that this definition is subjective and will continue to change in the future [3].

Gartner, Inc., an IT advisory firm, called big data the crude oil of the 21st century, and International Data Corporation (IDC), an IT market research company, defined in 2013 as "the next-generation technology and architecture designed to extract value from various kinds of large-scale data at low cost and support super-high-speed collection, discovery and analysis of data."

Thus, as big data becomes important, the most important thing to define big data is the scope of big data. If the definition of the scope of big data is different, the approach itself is different, so it is necessary to clarify it when defining big data [4]. In addition, big data is not a strictly defined academic term, so it is sometimes called big data even if it does not fit the previous definitions. So, it is predicted that the definition of big data will be subjective and continue to change [5].

In this study, we define big data not as a new thing that we have not known but as everything that we have made into data including all the things we have not perceived as data until now.

2.2. Aviation industry and air service

The aviation industry traditionally meant aircraft manufacturing and air transportation using aircraft. However, recently, as the field of creating added value by using aircraft has become very diverse, it is understood as a comprehensive concept with a series of industrial activities related to aircraft from the production of aircraft to the operation. The current aviation industry supports various tasks such as ground service, core, auxiliary service of air transportation, physical and human service by utilizing digital technology, and occupies a large portion of the development of this technology, thereby reducing costs, improving productivity, and generating additional profits. In addition, the aviation industry provides physical services such as the geographical movement of passengers or cargo, so it can be thought that the impact of the fourth industrial revolution through convergence with information and communication technology will be insignificant.

However, the added value provided by the aviation industry has customer service offered throughout flight in addition to this physical movement, and this field is a part of the vitality of information processing, so it is possible to improve through convergence with information and communication technology [6]. In other words, it is possible to provide newly-added value to customers through the improvement of customer service focusing on virtuality in addition to the traditional core value of the aviation industry such as the physical movement of passengers or cargo [7].

Air transportation means transportation itself, and it has characteristics of the service industry. An air transportation business is a business that transports passengers, cargo, and mail for a fee using an aircraft. It is a kind of business activity that provides intangible transportation services to consumers and collects the fare in return for profit. Jee Yong-sun [8] defined the main attribute of air transportation products as a service to transport passengers to their destinations while flying predetermined air routes using tangible materials called aircraft. Lee Sun-hee [9] said that air transportation is aimed at transporting people or goods by providing a certain space, but only when human services are combined in the provided space; it becomes a worthwhile product.

Therefore, this study aims to define aviation service as a body of all human and physical factors that are conducted for customers in all the business performance stages that airlines

have conducted for air transportation of people or objects based on the definitions of previous studies.

2.3. Service quality

Generally, service quality is associated with intuitive things such as kindness, bright laughter, and comfort. However, service quality should be evaluated in a general and comprehensive way based on customer satisfaction as well as management performance [10].

Dodds & Monroe [11] divided service quality into two approaches, objective quality, and subjective quality, objective quality is a concept to explain the actual and technical superiority or excellence between products, and subjective quality is a concept that includes people's subjective response to objects. Zeithaml & Bitner [12] defined service quality as attitude or judgment on service superiority, and Liu et al. [13] said that service quality can be defined as a subjective impression of customers on the best service received from sellers.

Therefore, this study defines the quality of aviation service as the overall evaluation of service users for all the services provided at airports or airlines based on the definition of previous studies.

In the previous studies on e-service quality factors, Lee Sae-hoon [14] composed of seven factors of e-service quality of low-cost carriers: tangibility, reliability, responsiveness, assurance, empathy, convenience, and security. In the study on the influence of e-service quality of travel industry by Kwon Il-joon [15] on tourist satisfaction, word of mouth, and travel agency reuse, he stated that efficiency, system availability, reliability, and security were the components of e-service quality. In addition, Lee Song-hee [16] presented five factors of e-service quality of tourism applications including reliability, informativity, responsiveness, security, and ease of use.

Therefore, this study aims to draw four factors of economic efficiency, ease of use, safety, and responsiveness based on the factors presented in the previous studies of e-service quality that are judged to meet the purpose of the study.

2.4. Satisfaction and repurchase intention

The dictionary meaning of satisfaction is "a state of being happy with no lack of emotional fullness," which indicates the degree to which individuals' needs and working environment coincide well. It can be said to be an internal indicator of the harmony between the individual and the working environment. In addition, satisfaction is a concept that includes dual satisfaction in social and economic aspects. Social satisfaction derives from psychological satisfaction that is due to interaction with the other party or the favorable behavior of the other party and economic satisfaction derives from satisfaction from economic results through transactions [17].

Anderson & Narus [18] said that satisfaction is defined as a positive state of emotion from the output of all the other party's elements in the relationship with the other party. Chon [19] said that satisfaction is the result of comparing the cost paid by the consumer to a product or service. Tse & Wilton [20] is a consumer's response to the difference between the consumer's prior expectation and the actual performance of the perceived product after consumption.

When applying this to aviation service, customers who want to use airports and aircraft obtain information such as images and awareness of airports and airlines from their family, relatives, acquaintances, etc., review whether they are airports and airlines that meet their expectations, and decide whether they are airlines that meet their expectations. After suing airlines that suit their tastes, customers feel satisfied if the services meet their expectations

with perceived emotion and experience combined. If the services did not meet their expectation, the evaluation of dissatisfaction appears.

Repurchase Intention is a purchase intention to reuse the products currently used by consumers or the services of a specific company in the future while using the services and products of the company. Therefore, repurchase intention can be defined as the possibility that customers will use products or service providers repeatedly in the future [21]. In the study of Park Jeong-ha [22], repurchase intention is the willingness or idea of the customer to repeatedly use any service or product. Oliver [23] defined it as the possibility that customers reuse purchased products, in which customer satisfaction can affect the attitude after purchasing the product and this attitude affects the intention of reuse. In addition, Bitner [24] said that repurchase intention is directly affected when they experience satisfaction or dissatisfaction with service quality.

The definition of repurchase intention has been defined by various scholars in various ways, but this study defines repurchase intention as the intention to use airport or airline service again for users who have experience using big data-based service provided by airports and airlines or to recommend specific airlines to their acquaintances.

3. Research design

3.1. Research model and hypothesis

This study started with the assumption that the service quality of big data-based aviation services has a very sensitive effect on users. Therefore, to prepare a plan for the activation of big data-based aviation service and the promotion of satisfaction, the relationship between satisfaction and repurchase intention according to big data-based aviation service quality is empirically analyzed.

To empirically verify the flow of the study, a research model was suggested like Figure 1 based on the previous studies presented in the theoretical background to study the effects of big data-based aviation service quality on satisfaction and repurchase intention.
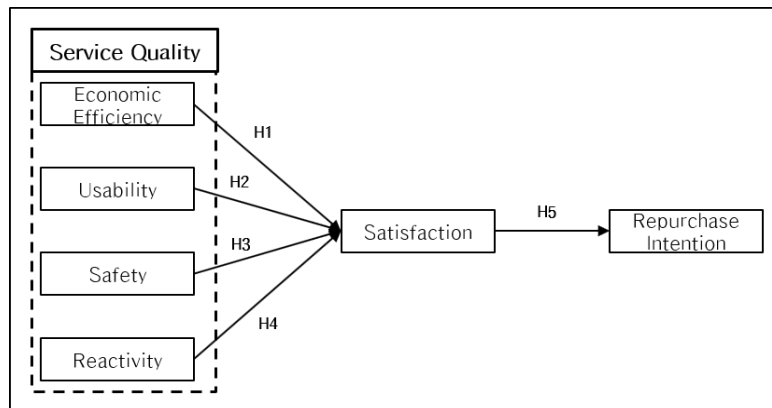

Figure 1. Research model

Recently, some researchers have argued that the preceding variable of customer satisfaction is service quality, and emphasized the effect of service quality on customer

satisfaction based on the research that customer satisfaction is increased when the first perceived service quality is higher.

Previous studies on service quality and satisfaction have shown that service quality increases customer satisfaction, and high service quality has a great influence on satisfaction on service quality and satisfaction in empirical research. Therefore, this study set the following hypothesis 1, hypothesis 2, hypothesis 3, and hypothesis 4 that the relationship between aviation service quality and satisfaction has a positive effect by dividing it into economic efficiency, ease of use, safety, and responsiveness.

Hypothesis 1: The economic efficiency of big data-based aviation service quality will have a significant positive effect on satisfaction.

Hypothesis 2: The ease of use of big data-based aviation service quality will have a significant positive effect on satisfaction.

Hypothesis 3. The safety of big data-based aviation service quality will have a significant positive effect on satisfaction.

Hypothesis 4. The responsiveness of big data-based aviation service quality will have a significant positive effect on satisfaction.

Kang Hye-sook and Cho Soo-hyun considered repurchase intention as a perceptual response of customers, such as intention to re-use the same airline, and giving information to others to use the same airline, in the study of the effect of the attributes of international airline service quality on loyalty, customer attitude, and repurchase intention. As a result of empirical analysis on the relationship between criteria of airline selection, customer satisfaction, and re-use intention of routes to the United States, it was found that in-flight service among criteria of airline selection of the routes to the United States had a significant positive effect on re-use intention. And airport service, flight service, and price service did not affect repurchase intention.

Based on the results of previous studies related to satisfaction and repurchase intention, this study set the following hypothesis 5.

Hypothesis 5. Satisfaction of aviation service quality based on big data will have a significant positive effect on repurchase intention.

4. Empirical analysis

4.1. Validity and Reliability Analysis and Correlation Analysis

The KMO measure is to check whether the data to be measured are suitable for factor analysis. In general, if the KMO measure value is 0.5 or higher, it can be said that the analyzed data is suitable for factor analysis. As a result of exploratory factor analysis, KMO measurement was .857, which is close to 1, so this tool can be seen as suitable data for factor analysis. Bartlett's unit matrix verification statistics also appeared to be 1789.719, which proved that it was not statistically unit matrix at the significance level of .001 and it was suitable for factor analysis. The result of calculating Cronbach's α coefficient to verify the reliability of the measurement tool of location characteristics composed through factor analysis is Convenience was .879, professionalism .917, satisfaction .891, and corporate image .964, all of which were more than .5. Therefore, the internal consistency of the questions was secured.

As a result of confirmatory factor analysis is CR value is .7 or more and AVE value is .5 or more, so convergent validity is secured. In addition, model's goodness of fit of the measurement model was X2=393.124, DF=263, p<.001), CMIN/DF (3)=1.689, GFI (standard value 9)=0.908, AGFI (standard value 9)=0.87, NFI (standard value 9)=0.961, CFI (standard value 9 9 9 9)=0.961)=0.988, IFI(standard value 9)=0.988, RMSEA(standard value .05)=0.039, and all of them were found to meet the standard value except AGFI(standard value 9)=.864.

In this study, the correlation analysis between the variables used in this study was conducted to analyze the preceding correlation between the variables. As a result of correlation analysis, the distribution of significant correlation coefficients at the significance level .01 was .365~.604, so the variables used in this study were found to have no problem with the multiple collinearities raised in multiple regression analysis. Therefore, the model used in this study is considered to be suitable for the later hypothesis test because reliability and validity are secured.

In addition, discriminant validity can be secured when the square root of the AVE value of each variable is higher than the square value between the corresponding latent variable and other latent variables. In this study, the correlation coefficient value was lower than the square root value of AVE value, and the discriminant validity was secured.

4.3. Hypothesis verification

This study model is to understand the causal relationship between satisfactions and repurchase intention of the quality of big data-based aviation service. The results of verifying the structural relationship between service quality, satisfaction, and repurchase intention for users using big data-based aviation services provided by domestic airports and domestic airlines are as follows in [Table 1] and [Figure 2].

The results of the verification of the research hypothesis are as follows.

First, the results of hypothesis 1 to examine the effects of economic efficiency of big data-based aviation service quality on satisfaction shows that the standardization coefficient .286, t-value 6.343(p=.000), which was statistically significant at the significance level .01, and <Hypothesis 1> was adopted. Second, as a result of verifying hypothesis 2 to find out how the ease of use of big data-based aviation service quality affects satisfaction, the standardization coefficient .181, t value 3.892(p=.000), which was statistically significant at the significance level .01, and <Hypothesis 2> was adopted. Third, as a result of the verification of hypothesis 3 to see how the safety of the aviation service quality based on big data affects the satisfaction, the standardization coefficient .642, t value 15.324 (p=.000), which was statistically significant at the significance level .01, and <Hypothesis 3> was adopted. Fourth, the result of hypothesis 4 to find out how the responsiveness of the big data-based aviation service quality affects the satisfaction showed that the standardization coefficient .1.038 and the t-value 15.324 (p=.000) were statistically significant at the significance level .01, and <Hypothesis 4> was adopted. Fifth, as a result of verifying hypothesis 5 to find out how satisfaction of big data-based aviation service quality affects repurchase intention, the standardization coefficient .924, t value 28.896(p=.000), which was statistically significant at the significance level .01, and <Hypothesis 5> was adopted.

Table 1. Verification of research hypothesis

| Hypothesis	Path	Parameter Estimate	Standardization Coefficient	S.E	t	p	Adoption or Not
Hypothesis 1	Economic efficiency -> Satisfaction	.284	.286	.045	6.343	.000***	adopted
Hypothesis 2	Usability -> Satisfaction	.176	.181	.028	3.892	.000***	adopted
Hypothesis 3	Safety -> Satisfaction	.637	.642	.040	15.324	.000***	adopted
Hypothesis 4	Responsiveness -> Satisfaction	1.024	1.038	.039	24.675	.000***	adopted
Hypothesis 5	Satisfaction -> Repurchse Intention	.914	.921	.032	28.896	.000***	adopted
Fit Measures	CMIN(X2)=379.528(d.f=26, p=.00), RMR=.054, GFI=.934 AGFI=.913, PGFI=.704, NFI=.970, RFI=.963, IFI=.980, TLI=.985, CFI=.980, RMSEA=.039						

*** *p<.001*
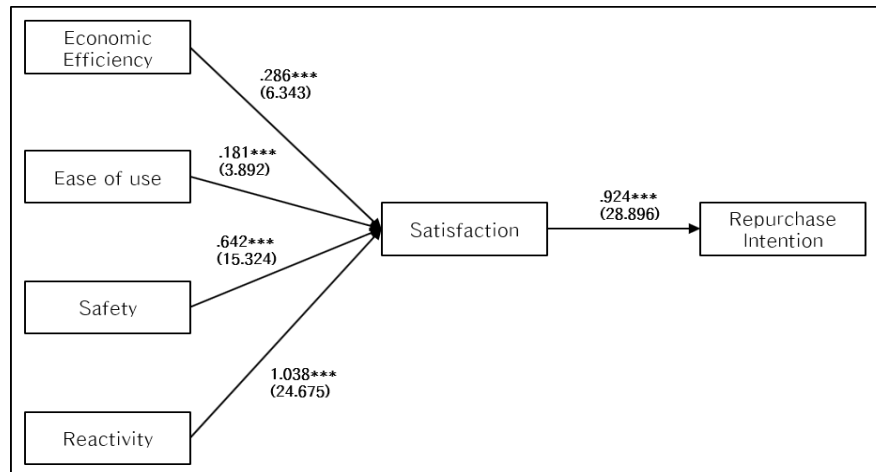
Figure 2. Path coefficients of research model

5. Conclusions

This study aims to empirically analyze the effects of quality of big data-based aviation service on satisfaction and reuse of users who have received big data-based aviation service from domestic airports and airlines.

The results of hypothesis 1 showed that the economic efficiency of service quality had a positive effect on satisfaction, and the verification of hypothesis 2 showed that the ease of use of service quality had a positive effect on satisfaction. The result of the verification of hypothesis 3 showed that the safety of service quality had a positive effect on satisfaction, and the result of the verification of hypothesis 4 showed that the responsiveness of service quality had a positive effect on satisfaction. Also, the result of the verification of hypothesis 5 showed that satisfaction had a positive effect on the repurchase intention. Therefore, hypothesis 1, hypothesis 2, hypothesis 3, hypothesis 4, and hypothesis 5 were all adopted.

Based on the results of this study, the academic implications for raising satisfaction and increasing re-use intention through big data-based aviation service quality are as follows.

First, it is academically significant that the integrated model, which explains the positive impact relationship through the medium of service quality and satisfaction in big data-based aviation services, is presented. Second, this study has academic significance in that practical research was conducted on users using big data-based aviation services.

In addition to the above academic implications, this study has the following practical implications. The quality of big data-based aviation service ─economic efficiency, ease of use, safety, and responsiveness─ had a positive effect on satisfaction. Service satisfaction perceived by big data-based airline service users has a great influence on repurchase intention. Therefore, to increase users' satisfaction with airline service through big data-based aviation services, airports and airlines need to develop services that can cope with the economic efficiency, ease of use, safety of personal information security, and service needs of users when providing big data-based aviation services. The limitation of this study is that it constitutes an indicator for users who have experienced big data-based services provided by domestic airports and airlines. As a result, it seems to be somewhat difficult that the results in this study can be analyzed comparatively with big data-based services of overseas airports and overseas airlines.

Despite these implications, this study proposes a follow-up study based on the limitations of the process of performing this study. In this study, the indicators were constructed for the users who experienced big data-based services provided by domestic airports and airlines. As a result, it is somewhat limited to compare big data-based services of overseas airports and overseas airlines. Therefore, if comparative studies including the users who received the services of overseas airports or overseas airlines are conducted in future studies, it will be helpful to suggest the direction of more actual and greater satisfaction.

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