



Print ISSN: 1738-3110 / Online ISSN 2093-7717
 JDS website: <http://accesson.kr/jds>
<http://doi.org/10.15722/jds.22.09.202409.107>

The Effect of Chatbot Service Acceptance Intention on Service Continuous Use Intention*

Hyeyoon PARK¹

Received: September 01, 2024. Revised: September 05, 2024. Accepted: September 15, 2024.

Abstract

Purpose: This research aims to contribute to the search for strategies on innovation in chatbot services in airline distribution industry. Personal and systemic characteristics of chatbot were derived together. The extended technology acceptance model theory was applied. The effects of perceived ease of use, usefulness, and intention to use chatbot from the user's perspective were empirically analyzed. **Research design, data and methodology:** Through an online survey, 309 people who have experience using chatbot services in airline distribution industry responded. AMOS 18.0 was used to analyze the data. **Results:** The hypothesis that personal characteristics will positively influence perceived ease and perceived usefulness was tested. Self-efficacy and user's innovativeness were shown have a significant effect on both perceived ease and perceived usefulness. System characteristics present a positive effect on perceived ease and perceived usefulness was tested. Consistency and familiarity were found to affect perceived ease and perceived usefulness. Perceived ease of use and perceived usefulness show a positive effect on intention to continue using chatbot service. **Conclusions:** When building an airline chatbot service in airline distribution industry, it is necessary to consider systematic characteristics, ease of use, and usability. It provided practical implications in that it have a significant impact on users' intention to use.

Keywords: Chatbot, Service Acceptance Intention, Service Continuity Use Intention, ETAM, Airline Distribution Industry

JEL Classification Code : L15, L84, M12, M31

1. Introduction[‡]

A major growth factor for chatbot is the changing consumption patterns. Consumers today demand round-the-clock service for assistance in various areas. Airlines are looking to develop chatbot that can respond to customers at any time. Since it is easier to obtain vast and rapid data than other industries, it is advantageous to advance the technology and commercialize the service, so chatbot services are constantly being developed (Chi et al., 2020).

A key aspect of using an A.I. chatbot service is its

expertise and ability to effectively solve the user's problem.

It has been shown that chatbot services designed for individual convenience, where personal characteristics influence the intention to use and satisfaction with chatbot, have a direct impact on user satisfaction (Crisafulli & Singh, 2017).

Previous studies that consider systemic characteristics have demonstrated that usability and ease of use, such as how convenient and service accessibility, are important for users to utilize airline chatbot services (Liu et al., 2018). When designing a new chatbot service, it is important to consider

* This paper was studied by the "2024 Hanseo University In-Campus Research Support Project".
[‡] First Author. Professor, Hanseo University. Republic of Korea, Email: hypark@hanseo.ac.kr

© Copyright: The Author(s)
 This is an Open Access article distributed under the terms of the Creative Commons Attribution Non-Commercial License (<http://creativecommons.org/licenses/by-nc/4.0/>) which permits unrestricted noncommercial use, distribution, and reproduction in any medium, provided the original work is properly cited

service interest, quality, and perceived usefulness to influence user satisfaction. Based on the previous research, it can be hypothesized that personal and system characteristics of chatbot will affect users' intention to use chatbot services.

Therefore, this research aims to differentiate itself from previous studies by utilizing both personal and system characteristics as factors that influence the intention to use chatbot services. Personal characteristics (user's innovativeness, user's self-efficacy) and system characteristics (system consistency, system familiarity) of chatbot are derived together from the perspective of airline customers.

In addition, by applying the theory of Extended Technology Acceptance Model (ETAM), we will examine the effects of service quality characteristics on perceived ease of use, perceived usefulness, and intention to use chatbot service from the customer's perspective.

The technology acceptance model has been widely used to study the acceptance of new technologies. However, it has the limitation that it does not provide adequate variables for external factors. Therefore, it is appropriate to apply the extended technology acceptance model in this study considering that personal characteristics and system characteristics are the factors presented in the extended technology acceptance model.

This study aims to verify the characteristics that significantly affect the intention to use chatbot services through the research model and hypothesis testing. Ultimately, this study aims to contribute to the exploration of strategies for value innovation in the aviation industry market and the establishment of successful chatbot service models.

2. Literature

2.1. Chatbot Service

'Chatbot' is a synthesis of chat and robot, and refers to AI-based communication software that provides appropriate answers to questions and related information through text or voice chat with people. It communicates with the server that provides the API in a request and response structure (Pavone et al., 2023).

In the past, chatbots simply used pattern-matching methods to output responses to predefined keywords, but nowadays, AI technologies such as machine learning and deep learning, which are related to big data and self-learning, can be utilized to create a higher level of communication as data from questions and answers are stored (Chi et al., 2022).

To develop a chatbot, you need a variety of technologies, including natural language processing (NLP) technology to

understand human language, text mining technology to find the information you need, and cognitive technology to understand human emotions, photos, and language (Choi et al., 2021).

A variety of technologies are required, including cognitive technologies that can understand human emotions, photos, and language. Currently, global IT companies such as Microsoft (MS), Google, IBM, etc. and IBM are currently providing technical services related to this, and domestic companies are also investing heavily in developing are investing heavily in the development of chatbot technology (Croli et al., 2022).

Companies that provide chatbot services are supporting the free interface and technology of chatbots as a strategy to attract various business accounts to their platforms, so the barrier to entry is lower than other ICTs. In addition, users who utilize existing mobile messenger platforms can be used as service targets, so it is expected that various services will be provided through chatbots in the future (Ho et al., 2018).

The global market for chatbots is expected to grow from \$2.6 billion in 2019 to \$9.4 billion by 2025, at a CAGR (compound annual growth rate) of 29.7%.

Chatbots have gained a lot of traction in the e-commerce sector. The vast amount of product information available in e-commerce can be frustrating for consumers, even with the search bar and filter options provided by companies (Babel et al., 2021). Chatbots can be used to provide information and resolve various inquiries around the clock to drive sales and reduce unnecessary labor costs. In the future, chatbots are expected to become the centerpiece of customer support services. Responding to consumer requests quickly has become a key factor in a company's success, and if implemented effectively, chatbots can provide a rich user experience (Belanche et al., 2020).

In the case of air transportation, many service companies are also striving to develop chatbot services, and in the air transportation industry, they are providing chatbot counseling services to enable daily conversations with customers, rather than just providing information such as flight information (Belanche et al., 2021).

Chatbot services powered by artificial intelligence are becoming an excellent solution for real-time, changing and sensitive information, such as booked passenger occupancy, seat upgrade rates, employee ticket usage of standby seats, etc. sensitive information that shows in real-time, such as passenger occupancy, upgrade rates, and whether or not employees are using tickets for standby seats (Hong & Williams, 2019).

KLM (Royal Dutch Airlines) has been operating a chatbot called Bluebot for many years (Kaczorowska, 2019).

Finnish airline Finnair also offers a service via Facebook Messenger called Finn, a chatbot. Finn is a system that utilizes the New Distribution Capability (NDG) developed

by the International Air Transport Association (IATA). Customers can interact with Finn to receive information about ticket purchases, booking management, delays, baggage rules, and more. Icelandair, Aeromexico, Lufthansa, and Jetstar also offer chatbot services based on Facebook Messenger. In the domestic airline industry, Korean Air, Asiana Airlines and Jin Air currently offer chatbot services (Lou et al., 2022).

2.2. Extended Technology Acceptance Model (ETAM)

The Technology Acceptance Model (TAM) was developed as a theoretical framework to demonstrate the factors that influence user acceptance of new information technology systems introduced to improve organizational performance. Theory of Reasoned Action (TRA), which is based on social psychology, and identifies the relationship between employees' beliefs, attitudes, intentions to use, and actual use of technology and selects external factors that affect the process (Martin et al., 2022).

Attitude is a key determinant of a user's willingness to accept a new information technology system. The determinants of attitude, which are not specified in the Theory of Reasoned Action, are Perceived Usefulness and Perceived Ease of Use (Muñoz et al., 2022).

Perceived Ease of Use and Perceived Usefulness influence users' attitudes and behavioral intentions (Venkatesh et al., 2023).

Perceived ease also affects perceived usefulness, because the easier a user finds a technology to use, the more useful they find the system. The attitudes formed on this basis represent beliefs and feelings about the user's behavior, which directly affect their intention to use (Yu, 2022).

The technology acceptance model has been endorsed as the most convincing model of information technology system acceptance and has been used in various fields of research, but it has the limitation of being simple in its constructs, emphasizing only the user's personal perceptions and judgments (Bansh & Darko, 2022). It has been criticized for requiring other variables and limiting the exploration of other variables. In addition, the technology acceptance model was initially applied to computer-related studies due to the advancement of technology. Now, with the development of the web and mobile, it has been criticized that the existing technology acceptance model has limitations in studying continuous usage intention.

In a follow-up study, Yu (2022) proposed the Extended Technology Acceptance Model (ETAM), which adds external variables to change for the limitations of the existing model. The ETAM includes personal, technical, and social characteristics as well as demographic characteristics. These affect perceived ease and usefulness and influence behavioral intention (Basuki et al., 2022).

The extended technology adoption model is criticized for its lack of conclusiveness, including limitations on the causal relationship between pre- and post-adoption and comparisons across national cultures. However, it is useful in explaining the causal relationship between adoption factors of information technology system acceptance. It has the advantage of making the process of technology adoption easier to understand (Kew & Tasir, 2022).

This research aims to analyze and observe the causal relationship of various factors on consumers' continuous chatbot use intention service based on online purchasing, a new information technology. Therefore, this study determined that it is appropriate to apply the expanded technology acceptance model as the theoretical basis that can most effectively explain the causal relationship of technology acceptance and utilized it to conduct the study.

This study uses individual characteristics and system characteristics as independent variables in the extended technology acceptance model for empirical analysis. The previous studies on each characteristic are as follows.

2.2.1. Personal Attribute Variables

Perceived playfulness was used as the main variable to identify factors that influence chatbot ordering services in the context of e-commerce. In addition, perceived anthropomorphism was used as a moderating effect on chatbot acceptance intention and behavior (Muñoz et al., 2022). The study was conducted on consumers who have experience with chatbot ordering services, and the results showed that perceived playfulness influences behavioral intention to use chatbot ordering services. They also suggested that when introducing chatbot services, it is necessary to segment and implement them according to the degree of response to the anthropomorphism provided.

Heaven (2022) used social influence, effort expectancy, performance expectancy, facilitating conditions, tangibility, certainty, and trustworthiness as the main variables to identify factors that affect consumer acceptance intention of A.I chatbot consumer counseling.

Cutler (2023) used personal characteristics of users as the main variable to identify the factors that affect users' satisfaction and intention to use chatbot. The study was conducted on students and general population over 20 years old, and the results showed that chatbot services designed for user convenience have a direct impact on user satisfaction. The study also suggested that innovative users actively utilize chatbots as a means to achieve their goals, so it would be more meaningful if they were set as target customers in the field verification stage after development.

Personal innovativeness, self-efficacy, and perceived enjoyment were used as the main variables to identify factors that influence the intention to use chatbots based on messenger platforms (Bansah & Darko, 2022). The study

was conducted among the general population, and the results showed that users perceive chatbot services as having low barriers to entry, excellent value, and positive perceptions of technology acceptance. It also suggested that realism, anthropomorphism, and emotional interaction are important factors for chatbot services.

2.2.2. Systematic Attribute Variables

Yu (2023) conducted a study on users who have experience with chatbot services for her research. To identify the factors that influence the use of chatbot services, he used searchability, attractiveness, reliability, usefulness, accessibility, and utilization as the main variables and subjective norms as a moderating effect. The results showed that users who use chatbot services are more concerned about the value of the service, that is, how convenient and accessible it is to utilize the service, rather than how much the user benefits from utilizing the service. He also suggested that it is desirable to consider user experience when developing chatbot services.

Haupt and Marks (2023) used smart service quality as the main variable to identify the factors that affect users. A study was conducted with people who have experience using smart services. It was found that users are willing to pay for real-time information and services and experience them before others. They also suggested that the quality of smart services is an area that requires in-depth empirical research, both academically and practically.

Social influence, service quality, and interestingness were used as the main variables to identify factors that affect the intention to use messenger chatbot services (Floridi & Chiriatti, 2020). The results showed that when building or operating a new chatbot service, designing it with service quality, interestingness, and perceived usefulness in mind will affect user satisfaction. It suggested that new technology in chatbot services is an important factor in attracting customers.

The variables of the extended technology acceptance model have been used in a lot of ways up to the researcher's purpose and direction. Therefore, in this study, we propose personal characteristics and system characteristics as factors that influence the intention to use chatbot. In the following, we will discuss more specifically the factors of personal characteristics and system characteristics that will be used in this study.

2.3. Chatbot Service Continuity Use Intention

Intention to use refers to an individual user's willingness to use an information technology system. It is a dependent variable that is influenced by various external and belief variables and usage attitudes. It can be seen as a concept that determines whether a user will perform or not (Heaven,

2022). Based on the concept of relationship satisfaction presented in previous studies, relationship satisfaction shows an emotional and emotional state, and is defined as maintaining a fair relationship between companies and consumers and continuing satisfaction and ties (Huang & Kao, 2021).

Human behavior is first characterized by "some intention". This means that no action is performed without an 'intention' (Xames & Shefa, 2023). Intention to use refers to the intention of the individual user to use the information technology. Intention to use is a dependent variable that is influenced by various external variables, belief variables, and usage attitudes, and can be said to be a concept that determines whether a user performs a given behavior (Kew & Tasir, 2022). Intention to use can be seen as a link between attitude and behavior, and is a very important concept for information technology to survive in the market, and for this reason, it is constantly addressed in marketing-related research (Bonsu & Baffour, 2023).

Intention to use is also the most immediate determinant of the outcome variables of the technology acceptance model because it directly affects actual use. This intention to use is more positive the easier the information technology to use and the more useful it is perceived to be. This means that perceived usefulness and perceived ease of use, which are the core beliefs of the TAM, influence the user's intention and behavior toward accepting information technology (Cutler, 2023).

It can be seen as a link between attitude and behavior. It is an important concept necessary for the existence of information technology systems in the market. It is also the most immediate determinant of the outcome variables of the technology acceptance model because it directly affects the actual use of the technology. Intention to use is positively related to the perceived ease of use and perceived usefulness of the information technology system. This means that perceived ease of use and perceived usefulness influence individual users' intention and behavior toward technology acceptance (Venkatesh et al., 2003).

3. Research Methodology

3.1. Research Model

To examine the relationship between intention to use airline chatbot and service continuance intention, the research model shown in Figure 1 is presented. Based on the analysis of prior research, a research model and research hypotheses were established, and for empirical analysis, a survey was conducted from June to July 2024 among users who have used airline chatbot services. A total of 309 questionnaires were collected.

The purpose of this research is to explain the effect of ease of use and perceived usefulness on chatbot service acceptance intention in the airline industry. This study utilizes an extended technology acceptance model as a framework for the underlying research in terms of acceptance of an information technology system called chatbot. The sub-variables of the independent variable, systemic characteristics, are consistency and familiarity, and the sub-variables of personal characteristics are self-efficacy and user innovation.

This study aims to present the influence of personal and system characteristics of airline passengers on ease of use, perceived usefulness, and chatbot service acceptance intention by conducting an online survey limited to passengers who have used chatbot.

A self-report questionnaire is used to collect data on personal and system characteristics of chatbots, ease of use, perceived usefulness, and intention to use. The variables used in the survey are all extracted from previous studies and reorganized to fit the purpose of this study.

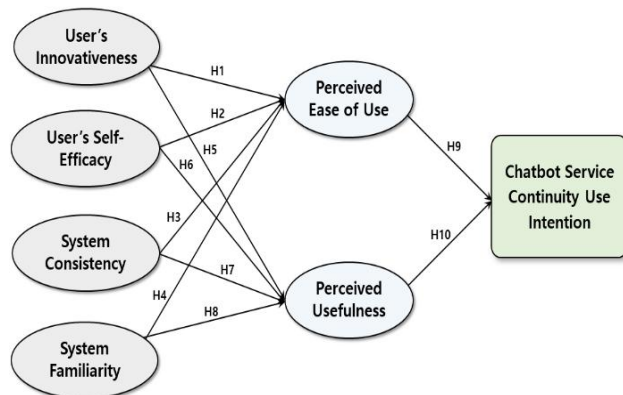


Figure1: Research Model

SPSS 24.0 was used to analyze this study. The detailed analysis method is as follows. First, frequency analysis is used to present the characteristics of the respondents. Second, a factor analysis was tested to check the validity. Third, to check the reliability of the survey items, we conducted a reliability test centered on Cronbach's α to examine the accuracy and predictability of the items. Fourth, regression analysis will be conducted to test the hypothesis.

The hypothesis of this study is to examine the mediation of ease of use and perceived usefulness on the effect of personal characteristics and system characteristics of airline chatbot services on the intention to use chatbot services, and the detailed hypotheses are as follows.

3.2. Hypothesis

The hypothesis of this study is to examine the mediation

of ease of use and perceived usefulness on the effect of personal characteristics and system characteristics of airline chatbot services on the intention to use chatbot services, and the detailed hypotheses are as follows.

1) Relationship between chatbot service users' personal characteristics and perceived ease of use

As sub-variables of personal characteristics of chatbot service, we used self-efficacy and user innovativeness, which are the most commonly used personal characteristics in the extended technology acceptance model.

Previous research on personal characteristics has shown that self-efficacy and user innovativeness influence perceived ease of use. User innovativeness, self-efficacy influenced intention to use platform-based chatbot services.

These previous studies have shown that the personal characteristics of information technology systems, self-efficacy and user innovativeness, influence the intention to use. For the purpose of this study, it can be inferred that personal characteristics of airline chatbot services can also influence perceived ease of use. Therefore, we set the following hypotheses

- H1:** Users' innovativeness have a positive effect on perceived ease of use.
- H2:** Users' self-efficacy have a positive effect on perceived ease of use.
- H3:** The consistency of the system have a positive effect on perceived ease of use.
- H4:** The familiarity of the system have a positive effect on perceived ease of use.

2) Relationship between chatbot service users' system characteristics and perceived usefulness

System consistency and system familiarity were used as sub-variables of chatbot service system characteristics. The system characteristics of chatbot were derived from consistency and familiarity. This research found that consistency and familiarity have been shown to influence the perceived usefulness. Previous studies have shown that system consistency and familiarity affect perceived usefulness. Considering the previous studies, we set the following hypothesis that the system characteristics of chatbot can influence consumers' perceived usefulness to use chatbot services.

- H5:** User innovativeness have a positive effect on perceived usefulness
- H6:** Users' self-efficacy have a positive effect on perceived usefulness.
- H7:** The consistency of the system have a positive effect on perceived usefulness.
- H8:** The familiarity of the system have a positive effect on perceived usefulness.

3) Relationship between perceived ease of use, usefulness, and chatbot service acceptance intention

Through the study of various technology acceptance models and the extended technology acceptance model, the following research hypothesis can be established.

H9: Perceived ease of use have a positive effect on chatbot service acceptance intention.

H10: Perceived ease of use have a positive effect on chatbot service acceptance intention.

4. Results

4.1. The Demographic Characteristics

The demographic characteristics of the sample of 309 respondents in this study are shown in Table 1.

Gender is 170 (55.0%) female and 139 (45.0%) male. 110 (35.6%) were in their 30s, 102 (33.0%) were in their 20s, 48 (15.5%) were in their 50s, 44 (14.2%) were in their 40s, and 5 (1.6%) were in their 60s. In terms of marital status, 169

(54.7%) were single and 140 (45.3%) were married. 177 (57.3%) have a college degree, 52 (16.8%) have a vocational degree, 42 (13.6%) have a high school diploma, and 38 (12.3%) have a graduate degree or higher.

The average annual income was 73 (23.6%) under 30 million won, 71 (23.0%) under 50 million won, 71 (23.0%) over 60 million won, 70 (22.7%) under 40 million won, and 24 (7.8%) under 60 million won, and the occupation was 100 (32.4%), service industry 76(24.6%), professional 47(15.2%), self-employed 29(9.4%), other 27(8.7%), student 14(4.5%), government employee 11(3.6%), and housewife 5(1.6%). 293 (94.8%) traveled in economy class and 16 (5.2%) traveled in business class.

The airlines used were Korean Air 138 (44.7%), low-cost airlines 117 (37.9%), Asiana Airlines 40 (12.9%), and foreign airlines 14 (4.5%). The most recently traveled routes were international flights 211 (68.3%), international medium-haul 37 (12.0%), domestic flights 32 (10.4%), and international short-haul 29 (9.4%), and the number of times per year 92 (29.8%) traveled 4-5 times, 83 (26.9%) 2-3 times, 54 (17.5%) 10 or more times, 48 (15.5%) once, and 32 (10.4%) 6-9 times.

Table 1: Demographic Characteristics

(n=309)

Classification		Frequency (person)	Percentage (%)	Classification		Frequency (person)	Percentage (%)
Gender	male	139	45.0	Position	Service Industry	76	24.6
	female	170	55.0		Professional	47	15.2
Age	20s	102	33.0		Self-Employed	29	9.4
	30s	110	35.6		Student	14	4.5
	40s	44	14.2		Government Employee	11	3.6
	Over 50s	53	17.2		Housewife	5	1.6
Marital Status	Single	169	54.7		Others	27	8.7
	Married	140	45.3	Used Airline	Domestic	32	10.4
Aircraft Using number of times	1 time	48	15.5		International Short	29	9.4
	2-3 times	83	26.9		International Medium	37	12.0
	4-5 times	92	29.8		International Long	211	68.3
	6-9 times	32	10.4	Used Class	Economy Class	293	94.8
	Over 10 times	54	17.5		Business Class	16	5.2

4.2. Feasibility and Reliability of Data

Construct validity of the measurement instruments in this study refers to the consistency between the construct and the variable that measures it, indicating how well the construct is measured by the observed variable. Convergent validity, discriminant validity, and law validity were tested, and internal consistency was evaluated based on Cronbach's α coefficient to verify the reliability of the instrument. For construct validity and reliability, this study conducted confirmatory factor analysis using AMOS 18.0. Reliability

analysis was conducted using PASW 18.0. The results of the final confirmatory factor analysis and reliability test are shown in Table 2.

This study utilized 7 latent variables and 29 observed variables to design the model. The results of confirmatory factor analysis showed that, AGFI did not meet the criteria. However, the remaining indices were found to meet the criteria very well, and the model was considered appropriate ($\chi^2=913.27$ (df=356, $p=.000$), Normed- $\chi^2=2.565$, RMR=.048, GFI=.909, AGFI=.856, NFI=.922, IFI=.945, TLI=.928, CFI=.944, RMSEA=.050). In addition, the standardized

factor loadings for the 29 measures were statistically significant. They were all greater than 0.5.

The average variance extracted (AVE) and concept reliability (CCR), which are the measures of convergent validity as specified by Fornell & Larcker (1981), met the

criteria of $AVE > 0.5$ and $CCR > 0.7$, respectively.

Therefore, the measures of this study were judged to be sufficiently convergent. The Cronbach's α coefficients of all constructs were higher than the threshold of 0.6, indicating the reliability of the selected measures in this study.

Table 2: Reliability Analysis and Confirmatory Factor Analysis Results

Measurement		Std. factor loading value	Std. error	C. R.	AVE (CCR)	Cronbach's α
User's Innovativeness	Compared to others, I've been a quick adopter of online shopping chatbot services.	.934	-	-	.827 (.950)	.915
	I'm very interested in finding the latest information about chatbot services.	.964	.027	35.610		
	I'm trying to learn using a chatbot service to learn how to use chatbot services.	.906	.033	28.349		
	I know more about online shopping chatbot services than others.	.872	.040	22.035		
User's Self Efficacy	I don't find it too difficult to use chatbot services.	.922	-	-	.742 (.919)	.812
	I use chatbot services more efficiently than others	.835	.041	21.198		
	Be able to recognize and explain the services and features offered by the chatbot service.	.928	.037	27.015		
	I don't need help from anyone to use the chatbot service.	.748	.045	17.050		
System Consistency	Chatbot services provide consistent service.	.940	-	-	.776 (.932)	.911
	Chatbot services are always accurate in their work.	.922	.031	29.906		
	The menu provided by the chatbot service and the content provided by the chatbot service.	.861	.039	24.375		
	Chatbot services provide accurate information about my inquiries.	.793	.043	19.991		
System Familiarity	I'm used to using chatbot services.	.860	-	-	.679 (.894)	.852
	I prefer to use chatbot services.	.883	.044	20.548		
	I'm familiar with chatbot services.	.785	.052	16.829		
	Chatbot services are not inconvenient.	.761	.059	16.053		
Perceived Ease of Use	Using an airline chatbot service is very easy.	.764	-	-	.729 (.915)	.833
	Airline chatbot services make it easy to handle the tasks you want to accomplish.	.902	.098	13.740		
	The instructions for using the airline chatbot service are clear and easy to understand.	.853	.100	13.153		
	Overall, the airline chatbot service is easy to use.	.889	.099	13.590		
Perceived Usefulness	Airline chatbot services are good for me.	.799	-	-	.733 (.916)	.788
	Airline chatbot services can help you make purchases.	.845	.056	17.272		
	Airline chatbot services can help you get things done faster.	.879	.054	18.261		
	The services and information provided by airline chatbot services are useful.	.898	.050	18.835		
Chatbot Service Continuity Use Intension	I am willing to use airline chatbot services in the future.	.838	-	-	.626 (.892)	.712
	I will try to use the airline shopping mall chatbot service in the future.	.612	.077	7.205		
	Airline shopping mall chatbot services are likely to be used.	.816	.057	16.668		
	I will continue to use the airline shopping mall chatbot service.	.846	.074	7.373		
	I would recommend using an online shopping mall chatbot service to others.	.846	.056	17.533		

The results of the construct validity analysis of this research are shown in Table 3. All correlations between each latent variable are less than or equal to 0.5 in absolute value, so multi-collinearity cannot be suspected. The AVE values of all variables are greater than the squared value of the correlation between each latent variable, indicating that the

discriminant validity of each construct is satisfied.

In addition, the direction of the correlation between each construct is consistent with the hypotheses set in this study, and it is judged that the law validity is also satisfied. Therefore, the construct validity of the measurement instruments of this study was determined to be satisfied.

Table 3: Compositional Feasibility Analysis of Compositional Concepts

	User's Innovativeness	User's Self Efficacy	System Consistency	System Familiarity	Perceived Ease of Use	Perceived Usefulness	Service Continuity Use Intension
User's Innovativeness	.827 ^a	.064 ^b	.200 ^b	.191 ^b	.177 ^b	.231 ^b	.212 ^b
User's Self Efficacy	.252	.742 ^a	.030 ^b	.009 ^b	.030 ^b	.030 ^b	.045 ^b
System Consistency	.447	.174	.776 ^a	.209 ^b	.203 ^b	.234 ^b	.149 ^b
System Familiarity	.437	.093	.457	.679 ^a	.165 ^b	.198 ^b	.125 ^b
Perceived Ease of Use	.421	.173	.450	.406	.729 ^a	.188 ^b	.128 ^b
Perceived Usefulness	.481	.174	.484	.445	.434	.733 ^a	.175 ^b
Service Continuity Use Intension	.460	.213	.399	.354	.358	.418	.626 ^a

^a: AVE, ^b: r^2 the square of the bivariate correlation coefficient (r^2)

4.3. Hypothesis Verification

4.3.1. Study Model Fit

In this study, the sub-factors of decision-making users' innovativeness, users' self-efficacy, system consistency, system familiarity, perceived usefulness, and ease of use of chatbot services were tested through the model. The fit results showed that the AGFI did not meet the criteria, as did the confirmatory factor analysis.

However, this is not an absolute criterion, and the rest of the indices were found to be very close to meeting the criterion, indicating that the model was appropriate for this study. ($\chi^2=1192.226$ (df=367, $p=.000$), Normed- $\chi^2=3.249$, RMR=.050, GFI=.908, AGFI=.868, NFI=.932, IFI=.940, TLI=.938, CFI=.950, RMSEA=.042).

4.3.2. Examination of a Hypothesis

The results of the test based on this research model are shown in Table 4 and Figure 2.

First, it was found that user innovativeness has a statistically effect on perceived usefulness ($\beta=.439$, C.R=7.309, $p=.000$). Therefore, H1, "User innovativeness will have a positive effect on perceived usefulness," was accepted.

Second, users' self-efficacy was shown have a statistically effect on perceived usefulness ($\beta=.130$,

C.R=2.680, $p=.007$). Therefore, H2, "Users' self-efficacy will have a positive effect on perceived usefulness," is accepted.

Third, system consistency was found to have a statistically effect on perceived usefulness ($\beta=.113$, C.R=2.363, $p=.018$). Therefore, H3, "System consistency will have a positive effect on perceived usefulness," is accepted.

Fourth, familiarity of the system has a statistically effect on perceived usefulness ($\beta=.554$, C.R=8.045, $p=.000$). Therefore, H4, "Familiarity of the system will have a positive effect on perceived usefulness," is accepted.

Fifth, user innovativeness was found to have a statistically effect on perceived ease of use ($\beta=.641$, C.R=11.247, $p=.000$). Therefore, H5, "User innovativeness will have a positive effect on perceived ease of use," was accepted.

Sixth, users' self-efficacy did not have a statistically effect on perceived ease of use ($\beta=.026$, C.R=.061, $p=.521$). Therefore, H6, "Users' self-efficacy will have a positive effect on perceived ease of use," was rejected.

Seventh, system consistency was found to have a statistically effect on perceived ease ($\beta=.459$, C.R=9.303, $p=.000$). Therefore, H7, "System consistency will have a positive effect on perceived ease," was accepted.

Eighth, familiarity of the system was found to have a statistically effect on perceived ease ($\beta=.312$, C.R=6.774,

$p=.000$). Therefore, H8, "Familiarity of the system will have a positive effect on perceived ease," was accepted.

Ninth, perceived usefulness has a statistically effect on intention to use chatbot services ($\beta=.283$, C.R=4.061, $p=.000$). Therefore, H9, "Perceived usefulness will have a positive effect on intention to use chatbot services," is

accepted.

Tenth, perceived ease of use has a statistically effect on intention to use chatbot services ($\beta=.519$, C.R=6.894, $p=.000$). Therefore, H10, "Perceived ease of use will have a positive effect on intention to use chatbot services," is accepted.

Table 4: Structural Equation Analysis

	Path		Std. path coefficient	Std.E	CR ^a	p-value	SMC ^b
H1	User's Innovativeness	→	.439	.031	7.309	***	.529
H2	User's Self Efficacy		.130	.025	2.680	.007	
H3	System Consistency		.113	.027	2.363	.018	
H4	System Familiarity		.554	.040	8.045	***	
H5	User's Innovativeness	→	.641	.036	11.247	***	.719
H6	User's Self Efficacy		.026	.025	.0.641	.521	
H7	System Consistency		.459	.033	9.303	***	
H8	System Familiarity		.312	.032	6.774	***	
H9	Perceived Ease of Use	→	.283	.097	4.061	***	.499
H10	Perceived Usefulness		.519	.088	6.894	***	

$\chi^2=1192.226$ (df=367, $p=.013$), Normed- $\chi^2=3.249$, RMR=.050, GFI=.908, AGFI=.868, NFI=.932, IFI=.940, TLI=.938, CFI=.950, RMSEA=.042
 ***: $p<.001$, a. C.R.(Critical Ratio), / b. SMC(Squared Multiple Correlation)

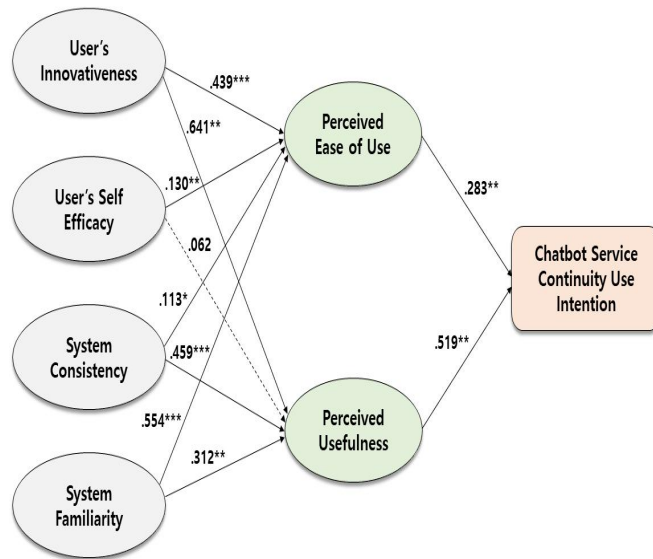


Figure 2: Structural Equation Analysis Results

5. Conclusion

This study was conducted to examine the influence of chatbot service usage intention from the perspective of airline passengers. For this study, we reviewed the existing research on chatbots and applied the Extended Technology Acceptance Model (ETAM), which can effectively explain advanced information technology systems, as the theoretical framework for this study. Based on this, a research model

was proposed considering the characteristics of the main variables.

The independent variables of the research model consist of personal characteristics (self-efficacy, user innovativeness) and system characteristics (consistency, familiarity), the parameters are perceived ease of use and usefulness, and the dependent variable is the intention to continue using the airline chatbot service. To test the hypotheses of the set research model, an online survey method was adopted.

As a result, we received 309 responses, and the results of the analysis using AMOS 18.0 are as follows.

This study theoretically derived the acceptance factors of information technology called airline chatbot service and empirically verified them. This study is very timely as the market for chatbot services is continuously expanding. After comparing the results of this research with previous studies, we will discuss the implications of this study as follows.

First, this study is differentiated in that it applies the extended technology acceptance model (ETAM) to the use of chatbot services by online shopping mall consumers.

Second, this study considers both systemic and personal characteristics of chatbot. The results show that system characteristics have a significant effect on airline passengers' intention to use chatbot services via perceived ease of use and usefulness. Personal characteristics have academic implications in that some of them are not significant. In addition, based on these results, it can be said to provide practical implications in that if system characteristics, perceived ease of use, and perceived usefulness are considered when building chatbot services for

online shopping malls in the future, it will have a meaningful impact on consumers' use intention.

Third, this study shows that perceived usefulness influences online shopping mall consumers' intention to use chatbot services. The practical implications are as follows: perceived usefulness is a factor that is actually important to the market.

Fourth, Companies are introducing technologies such as machine learning and deep learning based on big data to chatbots to improve the quality and usability of their services. Therefore, perceiving the use of chatbot as useful will be an important factor in the future success of online shopping malls by expanding the application of chatbot to serve customers.

This study was conducted on consumers who used airline chatbot services, and the results were significant. Nevertheless, there are the following limitations.

First, there is the limitation of the research subjects. This study was limited to customers who have used airline chatbot services. Therefore, in a follow-up research, it is necessary to test the impact on the intention to use chatbot services in airlines by limiting the respondents to those who actively use chatbot services.

Second, the study was limited to airline chatbot services, so the results of the study may be significant as evidence in the early stages of building chatbot services, but the empirical value may decrease in the advanced stage of the service.

Third, there is a limitation of variables. This study derived variables through prior research, but it has a limitation that it did not derive more diverse variables through interviews, etc. Therefore, it is necessary to derive variables in a more diverse way in subsequent studies.

References

- Babel, F., Kraus, J., Miller, L., Kraus, M., Wagner, N., Minker, W., & Baumann, M. (2021). Small talk with a robot? The impact of dialog content, talk initiative, and gaze behavior of a social robot on trust, acceptance, and proximity. *International Journal of Social Robotics*, 13, 1485-1498.
- Bansah, A. K., & Darko Agyei, D. (2022). Perceived convenience, usefulness, effectiveness and user acceptance of information technology: evaluating students' experiences of a Learning Management System. *Technology, Pedagogy and Education*, 31(4), 431-449.
- Basuki, R., Tarigan, Z., Siagian, H., Limanta, L., Setiawan, D., & Mochtar, J. (2022). The effects of perceived ease of use, usefulness, enjoyment and intention to use online platforms on behavioral intention in online movie watching during the pandemic era. *International Journal of Data and Network Science*, 6(1), 253-262.
- Belanche, D., Casaló, L. V., & Flavián, C. (2020). Customer's acceptance of humanoid robots in services: the moderating role of risk aversion. *Marketing and Smart Technologie*, November 29, 449-458.
- Belanche, D., Casaló, L. V., Schepers, J., & Flavián, C. (2021). Examining the effects of robots' physical appearance, warmth, and competence in frontline services: The Humanness-Value and Loyalty model. *Psychology & Marketing*, 38(12), 2357-2376.
- Bonsu, E. M., & Baffour-Koduah, D. (2023). From the consumers' side: Determining students' perception and intention to use ChatGPT in Ghanaian higher education. *Journal of Education, Society & Multiculturalism*, 4(1), 1-29.
- Chi, O. H., Denton, G., & Gursay, D. (2020). Artificially intelligent device use in service delivery: A systematic review, synthesis, and research agenda. *Journal of Hospitality Marketing & Management*, 29(7), 757-786.
- Chi, O. H., Gursay, D., & Chi, C. G. (2022). Tourists' attitudes toward the use of artificially intelligent (AI) devices in tourism service delivery: moderating role of service value seeking. *Journal of Travel Research*, 61(1), 170-185.
- Choi, S., Mattila, A. S., & Bolton, L. E. (2021). To err is human (-oid): how do consumers react to robot service failure and recovery? *Journal of Service Research*, 24(3), 354-371.
- Crisafulli, B., & Singh, J. (2017). Service failures in e-retailing: Examining the effects of response time, compensation, and service criticality. *Computers in Human Behavior*, 77, 413-424.
- Crolic, C., Thomaz, F., Hadi, R., & Stephen, A. T. (2022). Blame the bot: Anthropomorphism and anger in customer-chatbot interactions. *Journal of Marketing*, 86(1), 132-148.
- Cutler, K. (2023). ChatGPT and search engine optimization: The future is here. *Applied Marketing Analytics*, 9(1), 8-22.
- Deng, J., & Lin, Y. (2023). The benefits and challenges of ChatGPT: An overview. *Frontiers in Computing and Intelligent Systems*, 2(2), 81-83.
- Floridi, L., & Chiriatti, M. (2020). GPT-3: Its nature, scope, limits, and consequences. *Minds and Machines*, 30, 681-694.
- Haupt, C. E., & Marks, M. (2023). AI-generated medical advice—GPT and beyond. *Jama*, 329(16), 1349-1350.
- Heaven, W. D. (2022). Language Models Like GPT-3 Could Herald a New Type of Search Engine. *Ethics of Data and Analytics: Concepts and Cases*, 3(9), 57-59.
- Ho, A., Hancock, J., & Miner, A. S. (2018). Psychological, relational, and emotional effects of self-disclosure after conversations with a chatbot. *Journal of Communication*, 68(4), 712-733.
- Hong, J.-W., & Williams, D. (2019). Racism, responsibility and autonomy in HCI: Testing perceptions of an AI agent. *Computers in Human Behavior*, 100, 79-84.
- Huang, Y. S., & Kao, W. K. (2021). Chatbot service usage during a pandemic: fear and social distancing. *The Service Industries Journal*, 41(13-14), 964-984.
- Kaczorowska-Spychalska, D. (2019). How chatbots influence marketing. *Management*, 23(1), 251-270.
- Kew, S. N., & Tasir, Z. (2022). Learning analytics in online learning environment: A systematic review on the focuses and the types of student-related analytics data. *Technology, Knowledge and Learning*, 23(1), 1-23.
- Lee, K. J., & Kim, E. Y. (2020). The role and effect of artificial intelligence (ai) on the platform service innovation: The case study of Kakao in Korea. *Knowledge Management Research*,

- 21(1), 175-195.
- Liu, P., Glas, D. F., Kanda, T., & Ishiguro, H. (2018). Learning proactive behavior for interactive social robots. *Autonomous Robots*, 42, 1067-1085.
- Lou, C., Kang, H., & Tse, C. H. (2022). Bots vs. humans: how schema congruity, contingency-based interactivity, and sympathy influence consumer perceptions and patronage intentions. *International Journal of Advertising*, 41(4), 655-684.
- Martin, F., Wu, T., Wan, L., & Xie, K. (2022). A Meta-Analysis on the Community of Inquiry Presences and Learning Outcomes in Online and Blended Learning Environments. *Online Learning*, 26(1), 325-359.
- Muñoz, J. L. R., Ojeda, F. M., Jurado, D. L. A., Peña, P. F. P., Carranza, C. P. M., Berríos, H. Q., & Vasquez-Pauca, M. J. (2022). Systematic Review of Adaptive Learning Technology for Learning in Higher Education. *Eurasian Journal of Educational Research*, 98(98), 221-233.
- Pavone, G., Meyer-Waarden, L., & Munzel, A. (2023). Rage against the machine: experimental insights into customers' negative emotional responses, attributions of responsibility, and coping strategies in artificial intelligence-based service failures. *Journal of Interactive Marketing*, 58(1), 52-71.
- Venkatesh, V., Morris, M. G., Davis, G. B., & Davis, F. D. (2003). User acceptance of information technology: Toward a unified view. *MIS Quarterly*, 27(3), 425-478.
- Xames, M. D., & Shefa, J. (2023). ChatGPT for research and publication: Opportunities and challenges. *Journal of Applied Learning and Teaching*, 6(1), 1-6.
- Yu, H. (2023). Reflection on whether Chat GPT should be banned by academia from the perspective of education and teaching. *Frontiers in Psychology*, 14, 1-12.
- Yu, Z. (2022). A meta-analysis and bibliographic review of the effect of nine factors on online learning outcomes across the world. *Education and Information Technologies*, 27(2), 2457-2482.