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Exploring the Determinants of Travelers' Intention to Use the Airport Biometric System: A Korean Case Study

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Abstract: After the pandemic, there has been an increasing emphasis on customer convenience, with biometrics emerging as a key solution. This study empirically investigates the intention of Korean travelers to use airport biometric systems. The technology acceptance model (TAM) was employed to explore users' perceptions of the system's functional aspects, while technology familiarity, social influence, and trust in information protection were integrated into the model to understand users' psychological aspects. The results reveal that perceived usefulness and ease of use have a positive relationship with the intention to use the biometric system and that perceived ease of use positively influences perceived usefulness. The impact of social influence and technology familiarity was not statistically significant but trust emerged as the most influential factor determining the intention to use the system. Furthermore, the study identified that gender moderates the effect of trust on the intention to use. This study contributes by identifying key determinants for airport biometric system adoption and by investigating the moderating influence of gender. As a primary result, airport biometric systems must have effective functionality and a user-friendly passenger environment while ensuring confidence in system security. These findings have significant implications for the sustainable implementation of airport biometric systems.

Keywords: airport; airport biometric system; social influence; sustainable implementation; technology acceptance model; technology familiarity; trust in information protection

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1. Introduction

Travelers who encountered notable complexity and inconvenience at airports during COVID-19 are now seeking swift and seamless travel experiences [1]. Airports must implement suitable measures to ensure the sustainability and safety of their operations in response to this [2]. Even prior to the pandemic, airports had been striving to develop more efficient technology-based service processes to cope with the explosive growth in air travel demand [3,4]. Innovative concepts like kiosks [5], artificial intelligence, and robot technology [6], have been introduced to enhance airport facilities and operations, aiming to offer improved services [7]. The adoption of a new passenger-handling system, based on biometric information, has emerged as a crucial remedy to streamline service processes and enhance the travel experience [1]. This implementation is expected to significantly reduce the overall service process time at airports [8–10]. Related reports suggest that the airport's biometric system can cut the passenger-handling process time by approximately half [11]. Additionally, the biometric system is seen as a measure to bolster airport security [7,12]. Given the dynamic nature of the global air transport industry, airports must prioritize the security of their service systems for travelers' safety, with the biometric system enhancing airport security during passenger handling [13–15]. The advantages of the biometric system have garnered strong support from travelers [1,16,17]. According to the International Air Transport Association (IATA)'s 2022 global passenger survey, three quarters of passengers prefer biometric data over passports and boarding passes. Moreover, more than 33% have already had the experience of utilizing biometric identification during their travels and 88% of them reported satisfaction with the process [1]. With such resounding support, biometrics is currently being implemented by airlines and airports in various countries, including the United States, China, and Korea.

Despite the airport's biometric system showing high growth potential and efficiency, the passengers' concerns regarding the information security capability of the system can hinder its widespread adoption [1,18]. Users of the system may hesitate to use the biometric system due to concerns about potential privacy breaches and the exposure of private information [19]. For example, approximately half of the travelers are still worried about data protection in the results of IATA's 2022 global passenger survey. This negative perception of users can increase the risk of rejection, leading to potential failure in the sustainable implementation of biometric technology [18,19]. Therefore, it is crucial to prioritize the identification of critical determinants that positively or negatively influence passengers' intention to accept biometric technology [20].

The lack of conclusive findings in related academic fields can be attributed to the scarcity of studies exploring the factors that significantly influence the acceptance intention of airport biometric systems although a few exist (e.g., [10,13,21,22]). Also, travel behaviors have undergone significant changes in response to COVID-19 [23–25]. As we prepare for the post-pandemic era, it is important to establish precise strategies by identifying the factors that influence the adoption of airport biometric systems. Thus, this study aims to identify the key drivers behind travelers' intention to use airport biometric systems and suggests practical implications for the sustainable deployment of the system. We examine the intention of travelers using the technology acceptance model (TAM) to consider the traveler's perception of the functional aspect of the biometric system. We also delve into the roles of individual psychological factors by incorporating external variables such as trust in the airport's information protection capability, social influence, and technology familiarity. The uniqueness of biometric information raises privacy concerns, leading us to propose that trust in the airport's information security significantly impacts the intention to use the system. Due to the growing accessibility of biometric technology, users are more inclined to adopt it, which justifies the consideration of technology familiarity [26]. Thus, technology familiarity is expected to significantly affect the intention to use and the ease of using the airport biometric system. Social influence plays a role as potential adopters seek opinions from familiar groups when faced with new technology, impacting travelers' technology acceptance intention [27,28]. While these three constructs are valid in explaining technology acceptance (e.g., [26,29–32]), there have been limited studies that have concurrently investigated their effects when examining the intention to use the airport biometric system. To address this research gap and better understand the factors influencing biometric technology acceptance, we propose an extended TAM. Moreover, we are evaluating the moderating effect of gender given its significance in the technology acceptance literature [32–38]. The current literature lacks academic insight into the effect of gender differences. In essence, the primary aim of this study is to answer the following research questions (RQ).

RQ 1: *What are the key drivers that affect the intention to accept an airport biometric system?*

RQ 2: *Does gender difference moderate the effect of drivers on airport biometric acceptance intention?*

This study contributes two aspects to the literature: First, it identifies the crucial determinants for the intention to use the airport biometric systems using the extended TAM, introducing the relatively underexplored aspects of technology familiarity and trust in information protection within this research topic. Second, it represents the initial endeavor to validate how gender moderates the use of airport biometric systems as far as the authors are aware. As a result, this study reveals that for airport biometric systems to be sustainable, they must establish effective functionality and a user-friendly customer environment based on trust in information protection. At the same time, it is evident that women are more inclined to adopt airport biometric recognition systems than men when there is a sufficient sense of security in information handling.

2. Literature Review

2.1. Airport Biometric Technology

A biometric system is an automated pattern-recognition system that identifies a person based on single or multiple individual characteristics that the person possesses [8]. With the recent pandemic driving an increase in non-face-to-face services, the utilization of biometric-based services is naturally on the rise [39]. As the technical maturity of biometric technology has increased, this technology has been widely utilized in many settings because of its advantages in offering improved convenience and security [40,41]. Specifically, biometrics in airport operations can serve as a safe and efficient means to handle the rising passenger demand in the post-pandemic era [42,43].

From the passenger's perspective, biometric systems can replace all the existing document-based boarding procedures (like boarding passes and passports) with a single registration of biometric information. This means passengers no longer need to worry about losing or damaging these documents. Additionally, given the ongoing risk of pandemics negatively impacting travel intentions [44], the non-face-to-face services offered by airport biometric systems can provide passengers with a sense of psychological reassurance. One of the most significant advantages appreciated by passengers is the reduction in overall service process time, sparing them from long waits at the airport. Excessive waiting times are directly associated with negative perceptions such as neglect, time wastage, and boredom, ultimately leading to negative feelings and impressions [45]. In this regard, airport biometric systems can be a potent solution to this problem. For instance, the U.S. Customs and Border Protection (CBP) has implemented biometric facial comparison technology in various air transport environments, including 14 pre-clearance locations and 44 air exit locations. This innovative technology enables travelers to experience quicker and safer journeys [46].

From the perspective of airport operators, the biometric system can be utilized to automatically verify and recognize that the document owner and traveler are the same person through pre-registered biometric information [13]. According to Kalakou et al. [7], the biometric system is particularly expected to play a key role in the short-term development of airports because it can improve the end-to-end experience of travelers and overall security of the passenger-handling system. This enhancement is directly linked to increasing terminal capacity [47]. For instance, Istanbul Airport, in collaboration with Turkish Airlines, has implemented a new boarding gate based on biometric technology, resulting in a 30% reduction in processing time [43]. Miami Airport, which introduced biometric technology for screening international arrivals in 2018, reported an 80% decrease in passenger processing time [48]. Similarly, Los Angeles International Airport confirmed that the entire passenger processing procedure can be completed in just 20 min via the biometric system, representing a significant time reduction compared to conventional document-based processes [49]. Since biometric information is hard to be mimicked [50], it enables the airport to prevent identity fraud and minimize errors in the passenger-handling process [51]. The U.S. National Institute of Standards and Technology (NIST) reported an impressive accuracy rate of approximately 99.5% after evaluating the performance of seven algorithms implemented in the airport biometric system [52].

While it is evident that airport biometric systems offer faster and more efficient authentication and identification processes, they also raise concerns, particularly related to cybersecurity. Despite their ability to enhance security, these systems inevitably face cybersecurity risks due to the storage of numerous passengers' biometric data in a single database or platform. Rajapaksha and Jayasuriya [53] emphasized that cybersecurity is a crucial risk factor in airport operations relying on biometric systems, highlighting the importance of airports having policies and technologies that passengers can trust. Additionally, the reliance on electronic systems for recognition introduces the possibility of errors. Prabhaker, Pankanti, and Jain [20] have pointed out that variations in users' physiological characteristics, ambient conditions, or potential systemic errors can lead to misinterpretations in the sensor–user interaction. Such issues could potentially result in more inconveniences compared to the existing document-based processing procedures.

2.2. Further Related Research

It is crucial to consider factors influencing user technology acceptance to ensure the sustainable and successful implementation of the biometric system [18,54]. In the tourism and hospitality industry, various studies have been made to understand the tourist's intention to accept biometric technology and TAM has been considered as a reliable model to examine the behavioral intention to use biometric technology. For example, Morosan [55] confirmed the predictive power of the TAM to explain intention to adopt biometric technology in restaurants by conducting an empirical study. Kim, Brewer, and Bernhard [56] used the TAM to investigate the hotel guests' intention to use a fingerprint door lock and found that the two variables in the TAM (perceived usefulness and perceived ease of use) well explained the intention to use the biometric system. Morosan [57] also conducted empirical research on the intention to use the biometric system in hotels using TAM and suggested that TAM is an appropriate framework for the study of biometric system adoption.

In the air transport literature, a few researchers have tried to explore the biometric system field to increase the service quality and operational efficiency of airports. Farrell [51] reviewed the latest trends and related information to provide useful implications for airport operators to introduce biometric systems more effectively. Negri, Borille, and Falcão [47] studied the passengers' possibility to use the biometric system of a Brazilian airport using the discrete choice model and found that 83% of passengers were expected to use the biometric service of the airport. Recent empirical studies were conducted to explore factors that affect the individual's intention to use and accept it. Kim, Lee, and Costello [22] examined the relationship between perceived risk, perceived benefit, initial intention to use, and repeat intention to use and confirmed that there was a significant relationship in all links. Park and Park [10] developed a model incorporating variables from the innovation diffusion theory and the unified theory of acceptance and use of technology. This framework aimed to identify the factors that drive the adoption of airport biometric systems. Their study revealed significant connections between performance expectancy, effort expectancy, and the intention to accept the technology. Morosan [13] empirically investigated the U.S. travelers' intention to use airport biometric systems using the research model based on a unified theory of adoption and use of technology model and showed that performance and effort expectancy, low privacy concern, and compatibility have a positive impact on the U.S. travelers' intention. Kasim et al. [21] used the extended theory of planned behavior, incorporating perceived usefulness, perceived ease of use, and privacy concern into the basic model, to investigate the intention to use airport biometric systems. They discovered that attitude, subjective norm, and privacy concern had a positive impact on usage intention. However, the finding that the two core variables (perceived usefulness and perceived ease of use) did not significantly influence behavioral intention stood out when compared to other related literature, suggesting the need for further examination of these variables' impact. Also, exploring potential cultural differences using Asian samples could yield valuable insights and implications.

2.3. Theoretical Backgrounds and Hypotheses Developments

2.3.1. Technology Acceptance Model

The TAM is a customized version of the theory of reasoned action designed to understand users' technology adoption intentions and behavior. Since its inception by Davis [58], the TAM has become widely accepted as one of the leading models for explaining individual intentions to adopt technology. It revolves around two cognitive factors: perceived usefulness and perceived ease of use [59]. Perceived usefulness refers to the extent to which an individual believes that a particular information system or technology will enhance their task performance [60]. When technology is perceived as highly useful, individuals are more likely to recognize its positive impact on performance [60]. Moreover, people tend to view a system as more useful when it is user-friendly [61,62]. On the other hand, perceived ease of use relates to an individual's perception of the cognitive effort required to learn and utilize a system or technology [26]. Based on these theoretical frameworks, it is generally believed that when a person perceives minimal effort in using a system or technology, they are more likely to adopt it [59,60].

Through a wide range of empirical studies, numerous researchers have validated the TAM as a robust model for predicting technology acceptance intentions (e.g., [63–67]). In various information technology industries, such as online shopping [27,68], mobile technology [69], online banking [70], social media [71], and kiosks [72,73], the TAM has demonstrated its suitability in explaining technology acceptance intentions effectively. It is noteworthy that TAM remains effective in studying the intention to use contemporary innovative technologies like metaverse, AI, connected vehicles, and service robots [74–77]. Researchers in the air transport field have also extensively used the TAM to comprehend air travelers' intentions to use technology. For instance, Ruiz-Mafe et al. [78] applied TAM to study online ticket purchasing behavior, while Lu, Chou, and Ling [79] employed TAM to explain the intention to use self-check-in services provided by airlines. Assaker [33] employed TAM to explore the intention to adopt online travel reviews and user-generated content. Li and Jiang [80] and Min, So, and Jeong [81] similarly demonstrated the effectiveness of TAM in explaining the intention to use new technologies in tourism, AR-based tourism, and the Uber mobile application, respectively. These previous studies justify that TAM can be an appropriate model for explaining travelers' intentions to use the airport biometric system. Based on the theoretical background presented earlier, we propose the following three hypotheses:

H1: *Perceived ease of use will significantly influence the perceived usefulness.*

H2: *Perceived ease of use will significantly influence the intention to use the biometric system of an airport.*

H3: *Perceived usefulness will significantly influence the intention to use the biometric system of an airport.*

2.3.2. External Variables

As the original TAM primarily addressed technology use in unavoidable everyday situations, such as the workplace, it may not fully capture users' intention to use technology in voluntary scenarios [82], prompting researchers to question its adequacy (e.g., [82,83]). TAM has also been criticized for its limitation in capturing psychological factors arising from the technology-using process [84]. To enhance the model's predictive power, additional variables have been proposed [62]. Thus, to better understand airport users' intention to use the biometric system and increase the model's explanatory power, this study incorporated three external variables, namely technology familiarity, social influence, and trust in the information protection capability of airports, based on the related literature, which is particularly relevant to the context of the biometric recognition system [54,85,86].

Familiarity refers to specific activity-based cognition resulting from past experiences and interactions with a particular target [26,27]. In this study, technology familiarity is defined as a user's perception formed by experience with biometric technology. It involves the user's understanding of how the biometric system functions and how to use it. Familiarity reduces uncertainty and simplifies the task process by establishing the structure of the task [26]. That is, familiarity with a specific task situation causes the development of rules that simplify the decision-making process [31] and thus a person with familiarity with performing a given task feels it is easy to do so and makes fewer errors [87]. Previous studies have shown that there is a positive relationship between technology familiarity based on experience and perceived ease of use [88,89]. Numerous information system studies have also found a positive relationship between technology familiarity and the intention to use the technology (e.g., [26,90,91]). At the same time, there were aspects where familiarity lacked statistical significance in studies explaining acceptance intention [28]. For instance, Kim and Kwon [92] concluded that familiarity's influence on travelers' behavioral intentions was not substantiated when considering airport biometric systems as part of their travel experience. Based on this, we hypothesize that technology familiarity significantly influences the intention to use and the perceived ease of use of the airport biometric system.

Social influence refers to the degree to which alterations in an individual's feelings, motivations, or behaviors are caused by the influence of others [32]. In this study, social influence is specifically defined as the extent to which individuals believe that significant referents endorsed the use of the technology [93]. While the original TAM did not incorporate social influence in examining technology usage intention, models for explaining an individual's behavioral intention such as the theory of reasoned action and theory of planned behavior considered social influence as one of the key constructs. Many studies have demonstrated social influence's validity as an appropriate additional variable for predicting intention to accept new technology (e.g., [28,30,94]). This variable has consistently proven to be a significant motivator of behavioral intention within the tourism and air transport sectors until now (e.g., [95–97]). In biometrics-related research, a significant connection between social influence and acceptance intention has been observed [54,56,98]. Despite the abundance of empirical evidence supporting the positive effects of social influence on travel-related behavior and technology acceptance, it is worth mentioning that instances of negative influence have also been documented (e.g., [99,100]). According to Miltgen, Popovič, and Oliveira [18], social influence can either encourage or discourage technology usage intention. Thus, we hypothesize that social influence significantly impacts the intention to use the airport biometric system.

Trust in the capability of safeguarding information is a subjective belief that the party that owns the personal information will voluntarily implement appropriate and dependable protection commitments against potential threats and vulnerabilities of exposure [27]. This variable represents the opposite concept of privacy concern, signifying the apprehension arising from individuals' unease regarding the provision of their unique personal information [101]. In other words, privacy concerns stem from individual psychological factors, while trust is based on evaluations and faith in the information recipient [102]. These two variables have been considered crucial in understanding the intention to adopt technology. In certain instances, privacy concerns have been deemed insignificant in airport biometric system studies ([12,103]). However, research on the influence of trust has been overlooked in this topic and exploring this aspect could reveal fresh perspectives. In numerous studies, trust has been verified as one of the factors that have a strong influence on an individual's willingness to accept a technology [104–108]. In particular, trust has been considered essential for information systems dealing with personal information such as mobile payment and e-commerce [109,110]. Also, studies on biometric systems have highlighted the strong impact of trust on users' decisions to adopt this technology [111]. Based on the evidence of previous studies, we established hypotheses as follows. The theoretical research model of the current study is illustrated in Figure 1.

H4: *Technology familiarity will significantly influence perceived ease of use.*

H5: *Technology familiarity will significantly influence the intention to use the biometric system of an airport.*

H6: *Social influence will significantly influence the intention to use the biometric system of an airport.*

H7: *Trust in information protection will significantly influence the intention to use the biometric system of an airport.*

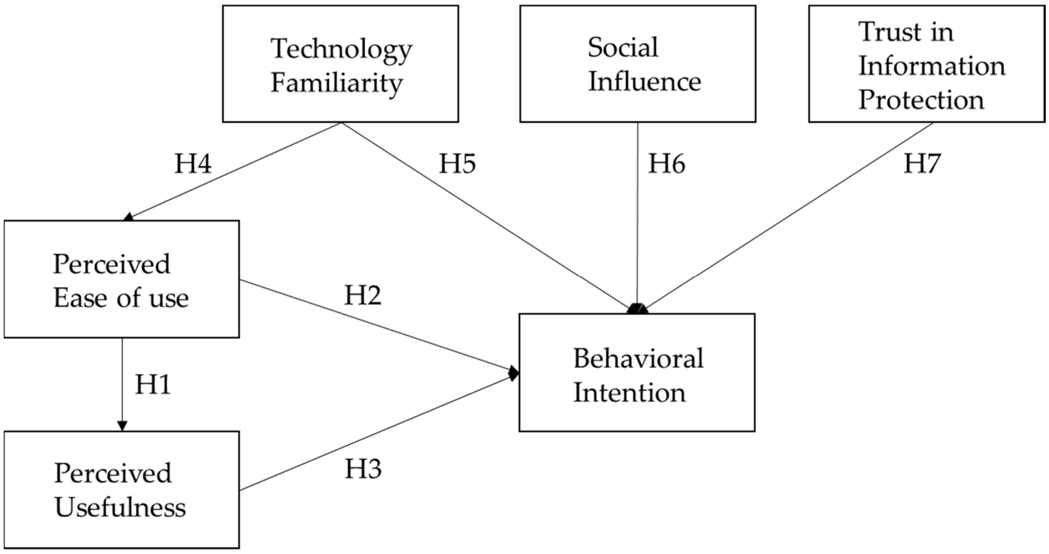

Figure 1. Theoretical research model.

2.3.3. Moderating Effect of Gender

Previous studies have suggested that gender is a critical demographic variable as a moderator in understanding technology acceptance intention [34,37,112]. For example, Venkatesh and Morris [32] found that gender-moderated relationships involving perceived ease of use, perceived usefulness, and behavioral intention also moderated the effect of social influence on behavioral intention. Their research revealed that males were more influenced by perceived usefulness in accepting technology, while females were more influenced by perceived ease of use. Furthermore, the impact of social influence on behavioral intention was greater for females compared to males [32]. Borrero et al. [112] also found that gender moderated the effect of perceived usefulness, perceived ease of use, and social influence on acceptance intention. Additionally, some prior studies have highlighted gender-specific perspectives regarding trust in technology [113,114]. Shao et al. [114] suggested that females displayed more concerns about privacy infringement and were more sensitive to an organization's security-related policy. Despite these insights into gender's role in moderating the relationship between user perception and behavioral intention, there is no academic insight into what causes the difference in the level of intention to use the airport biometric system between males and females. To address this research question, we established hypotheses to examine the moderating effect of gender as follows:

H8a: *Gender has a significant moderating effect on the relationship between perceived ease of use and perceived usefulness.*

H8b: *Gender has a significant moderating effect on the relationship between perceived ease of use and behavioral intention.*

H8c: *Gender has a significant moderating effect on the relationship between perceived usefulness and behavioral intention.*

H8d: *Gender has a significant moderating effect on the relationship between technology familiarity and perceived ease of use.*

H8e: *Gender has a significant moderating effect on the relationship between technology familiarity and behavioral intention.*

H8f: *Gender has a significant moderating effect on the relationship between social influence and behavioral intention.*

H8g: *Gender has a significant moderating effect on the relationship between trust in information protection and behavioral intention.*

3. Methodology

Data Collection and Analytical Method

The questions in the questionnaires were formulated using information from the pertinent literature [13,18,30,31,55,59,104,115,116]. Before actual data collection, we conducted a pre-test on 30 people comprising air practitioners and frequent flyers to ensure content validity. That is, the pre-test was conducted to evaluate whether each question effectively measured the intended aspects and to estimate the required time and resources before conducting the large-scale study [117,118]. The Cronbach's alpha values of the 30 samples fell within the range of 0.754 to 0.877, exceeding the threshold of 0.7 recommended by Gefen, Straub, and Boudreau [119]. Also, the questions were properly revised based on respondents' feedback. The final set of questionnaires consisted of 8 questions pertaining to demographic and travel-related information, alongside 18 questions targeting 6 constructs within the research model. All participants' responses were evaluated utilizing a 5-point Likert scale (1 = strongly disagree; 2 = disagree; 3 = neutral; 4 = agree; 5 = strongly agree). The survey data for the current research was collected at Gimpo international airport in Korea from May 22 to June 12 in 2023. The survey was administered in person through face-to-face interactions with the respondents. Well-trained investigators explained the research purposes and contents of the questionnaires to the respondents to reduce response errors. The survey was conducted when the respondents fully understood the questionnaires and agreed to the data collection. The investigators maintained a certain distance during the response for free expression from respondents. After excluding inappropriate responses and non-responses (41 in total), we collected 581 usable data out of the initial 622. We aimed to collect as much data as possible within the time frame permitted by the airport to ensure the quality of the analysis. Table 1 provides a summary of the respondents' demographic and travel-related information. We employed structural equation modeling using AMOS 27 and SPSS 27. We developed a research model using thoroughly validated relationships between variables and we employed the AMOS program, which is recognized for its effectiveness in confirmatory structural equation modeling (SEM) [120]. We also employed Cronbach's alpha to evaluate reliability through internal consistency.

Table 1. Demographic and travel-related information of the collected sample.

Attribute	Subgroup Categories	Sample Size	Proportion (%)
Gender	Male	291	50
	Female	290	50
Age *	20–29	147	25
	30–39	162	28
	40–49	137	24
	≥50	135	23
Purpose of travel	Leisure	393	68
	Business	50	9
	Visit friends and relatives	25	4
	Others	113	19
Education level	High school diploma or less	102	18
	Associate degree	140	24
	Bachelor's degree	238	41
	Graduate degree	101	17
Occupation	Company employee	135	23
	Private business	70	12
	Student	105	18
	Professional	87	15
	Housewife	31	5
	Government employee	71	12
	Others	82	14

Table 1. *Cont.*

Attribute	Subgroup Categories	Sample Size	Proportion (%)
Monthly income	Less than $1000	122	21
	$1000–2000	91	16
	$2001–3000	148	25
	$3001–4000	121	21
	More than $4000	99	17
Mainly used seat class	Economy class	555	96
	Business	18	3
	First	8	1
Flying frequency/Year	Once or less	184	32
	Two or three times	218	38
	Four or five times	117	20
	Over six times	62	11

* Due to the age restrictions that prohibit individuals under the age of 14 from registering biometric information, this specific age group, with individuals aged 14 to 19, was excluded from the survey.

4. Results

4.1. Measurement Model

To assess the measurement model's validity and reliability, confirmatory factor analysis (CFA) was performed. Before a CFA was carried out, we tested the normality assumption using skewness and kurtosis criteria. The absolute values of skewness ranged from 0.032 to 0.687 and kurtosis ranged from 0.239 to 1.304, indicating that the normality of measurement scales were satisfied [121]. The mean, standard deviation, skewness, and kurtosis of each construct were summarized in Appendix A. The goodness of fit of CFA is χ^2 = 397.244 (df = 120, p = 0.000); GFI = 0.929 (recommended >0.900); χ^2/df = 3.310 (recommended <3); CFI = 0.969 (recommended >0.950); NFI = 0.957 (recommended >0.900); and RMSEA = 0.063 (recommended <0.080); RMR = 0.039 (recommended <0.080) [122]. We evaluated the convergent validity by using standardized factor loading and the average variance extracted (AVE) of each latent construct. When all the factor loading values exceed 0.7 and the AVE value exceeds 0.5, convergent validity is confirmed [123]. In this study, the factor loading of items was greater than the recommended value, ranging between 0.791 and 0.919. AVE values were also higher than the threshold value, showing the range from 0.723 to 0.820. This outcome suggested good convergent validity. The reliability of the construct was examined by calculating composite reliability and Cronbach's alpha score. To establish reliability, all composite reliability and Cronbach's alpha scores should be over 0.7 [119]. The results showed that all composite reliability and Cronbach's alpha values were more than 0.7, which indicated the appropriate reliability. The composite reliability ranged from 0.886 to 0.932 and Cronbach's alpha coefficient ranged from 0.878 to 0.930. These results are summarized in Table 2. The discriminant validity was evaluated from a comparison between AVEs and the square value of inter-construct correlations. In order to verify a discriminant validity, AVE values should be greater than all square values of inter-construct correlation [123]. Table 3 shows that the lowest value of the AVE is 0.723 and the highest square value of inter-construct correlation is 0.539, indicating that the proper discriminant validity is achieved.

Table 2. The test results of reliability and validity.

Construct	Item	Factor Loading	AVE	Composite Reliability	Cronbach's Alpha
Perceived Usefulness [18,55,59]	1. Utilizing airport biometric technology will expedite my boarding process.	0.916	0.820	0.932	0.930
	2. I think that utilizing airport biometric technology improves the overall quality of the airport service process.	0.912			
	3. Overall, I think that utilizing airport biometric technology is useful	0.889			

Table 2. *Cont.*

Construct	Item	Factor Loading	AVE	Composite Reliability	Cronbach's Alpha
Perceived Ease of Use [18,55,59]	1. I would find it easy to learn how to use the airport biometric technology.	0.856	0.749	0.899	0.893
	2. The airport biometric technology is user-friendly, especially during initial use.	0.864			
	3. Utilizing airport biometric technology does not demand significant effort.	0.876			
Technology Familiarity [31,116]	1. I am familiar with using airport biometric technology.	0.903	0.778	0.913	0.878
	2. I have the knowledge to use airport biometric technology.	0.861			
	3. I am experienced with airport biometric technology.	0.882			
Social Influence [30,115]	1. My friends or relatives would support my use of airport biometric technology.	0.791	0.723	0.886	0.888
	2. Those who matter to me would prefer my use of airport biometric technology.	0.887			
	3. Those who influence my actions motivate me to utilize airport biometric technology.	0.869			
Trust in Information Protection [13,18,104]	1. I trust that the airport will take measures to safeguard personal biometric information.	0.841	0.754	0.902	0.901
	2. I trust that the airport will not share any of my personal biometric information without obtaining my consent.	0.869			
	3. I trust that the airport biometric technology offers a high level of security.	0.894			
Behavioral Intention [13,55,59]	1. I plan to utilize the airport biometric technology in the future.	0.919	0.819	0.931	0.928
	2. I will suggest others to utilize the airport biometric technology.	0.887			
	3. I intend to use the airport biometric technology.	0.908			

Table 3. The test results of discriminant validity.

	PU	PEOU	TF	SI	TIP	BI
PU *	0.820 **					
PEOU	0.402	0.749				
TF	0.267	0.471	0.778			
SI	0.245	0.212	0.175	0.723		
TIP	0.171	0.233	0.257	0.366	0.754	
BI	0.419	0.457	0.358	0.387	0.539	0.819

* PU = Perceived Usefulness, PEOU = Perceived Ease of Use, TF = Technology Familiarity, SI = Social Influence, TIP= Trust in Information Protection, BI = Behavioral Intention. ** The values in bold indicate the AVE for each construct while the plain values indicate the squared inter-construct correlations.

4.2. Structural Model

The structural equation model analysis was performed to test the hypotheses. The model demonstrated goodness of fit statistics in their acceptable ranges [122]: χ^2 = 273.968 (df = 97, p = 0.000); GFI = 0.954 (recommended >0.900); χ^2/df = 2.946 (recommended <3); CFI = 0.980 (recommended >0.950); NFI = 0.970 (recommended >0.900); RMSEA = 0.058 (recommended <0.080); RMR = 0.067 (recommended <0.080). These model fit indicators demonstrated a good fit for the research model. The path analysis results are summarized in Table 4. The result showed that H1 is supported (β = 0.645, p < 0.01) and it means that if travelers feel free to use the biometric system at an airport, they are more likely to perceive the usefulness of the system. Perceived ease of use positively affected usage intention (β = 0.281, p < 0.01) and perceived usefulness also had a positive relationship with usage intention (β = 0.249, $p < 0.01$), supporting the H2 and H3. These results suggest that travelers are more likely to accept the airport biometric system when they recognize that the system can efficiently support their airport task and is not difficult to use. In terms of external variables, technology familiarity had a positive effect on perceived ease of use (β = 0.758, $p < 0.01$) but it did not have a statistically significant impact on acceptance intention (β = 0.015, $p = 0.775$). Therefore, H4 was supported while H5 was not supported. In addition, the impact of social influence on intention to use was not statistically verified in this study (β = 0.070, $p = 0.065$) and it rejected H6. This result revealed that social influence is not a consideration when a traveler determines whether they use the airport biometric system. Finally, trust was confirmed as the greatest motivator to accelerate the traveler's intention to use the biometric system (β = 0.472, $p < 0.01$) and it supported H7. This result indicated that the trust of tourists must be considered to increase the intention to use the biometric system. The finalized research model is depicted in Figure 2.

Table 4. Results of the structural model and hypothesis test.

Hypothesis	Standard Error	Standardized Coefficient	*t*-Value	*p*-Value	Result
H1: PEOU → PU	0.044	0.645	14.836	***	Supported
H2: PEOU → BI	0.063	0.281	4.902	***	Supported
H3: PU → BI	0.040	0.249	6.845	***	Supported
H4: TF → PEOU	0.030	0.758	18.124	***	Supported
H5: TF → BI	0.042	0.015	0.286	0.775	Not supported
H6: SI → BI	0.048	0.070	1.844	0.065	Not supported
H7: TIP → BI	0.044	0.472	11.432	***	Supported

*** = $p < 0.01$.

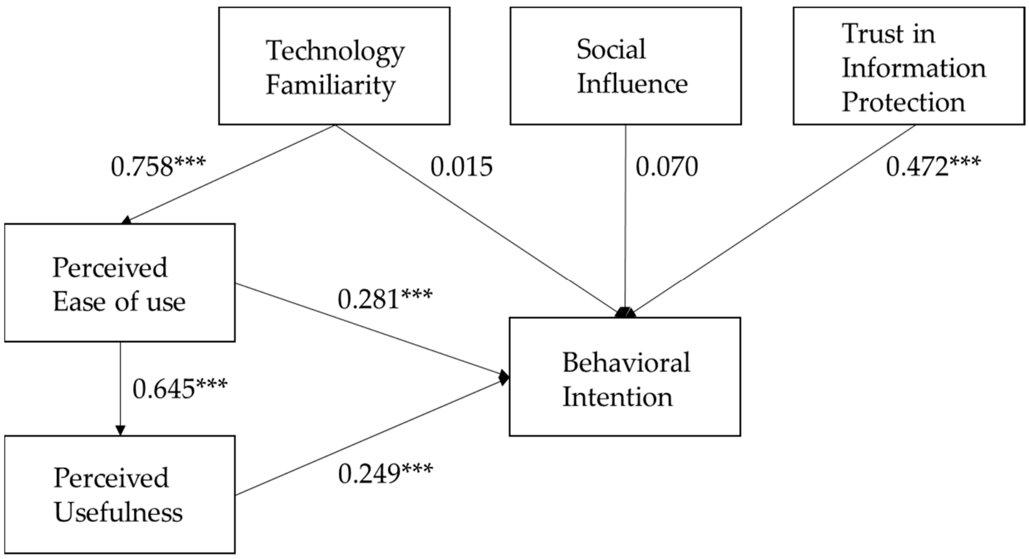

Figure 2. Research model result (*** = $p < 0.01$).

4.3. Moderating Effect Analysis

We conducted the moderation analysis to test the moderation hypotheses. The moderation analysis consisted of measurement and structural invariance tests. The total sample data was divided into male and female groups. After that, we generated an unconstrained model ($\chi^2 = 576.358$, $df = 240$, $p < 0.001$, $\chi^2/df = 2.401$, CFI = 0.963, TLI = 0.953, RMSEA = 0.049) and full-metric invariance model ($\chi^2 = 595.116$, $df = 252$, $p < 0.001$, $\chi^2/df = 2.362$, CFI = 0.962, TLI = 0.954, RMSEA = 0.048) to test the metric equivalence. The goodness-of-fit indices of the unconstrained model showed that the model had an appropriate fit to data [124]. Since all factor loadings in the full-metric invariance model are restricted to be equivalent between male and female groups, comparing the unconstrained model with the full-metric invariance model can confirm whether the male and female groups respond to the measurement items in the same way. The result of the chi-square difference test revealed that the two models were not significantly different ($\Delta\chi^2(12) = 18.758$, $p > 0.05$), indicating that the metric invariance of the two groups was supported.

A structural invariance test was carried out. The baseline model, which is a freely estimated model, was compared to a series of nested models constraining the specific relationships (i.e., seven paths of the baseline model). The model fit of the baseline model was included in the acceptable range ($\chi^2 = 446.837$, df = 194, $p < 0.001$, $\chi^2/\text{df} = 2.303$, CFI = 0.972, TLI = 0.956, RMSEA = 0.047). Table 5 denotes the details of the structural invariance test and hypothesis test of the moderating effect. Our findings showed that the path from trust in information protection to behavioral intention was significantly different between gender groups. Both men and women were affected by trust in the information protection capability of airports but it turned out that women were more affected than men. Except for the path from trust to behavioral intention, all the paths did not have a significant difference. Therefore, H8a, H8b, H8c, H8d, H8e, and H8f were not supported while H8g was supported.

Table 5. Results of the structural invariance test and hypothesis test of the moderating effect.

Path	Male	Female	Baseline Model	Nested Model	Chi-Square Difference	Result
H8a: PEOU → PU	0.656 ***	0.586 ***	$\chi^2(194) = 446.837$	$\chi^2(195) = 447.556$	$\Delta\chi^2(1) = 0.719$ ($p > 0.05$)	NS *
H8b: PEOU → BI	0.429 ***	0.241 ***	$\chi^2(194) = 446.837$	$\chi^2(195) = 446.842$	$\Delta\chi^2(1) = 0.005$ ($p > 0.05$)	NS
H8c: PU → BI	0.338 ***	0.255 ***	$\chi^2(194) = 446.837$	$\chi^2(195) = 447.851$	$\Delta\chi^2(1) = 1.014$ ($p > 0.05$)	NS
H8d: TF → PEOU	0.566 ***	0.503 ***	$\chi^2(194) = 446.837$	$\chi^2(195) = 447.903$	$\Delta\chi^2(1) = 1.066$ ($p > 0.05$)	NS
H8e: TF → BI	−0.020	0.063	$\chi^2(194) = 446.837$	$\chi^2(195) = 448.035$	$\Delta\chi^2(1) = 1.198$ ($p > 0.05$)	NS
H8f: SI → BI	0.170 **	−0.02	$\chi^2(194) = 446.837$	$\chi^2(195) = 450.214$	$\Delta\chi^2(1) = 3.377$ ($p > 0.05$)	NS
H8g: TIP → BI	0.410 ***	0.643 ***	$\chi^2(194) = 446.837$	$\chi^2(195) = 453.372$	$\Delta\chi^2(1) = 6.535$ ($p < 0.05$)	S **

* NS = Not Supported, ** S = Supported, *** = $p < 0.01$.

5. Discussion

5.1. Impact of Perceived Usefulness and Perceived Ease of Use on the Intention to Use the Airport Biometric System

The outcomes of this study revealed that the perceived usefulness and perceived ease of use, related to the system's functional aspects, significantly predicted the intention to accept the airport biometric system. These findings align with earlier biometric-related research that suggested the positive impact of perceived usefulness and perceived ease of use on the intention to use biometric systems [13,55,56,125,126]. However, the results can diverge from the research conducted by Kasim et al. [21], which employed usefulness and ease of use to explore intentions towards airport biometric system usage. In their study, the impact of usefulness and ease of use on intention was not statistically significant. In response to these divergent outcomes, the researchers suggested that the influence of usefulness and ease of use might vary depending on factors such as the type of biometric information (e.g., face, eyes, vein, or fingerprints) or respondent characteristics. Additionally, it is worth noting that while their study utilized an online survey, the data for this study were gathered in person through face-to-face interactions with respondents at the airport where the biometric system is deployed. Such differences in data collection methods could potentially account for the disparities in results.

Based on these results, this study demonstrated that perceived usefulness and perceived ease of use in TAM can be used effectively in explaining traveler's intention to use the airport biometric system. The positive impact of perceived usefulness indicates that passengers who believe the biometric system can enhance airport service efficiency are more inclined to embrace its use. Similarly, the positive connection between perceived ease of use and usage intention suggests that travelers are more likely to adopt the system when they perceive it as requiring less effort. Thus, proactively eliminating the difficulties that users may experience and making them feel free to use the system are crucial for the successful and sustainable implementation of airport biometric systems. Furthermore, the positive correlation between perceived usefulness and perceived ease of use implies that passengers who perceive the system as uncomplicated are more likely to find it useful and consider its adoption. These encouraging effects highlight the importance of implementing the biometric system to effectively support passengers' airport tasks and promote its widespread use.

5.2. Impact of External Variables on the Intention to Use the Airport Biometric System

One of the findings identified that trust had the strongest influence among the established constructs ($\beta = 0.572$, $p < 0.01$). This outcome aligns with previous research highlighting trust as the most powerful predictor of biometric system adoption [18,127]. In a similar vein, Obermeier, Kilngersberger, and Auinger [103] pointed out that while airport users might be willing to share their unique biometric data to enhance convenience, a stringent security standard would be likely to be demanded. The study by Kim, Lee, and Castello [22] also demonstrated that perceived risk, including security risk, significantly negatively impacts both initial and repeated intentions to use the airport biometric system. The apprehension surrounding potential data exposure and misuse are significant deterrents to biometric technology adoption [128] so it is reasonable that users who have confidence in the organization's data protection capabilities are more inclined to embrace a biometric system.

Moderation analysis further unveiled that gender played a significant role in moderating trust. The impact of trust on usage intention was evidently stronger in females compared to males. This finding resonates with prior research [113,114] suggesting that females' privacy concerns lead them to be more influenced by robust information security policies when adopting specific systems or technologies compared to males. Based on the results of the current study, it is evident that when a sense of security in information handling is established, women are more predisposed to adopting the airport biometric system than men.

While the meaning of social influence has been elucidated in various previous studies such as destination choices [129], airline preferences [130], and e-ticket purchasing [26,28], its statistical significance was established, but not in our study. This suggests that tourists using the airport's biometric system do not heavily rely on recommendations or opinions from others. To contextualize this result, it is crucial to note that an airport biometric system is a relatively recent service, particularly limited to domestic flights in Korean airports. Regarding the intention to adopt innovation, it is often expected that the lack of a significant impact of social influence on acceptance intention can occur, as previous studies have also yielded comparable findings (e.g., [131–133]). For social influence to play a role, travelers should receive prior recommendations from experienced users [115]. However, as previously discussed, biometric system are not yet widespread compared to other airport services, making it challenging to gather relevant information from experienced peers. Moreover, modern travelers tend to seek travel-related information from online sources such as blogs, social media, online reviews, and online travel agencies [134–137] which can diminish the impact of normative pressure [106]. This scenario may well explain the lack of a significant impact of social influence on the intention to use airport biometric systems. Although its impact was not statistically significant, including this variable was necessary to comprehend the social context in the investigation of airport biometric acceptance intention [13], representing a meaningful endeavor in this regard.

Regarding technology familiarity, this variable impacted perceived ease of use ($\beta = 0.758$, $p < 0.01$). However, it did not have a direct influence on the intention to use the airport biometric system. This finding should be understood considering the distinctive features of airport biometric systems. Unlike biometric devices integrated into our daily routines like commuting, mobile phones, banking, and computers, it is important to acknowledge that airport biometric systems are accessible only within the confines of airport usage. In essence, individuals, even those well-versed in biometric technology, seem to perceive airport biometric systems as distinct due to their relatively limited accessibility.

5.3. Variables with Potential Negative Impact

We attempted to discover the essential determinants that impact the intention to use the airport biometric system and ascertain their statistical significance, regardless of whether they have a positive or negative effect. Our findings confirmed that perceived usefulness, ease of use, and trust in information protection significantly and positively influenced the intention to use. However, we could not identify factors negatively affecting the intent to use within our research model. Therefore, we aim to explore related studies encompassing biometric technology in general, including airport biometric systems, to pinpoint variables potentially influencing intention negatively.

In the context of airport biometrics, there are variables that have a negative influence, such as perceived risk, and privacy concern. Kim, Lee, and Castello [22] categorized perceived risk into temporary, physical, and functional risks, which were linked to a decreased intention to use the biometric system. Privacy concern has traditionally been considered a variable that can have a negative impact on the intention to use most technologies or systems involving the use of other people's information. Similarly, the airport biometric identification system utilizes an individual's unique biometric information for airport handling procedures, which are public services, making it susceptible to a negative impact. While Kasim's [21] study clearly confirmed a negative influence, Morosan's study [13] did not establish statistical significance.

There are also factors that negatively affect the intention to use biometric technology due to its inherent characteristics. For instance, James et al. [138] proposed that biometric technology involving the scanning of an individual's eyes and face can evoke negative emotions. This characteristic is referred to as physical invasiveness. Their study empirically confirmed that physical invasiveness indeed has a negative effect on the intention to use biometric technology. In a related context, information sensitivity, defined as the degree to which an individual is sensitive to information, has been identified as a factor that negatively impacts the intention to use the biometric system. Typically, users regard an individual's unique biometric information as highly sensitive and the act of its utilization is often perceived negatively, potentially impeding the intention to use it [54].

6. Conclusions

The sustainable operation of airport biometric systems relies not only on their technological excellence but also on passenger adoption. Cutting-edge features alone do not ensure high usage rates. Hence, understanding user intentions, addressed in RQ1, is vital for sustaining these costly and time-intensive systems. The study confirmed that perceived usefulness, ease of use, and trust in information protection significantly impact intention. Notably, this research seeks to identify drivers that encourage passengers to consistently utilize the biometric system even in a post-COVID-19 environment marked by reduced risks and deregulation. Moreover, this study has confirmed the influence of gender on the intention to use airport biometric systems, especially when dealing with highly sensitive personal biometric data. This gender-related impact is particularly noteworthy in public spaces like airports [139]. We addressed this gap through RQ2 and our findings indicate that women tend to have a higher intention to use these systems, driven by greater trust in information protection compared to men.

6.1. Practical and Academic Implications

Based on the main research findings, several strategies and action plans are recommended from the perspective of airport system practitioners. Firstly, our results emphasize the need for airport managers to ensure the effective functionality of a biometric system, aligning it with passengers' needs. Clear identification of the positive experiences passengers expect from the system and its proper implementation are crucial. To promote adoption and future use, proactive marketing efforts are essential in conveying the system's usefulness. Additionally, practitioners should recognize the pivotal role of the ease of using the system. The simplification of processes, user-friendly interfaces, and straightforward registration procedures for personal biometric information are vital in this regard. Secondly, trust emerges as the key driver for encouraging system use. Airport managers must establish robust policies and procedures to instill traveler confidence in the airport's ability to safeguard personal information. Implementing marketing strategies that highlight the system's information security capabilities and how passenger data are protected can enhance trust and subsequently influence their intention to use the biometric system.

From an academic standpoint, this study aims to address the lack of empirical research on the factors influencing travelers' intentions to use the airport biometric system. Despite the growing global interest in airport biometric systems [1,7,13], there has been limited research focused on passenger intentions—a crucial precursor for the sustainable implementation of the system. In this regard, this study offers valuable academic insight by introducing an extended TAM framework that incorporates technology familiarity, social influence, and trust. By examining both the functional aspects of the system (perceived usefulness and perceived ease of use) and users' socio-psychological factors (technology familiarity, social influence, and trust), the proposed research model offers a more comprehensive understanding of acceptance intentions. Moreover, gender has frequently been identified as a significant moderator in related fields [32,34,36,140] yet empirical evidence within the airport biometric system context is limited. Our study contributes to filling this research gap by exploring the moderating role of gender, providing an initial step in comprehending individual characteristics in the context of the airport biometric system.

6.2. Future Works

While the current study provides empirical insights, further research is needed for a more comprehensive understanding. Firstly, the study confirms the significance of perceived usefulness and perceived ease of use in explaining an intention to use the airport biometric system. However, these concepts encompass various attributes such as system quality, processing speed, and compatibility. Therefore, investigating the specific attributes of the biometric system that travelers find useful and easy to use is necessary for a deeper analysis. This would enable the identification of more nuanced factors influencing the intention to use the system and aid airports in formulating concrete and practical implementation strategies. Secondly, it is worth noting that individual perceptions towards a certain system or technology can evolve with usage over time [88,141]. Given that the current study adopts a cross-sectional approach, it is unable to capture these changes. To address this limitation, a recommended avenue for future research is conducting a longitudinal study that considers evolving impacts over time.

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Appendix A

Table A1. Mean, standard deviation, skewness, and kurtosis of measurement items.

Construct	Item	Mean	Standard Deviation	Skewness	Kurtosis
Perceived Usefulness	PU1	3.859	1.085	−0.687	−0.326
	PU2	3.816	1.086	−0.662	−0.308
	PU3	3.874	1.056	−0.634	−0.427
Perceived Ease of use	PEOU1	3.439	1.091	−0.162	−0.698
	PEOU2	3.339	1.082	−0.116	−0.733
	PEOU3	3.318	1.102	−0.167	−0.642
Technology Familiarity	TF1	3.000	1.003	0.225	−0.239
	TF2	3.033	1.076	0.068	−0.570
	TF3	3.091	1.096	−0.032	−0.773
Social Influence	SI1	3.053	1.395	0.049	−1.305
	SI2	2.733	1.145	0.403	−0.642
	SI3	2.790	1.234	0.156	−0.955
Trust in Information Protection	TIP1	2.967	1.126	0.100	−0.721
	TIP2	3.207	1.052	−0.198	−0.601
	TIP3	3.072	1.168	0.034	−0.885
Behavioral Intention	BI1	3.547	1.099	−0.334	−0.696
	BI2	3.373	1.110	−0.374	−0.470
	BI3	3.575	1.079	−0.445	−0.484

References

1. IATA. Convenience Is Top Priority for Passenger. Available online: https://airlines.iata.org/2022/11/01/convenience-top-priority-passengers (accessed on 9 August 2023).
2. Florido-Benítez, L. The effects of COVID-19 on Andalusian tourism and aviation sector. *Tour. Rev.* **2021**, *76*, 829–857. [CrossRef]
3. Bogicevic, V.; Bujisic, M.; Bilgihan, A.; Yang, W.; Cobanoglu, C. The impact of traveler-focused airport technology on traveler satisfaction. *Technol. Forecast. Soc. Chang.* **2017**, *123*, 351–361. [CrossRef]
4. Pandey, M.M. Evaluating the service quality of airports in Thailand using fuzzy multi-criteria decision making method. *J. Air Transp. Manag.* **2016**, *57*, 241–249. [CrossRef]
5. Tyagi, S.; Lodewijks, G. The Impact of Passenger Characteristics on Use of Self-Service Technologies for Check-In Process: A Case Study of Sydney Airport. *J. Aviat. Technol. Eng.* **2022**, *11*, 2. [CrossRef]
6. Donadio, F.; Frejaville, J.; Larnier, S.; Vetault, S. Artificial intelligence and collaborative robot to improve airport operations. In *Online Engineering & Internet of Things, Proceedings of the 14th International Conference on Remote Engineering and Virtual Instrumentation REV 2017, New York, NY, USA, 15–17 March 2017*; Springer: Berlin/Heidelberg, Germany, 2017.
7. Kalakou, S.; Psaraki-Kalouptsidi, V.; Moura, F. Future airport terminals: New technologies promise capacity gains. *J. Air Transp. Manag.* **2015**, *42*, 203–212. [CrossRef]
8. Horkay, J.; Al-Rabeei, S.; Korba, P.; Hovanec, M.; Tymofiiv, V. Opportunities for the Use of Biometric Technology in Air Transport. In *EAI International Conference on Smart Cities within Smart City 360° Summit*; Springer: Berlin/Heidelberg, Germany, 2022.
9. OAG Aviation. Biometrics at the Airport: Why the Travelsphere's Future is Digital. Available online: https://www.oag.com/blog/biometrics-airport-travelspheres-future-digital (accessed on 9 August 2023).
10. Park, S.; Park, J. A Study on the Factors Influencing the Intention to Use Bio Pass at Airports through Innovation Resistance. *J. Korean Soc. Aviat. Aeronaut.* **2023**, *31*, 7–17. [CrossRef]
11. The Economist. How Airports Use Biometric Technology. Available online: https://www.economist.com/the-economist-explains/2018/11/12/how-airports-use-biometric-technology (accessed on 9 August 2023).
12. Khan, N.; Efthymiou, M. The use of biometric technology at airports: The case of customs and border protection (CBP). *Int. J. Inf. Manag. Data Insights* **2021**, *1*, 100049. [CrossRef]
13. Morosan, C. An empirical examination of US travelers' intentions to use biometric e-gates in airports. *J. Air Transp. Manag.* **2016**, *55*, 120–128. [CrossRef]
14. The New York Times. Your Face Is, or Will Be, Your Boarding Pass. Available online: https://www.nytimes.com/2021/12/07/travel/biometrics-airports-security.html (accessed on 9 August 2023).
15. Zhang, Z. Smart Solutions to Airport Security in Post-COVID-19 Era. *Aca. J. Bus. Manag.* **2022**, *4*, 100–106.
16. IATA. IATA 2018 Global Passenger Survey. Available online: http://www.invest-data.com/eWebEditor/uploadfile/201810152130335422704.pdf (accessed on 9 August 2023).

17. IATA. IATA 2021 Global Passenger Survey. Available online: https://www.iata.org/contentassets/baf7cb5eed64472aaac8906608085aff/global-passenger-survey-2022-media-briefing.pdf (accessed on 9 August 2023).
18. Miltgen, C.L.; Popovič, A.; Oliveira, T. Determinants of end-user acceptance of biometrics: Integrating the "Big 3" of technology acceptance with privacy context. *Decis. Support Syst.* **2013**, *56*, 103–114. [CrossRef]
19. Alabsi, M.I.; Gill, A.Q. A review of passenger digital information privacy concerns in smart airports. *IEEE Access* **2021**, *9*, 33769–33781. [CrossRef]
20. Prabhakar, S.; Pankanti, S.; Jain, A.K. Biometric recognition: Security and privacy concerns. *IEEE Secur. Priv.* **2003**, *2*, 33–42. [CrossRef]
21. Kasim, K.O.; Winter, S.R.; Liu, D.; Keebler, J.R.; Spence, T.B. Passengers' perceptions on the use of biometrics at airports: A statistical model of the extended theory of planned behavior. *Technol. Soc.* **2021**, *67*, 101806. [CrossRef]
22. Kim, C.; Lee, K.C.; Costello, F.J. The intention of passengers towards repeat use of biometric security for sustainable airport management. *Sustainability* **2020**, *12*, 4528. [CrossRef]
23. Fan, X.; Lu, J.; Qiu, M.; Xiao, X. Changes in travel behaviors and intentions during the COVID-19 pandemic and recovery period: A case study of China. *J. Outdoor Recreat. Tour.* **2023**, *41*, 100522. [CrossRef] [PubMed]
24. Florido-Benítez, L. A Bibliometric Overview of the International Airports and Airlines 'IAA'Topic in Journals and Scientific Community. *Logistics* **2023**, *7*, 35. [CrossRef]
25. Lee, S.; Ko, E.; Jang, K.; Kim, S. Understanding individual-level travel behavior changes due to COVID-19: Trip frequency, trip regularity, and trip distance. *Cities* **2023**, *135*, 104223. [CrossRef]
26. Gefen, D. E-commerce: The role of familiarity and trust. *Omega* **2000**, *28*, 725–737. [CrossRef]
27. Gefen, D.; Karahanna, E.; Straub, D.W. Inexperience and experience with online stores: The importance of TAM and trust. *IEEE Trans. Eng. Manag.* **2003**, *50*, 307–321. [CrossRef]
28. Lee, C.; Wan, G. Including subjective norm and technology trust in the technology acceptance model: A case of e-ticketing in China. *Data Base Adv. Inf.* **2010**, *41*, 40–51. [CrossRef]
29. Fang, Y.; Qureshi, I.; Sun, H.; McCole, P.; Ramsey, E.; Lim, K.H. Trust, satisfaction, and online repurchase intention: The moderating role of perceived effectiveness of e-commerce institutional mechanisms. *MIS Q.* **2014**, *38*, 407–428. [CrossRef]
30. Kim, H.B.; Kim, T.T.; Shin, S.W. Modeling roles of subjective norms and eTrust in customers' acceptance of airline B2C eCommerce websites. *Tour. Manag.* **2009**, *30*, 266–277. [CrossRef]
31. Kinard, B.R.; Capella, M.L.; Kinard, J.L. The impact of social presence on technology based self-service use: The role of familiarity. *Serv. Mark. Q.* **2009**, *30*, 303–314. [CrossRef]
32. Venkatesh, V.; Morris, M.G. Why don't men ever stop to ask for directions? Gender, social influence, and their role in technology acceptance and usage behavior. *MIS Q.* **2000**, *24*, 115–139. [CrossRef]
33. Assaker, G. Age and gender differences in online travel reviews and user-generated-content (UGC) adoption: Extending the technology acceptance model (TAM) with credibility theory. *J. Hosp. Mark. Manag.* **2020**, *29*, 428–449. [CrossRef]
34. Kim, J. An extended technology acceptance model in behavioral intention toward hotel tablet apps with moderating effects of gender and age. *Int. J. Contemp. Hosp. Manag.* **2016**, *28*, 1535–1553. [CrossRef]
35. Lian, J.W.; Yen, D.C. Online shopping drivers and barriers for older adults: Age and gender differences. *Comput. Hum. Behav.* **2014**, *37*, 133–143. [CrossRef]
36. Morris, M.G.; Venkatesh, V.; Ackerman, P.L. Gender and age differences in employee decisions about new technology: An extension to the theory of planned behavior. *IEEE Trans. Eng. Manag.* **2005**, *52*, 69–84. [CrossRef]
37. Sharma, M.; Singh, A.; Daim, T. Exploring cloud computing adoption: COVID era in academic institutions. *Technol. Forecast. Soc. Change* **2023**, *193*, 122613. [CrossRef]
38. Tarhini, A.; Hone, K.; Liu, X. Measuring the moderating effect of gender and age on e-learning acceptance in England: A structural equation modeling approach for an extended technology acceptance model. *J. Educ. Comput. Res.* **2014**, *51*, 163–184. [CrossRef]
39. Gomez-Barrero, M.; Drozdowski, P.; Rathgeb, C.; Patino, J.; Todisco, M.; Nautsch, A.; Damer, N.; Evans, N.; Busch, C. Bio-metrics in the era of COVID-19: Challenges and opportunities. *IEEE Trans. Technol. Soc.* **2022**, *3*, 307–322. [CrossRef]
40. El Fkharany, H.M. Applying Biometric Technology for Enhancing Airports Efficiency during COVID-19 pandemic: A case study of Egyptian Destination. *Int. J. Tour. Hosp. Res.* **2022**, *3*, 104–117. [CrossRef]
41. Paik, S.; Mays, K.K.; Katz, J.E. Invasive Yet Inevitable? Privacy Normalization Trends in Biometric Technology. *Soc. Media Soc.* **2022**, *8*, 20563051221129147. [CrossRef]
42. Airports International. How Biometrics Are Driving Airport Recovery. Available online: https://www.airportsinternational.com/article/how-biometrics-are-driving-airport-recovery (accessed on 17 August 2023).
43. Airport Technology. Contactless Airport Boarding: Biometric Technology with SITA. Available online: https://www.airport-technology.com/features/contactless-airport-boarding-biometric-technology-with-sita/ (accessed on 17 August 2023).
44. Nguyen, H.M.; Phuc, H.N.; Tam, D.T. Travel intention determinants during COVID-19: The role of trust in government performance. *J. Innov. Knowl.* **2023**, *8*, 100341. [CrossRef]
45. Kim, M.H.; Park, J.W.; Choi, Y.J. A study on the effects of waiting time for airport security screening service on passengers' emotional responses and airport image. *Sustainability* **2020**, *12*, 10634. [CrossRef]
46. US Customs and Border Protection. Airport/CBP Biometrics. Available online: https://www.cbp.gov/travel/biometrics/airports (accessed on 17 August 2023).

47. Negri, N.A.R.; Borille, G.M.R.; Falcão, V.A. Acceptance of biometric technology in airport check-in. *J. Air Transp. Manag.* **2019**, *81*, 101720. [CrossRef]
48. SITA. Embracing the Change and Adopting Biometrics beyond US Exit. Available online: https://www.sita.aero/pressroom/blog/embracing-the-change-and-adopting-biometrics-beyond-us-exit/ (accessed on 17 August 2023).
49. Future Travel Experience. LAX Unveils New $1.7bn West Gates Expansion Equipped with Latest Technology. Available online: https://www.futuretravelexperience.com/2021/06/lax-unveils-new-1-7bn-west-gates-expansion-equipped-with-latest-technology/ (accessed on 9 August 2023).
50. SITA. Biometric for Better Travel. Available online: https://www.sita.aero/resources/White-papers/biometrics-for-better-travel/ (accessed on 17 August 2023).
51. Farrell, S. How airports can fly to self-service biometrics. *Biom. Technol. Today* **2016**, *2016*, 5–7. [CrossRef]
52. NIST. NIST Evaluates Face Recognition Software's Accuracy for Flight Boarding. Available online: https://www.nist.gov/news-events/news/2021/07/nist-evaluates-face-recognition-softwares-accuracy-flight-boarding (accessed on 17 August 2023).
53. Rajapaksha, A.; Jayasuriya, N. Smart airport: A review on future of the airport operation. *Glob. J. Manag. Bus. Res.* **2020**, *20*, 25–34. [CrossRef]
54. Hino, H. Assessing Factors Affecting Consumers' Intention to Adopt Biometric Authentication Technology in E-shopping. *J. Internet Commer.* **2015**, *14*, 1–20. [CrossRef]
55. Morosan, C. Customers' adoption of biometric systems in restaurants: An extension of the technology acceptance model. *J. Hosp. Mark. Manag.* **2011**, *20*, 661–690. [CrossRef]
56. Kim, J.; Brewer, P.; Bernhard, B. Hotel customer perceptions of biometric door locks: Convenience and security factors. *J. Hosp. Mark. Manag.* **2008**, *17*, 162–183. [CrossRef]
57. Morosan, C. Theoretical and empirical considerations of guests' perceptions of biometric systems in hotels: Extending the technology acceptance model. *J. Hosp. Tour. Res.* **2012**, *36*, 52–84. [CrossRef]
58. Davis, F.D. A Technology Acceptance Model for Empirically Testing New End—User Information Systems: Theory and Results. Ph.D. Thesis, MIT Sloan School of Management, Cambridge, MA, USA, 1986.
59. Davis, F.D.; Bagozzi, R.P.; Warshaw, P.R. User acceptance of computer technology: A comparison of two theoretical models. *Manag. Sci.* **1989**, *35*, 982–1003. [CrossRef]
60. Davis, F.D. Perceived usefulness, perceived ease of use, and user acceptance of information technology. *MIS Q.* **1989**, *13*, 319–340. [CrossRef]
61. Agag, G.; El-Masry, A.A. Understanding consumer intention to participate in online travel community and effects on consumer intention to purchase travel online and WOM: An integration of innovation diffusion theory and TAM with trust. *Comput. Hum. Behav.* **2016**, *60*, 97–111. [CrossRef]
62. Venkatesh, V.; Davis, F.D. A theoretical extension of the technology acceptance model: Four longitudinal field studies. *Manag. Sci.* **2000**, *46*, 186–204. [CrossRef]
63. Abdullah, F.; Ward, R. Developing a General Extended Technology Acceptance Model for E-Learning (GETAMEL) by analysing commonly used external factors. *Comput. Hum. Behav.* **2016**, *56*, 238–256. [CrossRef]
64. Amaro, S.; Duarte, P. An integrative model of consumers' intentions to purchase travel online. *Tour. Manag.* **2015**, *46*, 64–79. [CrossRef]
65. Dutot, V.; Bhatiasevi, V.; Bellallahom, N. Applying the technology acceptance model in a three-countries study of smartwatch adoption. *J. High Technol. Manag. Res.* **2019**, *30*, 1–14. [CrossRef]
66. Manis, K.T.; Choi, D. The virtual reality hardware acceptance model (VR-HAM): Extending and individuating the technology acceptance model (TAM) for virtual reality hardware. *J. Bus. Res.* **2019**, *100*, 503–513. [CrossRef]
67. Scherer, R.; Siddiq, F.; Tondeur, J. The technology acceptance model (TAM): A meta-analytic structural equation modeling approach to explaining teachers' adoption of digital technology in education. *Comput. Educ.* **2019**, *128*, 13–35. [CrossRef]
68. Ashraf, A.R.; Thongpapanl, N.; Auh, S. The application of the technology acceptance model under different cultural contexts: The case of online shopping adoption. *J. Int. Mark.* **2014**, *22*, 68–93. [CrossRef]
69. Park, S.Y.; Nam, M.; Cha, S. University students' behavioral intention to use mobile learning: Evaluating the technology acceptance model. *Br. J. Educ. Technol.* **2012**, *43*, 592–605. [CrossRef]
70. Kesharwani, A.; Singh Bisht, S. The impact of trust and perceived risk on internet banking adoption in India: An extension of technology acceptance model. *Int. J. Bank Mark.* **2012**, *30*, 303–322. [CrossRef]
71. Kwon, S.J.; Park, E.; Kim, K.J. What drives successful social networking services? A comparative analysis of user acceptance of Facebook and Twitter. *Soc. Sci. J.* **2014**, *51*, 534–544. [CrossRef]
72. Kim, M.; Qu, H. Travelers' behavioral intention toward hotel self-service kiosks usage. *Int. J. Contemp. Hosp. Manag.* **2014**, *26*, 225–245. [CrossRef]
73. Kim, U.; Chung, T.; Park, E. Quality Characteristics and Acceptance Intention for Healthcare Kiosks: Perception of Elders from South Korea Based on the Extended Technology Acceptance Model. *Int. J. Environ. Res.* **2022**, *19*, 16485. [CrossRef]
74. Aburbeian, A.M.; Owda, A.Y.; Owda, M. A technology acceptance model survey of the metaverse pro-spects. *AI* **2022**, *3*, 285–302. [CrossRef]
75. Acharya, S.; Mekker, M. Public acceptance of connected vehicles: An extension of the technology ac-ceptance model. *Transp. Res. F Traffic Psychol.* **2022**, *88*, 54–68. [CrossRef]

76. Na, S.; Heo, S.; Han, S.; Shin, Y.; Roh, Y. Acceptance model of artificial intelligence (AI)-based technologies in construction firms: Applying the Technology Acceptance Model (TAM) in combination with the Technology–Organisation–Environment (TOE) framework. *Buildings* **2022**, *12*, 90. [CrossRef]
77. Kao, W.K.; Huang, Y.S.S. Service robots in full-and limited-service restaurants: Extending technology acceptance model. *J. Hosp. Tour. Manag.* **2023**, *54*, 10–21. [CrossRef]
78. Ruiz-Mafe, C.; Sanz-Blas, S.; Hernandez-Ortega, B.; Brethouwer, M. Key drivers of consumer purchase of airline tickets: A cross-cultural analysis. *J. Air Transp. Manag.* **2013**, *27*, 11–14. [CrossRef]
79. Lu, J.L.; Chou, H.Y.; Ling, P.C. Investigating passengers' intentions to use technology-based self check-in services. *Transp. Res. E Logist. Transp.* **2009**, *45*, 345–356. [CrossRef]
80. Li, S.; Jiang, S. The Technology Acceptance on AR Memorable Tourism Experience—The Empirical Evidence from China. *Sustainability* **2023**, *15*, 13349. [CrossRef]
81. Min, S.; So, K.K.F.; Jeong, M. Consumer adoption of the Uber mobile application: Insights from diffusion of innovation theory and technology acceptance model. *J. Travel Tour. Mark.* **2019**, *36*, 770–783. [CrossRef]
82. Vijayasarathy, L.R. Predicting consumer intentions to use on-line shopping: The case for an augmented technology acceptance model. *Inf. Manag.* **2004**, *41*, 747–762. [CrossRef]
83. Venkatesh, V. Determinants of perceived ease of use: Integrating control, intrinsic motivation, and emotion into the technology acceptance model. *Inf. Syst. Res.* **2000**, *11*, 342–365. [CrossRef]
84. Alsyouf, A.; Lutfi, A.; Alsubahi, N.; Alhazmi, F.N.; Al-Mugheed, K.; Anshasi, R.J.; Alharbi, N.A.; Albugami, M. The use of a Technology Acceptance Model (TAM) to predict patients' usage of a personal health record system: The role of se-curity, privacy, and usability. *Int. J. Environ. Res. Public Health* **2023**, *20*, 1347. [CrossRef]
85. Habibu, T.; Luhanga, E.T.; Sam, A.E. A study of users' compliance and satisfied utilization of biometric application system. *Inf. Secur. J.* **2021**, *30*, 125–138. [CrossRef]
86. Riley, C.; Buckner, K.; Johnson, G.; Benyon, D. Culture & biometrics: Regional differences in the perception of biometric authentication technologies. *AI Soc.* **2009**, *24*, 295–306.
87. Simon, H.A.; Gilmartin, K. A simulation of memory for chess positions. *Cogn. Psychol.* **1973**, *5*, 29–46. [CrossRef]
88. Karahanna, E.; Straub, D.W.; Chervany, N.L. Information technology adoption across time: A cross-sectional comparison of pre-adoption and post-adoption beliefs. *MIS Q.* **1999**, *23*, 183–213. [CrossRef]
89. Thompson, R.L.; Higgins, C.A.; Howell, J.M. Influence of experience on personal computer utilization: Testing a conceptual model. *J. Manag. Inf. Syst.* **1994**, *11*, 167–187. [CrossRef]
90. Dishaw, M.T.; Strong, D.M. Extending the technology acceptance model with task–technology fit constructs. *Inf. Manag.* **1999**, *36*, 9–21. [CrossRef]
91. Kim, S.S.; Malhotra, N.K. A longitudinal model of continued IS use: An integrative view of four mechanisms underlying postadoption phenomena. *Manag. Sci.* **2005**, *51*, 741–755. [CrossRef]
92. Kim, S.B.; Kwon, K.J. Examining the relationships of image and attitude on visit intention to Korea among Tanzanian college students: The moderating effect of familiarity. *Sustainability* **2018**, *10*, 360. [CrossRef]
93. López-Nicolás, C.; Molina-Castillo, F.J.; Bouwman, H. An assessment of advanced mobile services acceptance: Contributions from TAM and diffusion theory models. *Inf. Manag.* **2008**, *45*, 359–364. [CrossRef]
94. Kaushik, A.K.; Agrawal, A.K.; Rahman, Z. Tourist behaviour towards self-service hotel technology adoption: Trust and subjective norm as key antecedents. *Tour. Manag. Perspect.* **2015**, *16*, 278–289. [CrossRef]
95. Hateftabar, F. Analyzing the adoption of online tourism purchases: Effects of perceived tourism value and personal innovativeness. *Curr. Issues Tour.* **2023**, *26*, 1861–1877. [CrossRef]
96. Ramkissoon, H. Perceived social impacts of tourism and quality-of-life: A new conceptual model. *J. Sustain. Tour.* **2023**, *31*, 442–459. [CrossRef]
97. Wattanacharoensil, W.; Fakfare, P.; Manosuthi, N.; Lee, J.S.; Chi, X.; Han, H. Determinants of traveler intention toward animal ethics in tourism: Developing a causal recipe combining cognition, affect, and norm factors. *Tour. Manag.* **2024**, *100*, 104823. [CrossRef]
98. Seyal, A.H.; Turner, R. A study of executives' use of biometrics: An application of theory of planned behaviour. *Behav. Inf. Technol.* **2013**, *32*, 1242–1256. [CrossRef]
99. Nassar, A.A.; Othman, K.; Nizah, M.A.B.M. The impact of the social influence on ict adoption: Behavioral intention as mediator and age as moderator. *Int. J. Acad. Res. Bus. Soc. Sci.* **2019**, *9*, 963–978. [CrossRef] [PubMed]
100. Almarashdeh, I.; Eldaw, K.E.; Alsmadi, M.; Alghamdi, F.; Jaradat, G.; Althunibat, A.; Alzaqebah, M.; Mohammad, R.M.A. The adoption of bitcoins technology: The difference between perceived future expectation and intention to use bitcoins: Does social influence matter? *Int. J. Electr. Comput. Eng. Syst.* **2021**, *11*, 5351. [CrossRef]
101. Dhagarra, D.; Goswami, M.; Kumar, G. Impact of trust and privacy concerns on technology acceptance in healthcare: An Indian perspective. *Int. J. Med. Inform.* **2020**, *141*, 104164. [CrossRef]
102. Merhi, M.; Hone, K.; Tarhini, A. A cross-cultural study of the intention to use mobile banking between Lebanese and British consumers: Extending UTAUT2 with security, privacy and trust. *Technol. Soc.* **2019**, *59*, 101151. [CrossRef]

103. Obermeier, G.; Klingersberger, J.; Auinger, A. Factors Influencing Usage Intentions Towards a Self-service Kiosk with Biometric Authentication. In Proceedings of the 55th Hawaii International Conference on System Sciences, Maui, HI, USA, 4–7 January 2022.
104. Dimitriadis, S.; Kyrezis, N. Linking trust to use intention for technology-enabled bank channels: The role of trusting intentions. *Psychol. Mark.* **2010**, *27*, 799–820. [CrossRef]
105. Gefen, D.; Straub, D.W. The relative importance of perceived ease of use in IS adoption: A study of e-commerce adoption. *J. Assoc. Inf. Syst.* **2000**, *1*, 1–28. [CrossRef]
106. Ponte, E.B.; Carvajal-Trujillo, E.; Escobar-Rodríguez, T. Influence of trust and perceived value on the intention to purchase travel online: Integrating the effects of assurance on trust antecedents. *Tour. Manag.* **2015**, *47*, 286–302. [CrossRef]
107. Teh, P.-L.; Ahmed, P.K. Understanding social commerce adoption: An extension of the Technology Acceptance Model. In Proceedings of the 2012 IEEE International Conference on Management of Innovation & Technology (ICMIT), Sanur Bali, Indonesia, 11–13 June 2012.
108. Wu, K.; Zhao, Y.; Zhu, Q.; Tan, X.; Zheng, H. A meta-analysis of the impact of trust on technology acceptance model: Investigation of moderating influence of subject and context type. *Int. J. Inf. Manag.* **2011**, *31*, 572–581. [CrossRef]
109. Chandra, S.; Srivastava, S.C.; Theng, Y.-L. Evaluating the role of trust in consumer adoption of mobile payment systems: An empirical analysis. *Commun. Assoc. Inf.* **2010**, *27*, 561–588. [CrossRef]
110. Escobar-Rodríguez, T.; Carvajal-Trujillo, E. Online purchasing tickets for low cost carriers: An application of the unified theory of acceptance and use of technology (UTAUT) model. *Tour. Manag.* **2014**, *43*, 70–88. [CrossRef]
111. Tassabehji, R.; Kamala, M.A. Improving e-banking security with biometrics: Modelling user attitudes and acceptance. In Proceedings of the 2009 3rd International Conference on New Technologies, Mobility and Security, Cairo, Egypt, 20–23 December 2009.
112. Borrero, J.D.; Yousafzai, S.Y.; Javed, U.; Page, K.L. Expressive participation in Internet social movements: Testing the moderating effect of technology readiness and sex on student SNS use. *Comput. Hum. Behav.* **2014**, *30*, 39–49. [CrossRef]
113. Schumacher, P.; Morahan-Martin, J. Gender, Internet and computer attitudes and experiences. *Comput. Hum. Behav.* **2001**, *17*, 95–110. [CrossRef]
114. Shao, Z.; Zhang, L.; Li, X.; Guo, Y. Antecedents of trust and continuance intention in mobile payment platforms: The moderating effect of gender. *Electron. Commer. Res. Appl.* **2019**, *33*, 100823. [CrossRef]
115. Kim, J.H.; Lee, H.C. Understanding the repurchase intention of premium economy passengers using an extended theory of planned behavior. *Sustainability* **2019**, *11*, 3213. [CrossRef]
116. Lee, Y.; Kwon, O. Intimacy, familiarity and continuance intention: An extended expectation–confirmation model in web-based services. *Electron. Commer. Res. Appl.* **2011**, *10*, 342–357. [CrossRef]
117. Willis, G.B. Questionnaire pretesting. In *The SAGE Handbook of Survey Methodology*; SAGE Publications Ltd.: Thousand Oaks, CA, USA, 2016.
118. Häder, M. Pretests. In *Empirical Social Research: An Introduction*; Springer Fachmedien Wiesbaden: Wiesbaden, Germany, 2022.
119. Gefen, D.; Straub, D.; Boudreau, M.-C. Structural equation modeling and regression: Guidelines for research practice. *Commun. Assoc. Inf.* **2000**, *4*, 7. [CrossRef]
120. Aji, H.M.; Muslichah, I.; Seftyono, C. The determinants of Muslim travellers' intention to visit non-Islamic countries: A halal tourism implication. *J. Islam. Mark.* **2021**, *12*, 1553–1576. [CrossRef]
121. Kline, R. *Structural Equation Modeling*, 3rd ed.; Guilford Press: New York, NY, USA, 2011.
122. Hair, J.F.; Black, W.C.; Babin, B.J.; Anderson, R.E. *Multivariate Data Analysis*, 8th ed.; Cengage: Boston, MA, USA, 2019.
123. Fornell, C.; Larcker, D.F. Evaluating Structural Equation Models with Unobservable Variables and Measurement Error. *J. Mark. Res.* **1981**, *18*, 39–50. [CrossRef]
124. Chua, B.L.; Lee, S.; Kim, H.C.; Han, H. Investigation of cruise vacationers' behavioral intention formation in the fast-growing cruise industry: The moderating impact of gender and age. *J. Vacat. Mark.* **2019**, *25*, 51–70. [CrossRef]
125. Norfolk, L.; O'Regan, M. Biometric technologies at music festivals: An extended technology acceptance model. *J. Conv. Event Tour.* **2020**, *22*, 36–60. [CrossRef]
126. Wang, J.S. Exploring biometric identification in FinTech applications based on the modified TAM. *Financ. Innov.* **2021**, *7*, 42. [CrossRef]
127. Pai, C.-K.; Wang, T.-W.; Chen, S.-H.; Cai, K. Empirical study on Chinese tourists' perceived trust and intention to use biometric technology. *Asia Pac. J. Tour. Res.* **2018**, *23*, 880–895. [CrossRef]
128. Scott, M.; Acton, T.; Hughes, M. An assessment of biometric identities as a standard for e-government services. *Int. J. Serv. Stand.* **2005**, *1*, 271–286. [CrossRef]
129. Jalilvand, M.R.; Samiei, N.; Dini, B.; Manzari, P.Y. Examining the structural relationships of electronic word of mouth, destination image, tourist attitude toward destination and travel intention: An integrated approach. *J. Dest. Mark. Manag.* **2012**, *1*, 134–143. [CrossRef]
130. Buaphiban, T.; Truong, D. Evaluation of passengers' buying behaviors toward low cost carriers in Southeast Asia. *J. Air Transp. Manag.* **2017**, *59*, 124–133. [CrossRef]
131. Singh, S.; Sahni, M.M.; Kovid, R.K. What drives FinTech adoption? A multi-method evaluation using an adapted technology acceptance model. *Manag. Decis.* **2020**, *58*, 1675–1697. [CrossRef]

132. Jariyapan, P.; Mattayaphutron, S.; Gillani, S.N.; Shafique, O. Factors influencing the behavioural intention to use cryptocurrency in emerging economies during the COVID-19 pandemic: Based on technology acceptance model 3, perceived risk, and financial literacy. *Front. Psychol.* **2022**, *12*, 814087. [CrossRef]
133. Gupta, K.; Arora, N. Investigating consumer intention to accept mobile payment systems through unified theory of acceptance model: An Indian perspective. *South Asian J. Bus. Stud.* **2020**, *9*, 88–114. [CrossRef]
134. Guo, Y.; Barnes, S.J.; Jia, Q. Mining meaning from online ratings and reviews: Tourist satisfaction analysis using latent dirichlet allocation. *Tour. Manag.* **2017**, *59*, 467–483. [CrossRef]
135. Lim, J.; Lee, H.C. Comparisons of service quality perceptions between full service carriers and low cost carriers in airline travel. *Curr. Issues Tour.* **2019**, *23*, 1261–1276. [CrossRef]
136. Nam, S.; Ha, C.; Lee, H.C. Redesigning In-Flight Service with Service Blueprint Based on Text Analysis. *Sustainability* **2018**, *10*, 4492. [CrossRef]
137. Nam, S.; Lee, H.C. A Text Analytics-Based Importance Performance Analysis and Its Application to Airline Service. *Sustainability* **2019**, *11*, 6153. [CrossRef]
138. James, T.; Pirim, T.; Boswell, K.; Reithel, B.; Barkhi, R. An extension of the technology acceptance model to determine the intention to use biometric devices. In *End User Computing Challenges and Technologies: Emerging Tools and Applications*; IGI Global: Hershey, PA, USA, 2008.
139. Navarrete-Hernandez, P.; Vetro, A.; Concha, P. Building safer public spaces: Exploring gender difference in the perception of safety in public space through urban design interventions. *Landsc. Urban Plan.* **2021**, *214*, 104180. [CrossRef]
140. Gefen, D.; Straub, D.W. Gender differences in the perception and use of e-mail: An extension to the technology acceptance model. *MIS Q.* **1997**, *21*, 389–400. [CrossRef]
141. Hu, P.J.-H.; Clark, T.H.K.; Ma, W.W. Examining technology acceptance by school teachers: A longitudinal study. *Inf. Manag.* **2003**, *41*, 227–241. [CrossRef]