Tez, Ö.Y., Gürbüz, P.G. &Deveci, M.E. (2022). Use of urban air mobility technology in the field of tourism and recreation, *The Online Journal of Recreation and Sports (TOJRAS)*, 11(3), 14-33.

DOI: https://doi.org/10.22282/ojrs.2022.101

Makale Türü (ArticleType):
Araştırma Makalesi / Research Article

ISSN: 2146-9598 Doi Prefix:10.22282

USE OF URBAN AIR MOBILITY TECHNOLOGY IN THE FIELD OF TOURISM AND RECREATION

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ABSTRACT

UAM technologies, also known as the flying car, which is shown as the future of aviation, are planned to be used in the field of recreation and tourism in the near future. Therefore, in this study, the attitudes of leisure participants towards the acceptance and use of urban air mobility (UAM) technologies in the field of tourism and recreation were examined in terms of socio-demographic variables. 270 leisure participants participated in the research. Data were collected with the Urban Air Mobility Acceptance and Use Model Scale. As a result, a statistically significant difference was found between the variables of gender, age and education level and the sub-dimensions of the UAM scale. There was no statistically significant difference between the monthly total income, flight purpose and flight frequency variables and the sub-dimensions of the UAM scale. In addition, the study is one of the few examples in the literature.

Keywords: Technology, urban air mobility, flying car, recreation, tourism

INTRODUCTION

Technology has shaped human life since it first entered human life and has become one of the most controversial areas of the current century. Technological advances are rapidly changing and transforming the city's life, culture, and habits of its citizens. As a result of this transformation, people's wishes and expectations are carried to different dimensions. For a long time, technology has tried to be combined with life to increase the quality of life of people. Smart technological application designs are being developed for practical solutions to the condensing urban population. As a result, cities are becoming more digital and gaining a digital identity. Therefore, this situation has increased the emergence and diffusion of smart Technologies (Örselli and Akbay, 2019).

The areas affected by technology are almost innumerable. One of them is aviation and (indirectly) recreation and the tourism field. In this regard, examining technology in the fields of recreation and tourism, as well as aviation, will bring a new perspective to recreation and tourism. For this purpose, this study aims to examine the attitudes of leisure participants towards the acceptance and use of today's urban air mobility (UAM) technologies in terms of socio-demographic variables (ages, gender, education level, flying purpose, air travel frequency, city of residence, monthly income per of).

LITERATURE REVIEW

Urban Air Mobility-UAM

There are stories in aviation history books frequently depicting people who have aspired to fly by observing the movements of birds and other winged animals and make various attempts throughout history. People have made great efforts to realize this dream as depicted in stories—as a result, aircraft have been developed and are no longer merely a dream (Yavas and Tez, 2021). Most UAM concepts use electrically powered vertical takeoff and landing (eVTOL) vehicles in some configurations. Vehicles are sometimes popularly referred to as air taxis, passenger planes, or simply flying cars (Roosien and Bussink, 2018). In this regard, UAM is defined as an emerging air transport concept that carries passengers or small packages in overpopulated areas, from small towns to the largest cities (Shaheen, Cohen and Farrar, 2018). The US Federal Aviation Administration has defined these systems as "a safe and efficient aviation transportation system to be performed by highly automated air vehicles that allow passenger or cargo transportation at low altitudes in and around cities" (Yavas and Tez, 2021).

Benefiting from its air transport capacity, UAM aims to reduce problems such as congestion, pollution, and the scarcity of urban space faced by the increasing demand for mobility in increasingly crowded environments (Rothfeld et al., 2020). Increasing urban congestion has paved the way for UAM to be used as a new mode of travel in the future. The use of these technologies will shorten commutes, reduce congestion, and spark a revolution in people's movement in and around cities by making point-to-point flights between cities possible (Shaheen et al., 2018). The idea of UAM usage depends on social acceptance among consumers, which is the main challenge for UAM market entry. Adoption and use are the result of complex decisions and depend on many unobserved variables. According to Carl Rogers' humanist theory, people's ability to adapt, learn, and change plays a vital role in the process of change and growth. Quality of life or happiness is also an output of the

process, not a state of being (Miguel et al., 2021). As the quality of life (QoL) can be defined in many ways, the World Health Organization (WHO) defines the quality of life (QoL) as "an individual's perception of his/her position in life concerning his/her goals, expectations, standards, and concerns in the context of the culture in which he/she lives" (WHOQOL, 1995). For this reason, surveys and scales in this field focus on improving people's understanding of new technologies, thus identifying the most influential factors in their acceptance and adoption (Rothfeld et al., 2020).

Flying Cars in Turkey and in the World

While flying cars (which will offer a new airline travel experience) are expected to be put into service for different purposes, their purpose is stated to be for "free time experience [and] entertainment" in passenger transportation in the short term (Rothfeld et al., 2020). The Chinese company (Ehang, 2020), which works on UAM systems and produces various products, has also stated that the system is capable of responding to various usage areas, one of which is the recreation and tourism sector.

Many flying car projects are being carried out in many countries (e.g., the USA, England, Germany, China, France). An important step was taken in China in 2021, and the world's first flying taxis are now being actively used (Ehang, 2020). The Turkish equivalent of air vehicles for the UAM system developed with various examples in the world stands out with the Cezeri3 model, which was developed by the Baykar Company (Yavas and Tez, 2021). There are two known flying car projects in Turkey. The first of these projects is "Cezeri" belonging to the Baykar company. Al-Jazari is better known because he is on the agenda of the media. However, apart from Cezeri, AirCarCorp's "AirCar" flying car is also among Turkey's domestic flying car projects (Baysal, 2020).

Use of Flying Cars in Recreation and Tourism

The concept of "leisure time," which includes social and recreational activities, seems to be well understood at first glance. However, many scholars have noted that defining "leisure time" is not as simple as originally assumed (Howe and Rancourt, 1990). There are many definitions of "leisure" in the literature Meurs and Kalfs (2000) define "leisure time" in a broad sense as all the time that a person does not devote to ensuring their future well-being. Thus, it has been noted that this definition excludes activities related to generating income, managing a household, and maintaining physical well-being. On the other hand, leisure travel is defined as all non-specific journeys to ensure one's future well-being or even to maintain a normal life (Mokhtarian et al., 2006).

Travel time is important in the field of recreation and tourism. Leisure travel is the most important travel purpose in terms of the number of kilometers traveled. When combined with holiday trips in Germany in 1997, it was determined that 48% of people on a person-kilometer basis travel for leisure. It has also been reported that this rate is twice the amount of commuting (Schlich et al., 2004). Due to the nature of most people's working lives, people often want to travel for leisure by getting away from their daily environments to do what they want to

do (and often cannot do) to make up for the declining quality of life. People travel for leisure for their own good and value their travel experiences (Schlich et al., 2004).

Leisure travel is flexible and characterized by fewer temporal and spatial constraints than travel to work or school. For this reason, the variety of leisure time behaviors for each person is quite high. Changing patterns of time use and the increasing societal importance of leisure are reflected in the change of leisure and vacation activities and related travel behavior. People tend to go on vacations more often, for shorter periods, and to farther destinations. The structure and performance of daily leisure activities are also changing. The number and variety of different activities carried out during people's leisure time has increased significantly, and the activities themselves have become increasingly specialized. For instance, the demand for all kinds of extreme or adventure sports has increased together with the increasing importance of individual sports or hobby activities (Schlich et al., 2004). However, there is a transportation strategy that tries to both speed up and slow down traffic during trips. The idea of a congestion-free transportation system has never been a realistic goal.

Predicting the future of technology is highly important for dreamers hoping to develop better tools and techniques, as well as for people hoping to take advantage of such new and advanced technology. Since the beginning of the 21st century, humanity has made tremendous strides in the development of new technologies. These technological breakthroughs are expected to change people's lifestyle, comfort, and thinking in the near future. Whether these breakthroughs will occur is still unknown. This article discusses the most anticipated possible technological breakthrough of the 21st century—namely, UAM—which has significantly impacted the lifestyle of humans.

Against this background, it is surprising that no research has delved into the likely pervasive implications of flying cars for the recreation and tourism space given the potentially short timeframe remaining until flying cars hit the mass market. To the best of our knowledge, flying cars in the recreation and tourism sectors have been addressed only in the study published by (Rowlands et al., 2003) and the report produced by (Ehang, 2020). In the Cezeri3 publicity and information report developed by Baykar Company in Turkey, it is stated that these technologies will be used for the purpose of "leisure time experience" in the short term and will be an alternative means of transportation for passenger transportation in the long term (Yavas and Tez, 2021). Planning the use of flying car projects in the field of recreation and tourism in the world and in Turkey indicates that a new era will begin in the near future and that flying cars will become part of everyday life in ten to fifteen years.

This article will reveal the potential implications of the acceptance and use of flying cars for recreation and tourism. It also aims to break new ground in the field of recreation and tourism. Our primary focus will be on the preferences for the use of flying cars for transportation for leisure and entertainment experiences in the field of recreation and tourism. Because understanding UAM's passenger perception allows taking relevant measures by best addressing the social acceptance of such stakeholders as governments or manufacturers, promoting measurement tools is necessary to develop technology. The measurement tool (Yavas and Tez, 2021) developed for the social acceptance of UAM was used in the present study. The factors affecting the potential adoption and use of the system were revealed with the measurement tool. Our discussion will be of interest to academia, as

its original ideas and eventual research agenda could trigger a new subfield of interest in recreation and tourism research. At the same time, flying cars can be an alternative transformation area for transportation in the field of recreation and tourism. Flying cars will lead to new socio-economic opportunities for recreation and tourism and will yield results that will attract the attention of stakeholders in industry and policy. In this context, examining technology in the fields of recreation and tourism as well as aviation will bring a new perspective to recreation and tourism. Therefore, in this study, it is aimed to examine the attitudes of leisure participants towards the acceptance and use of UAM technologies in terms of socio-demographic variables (ages, gender, education level, flying purpose, air travel frequency, city of residence, monthly income per of) by using the "Urban Air Transport Acceptance and Use Model Scale (UAM-AUM)".

METHODS

Research Group

The criterion sampling method was used in the study. In this sense, "having at least one airline experience" was taken as a criterion in the study. Accordingly, a total of 270 (male 142 $\bar{x}$ = 29.35 ss= 10.88 years old; female 128 $\bar{x}$= 29.30, ss= 10.67 years old) leisure time participants from different occupational groups, mainly businessmen, academics, engineers, pilots, sailors, health sector and finance sector workers, aged between 20 and 71 and selected by convenience sampling method, were included in the research. The study was conducted according to the guidelines of the Declaration of Helsinki and approved by the Research Ethics Committee of the Ege University. After obtaining approval, participants were invited to an online meeting where we presented the aims of the project and were asked to approve the informed consent form. Participants were informed that they could cancel the participation agreement at any time.

Data Collection Tools

Various social psychology-based models and theories have been developed that examine individuals' behavior according to their attitudes and intentions towards technology. One of these models, the "Technology Acceptance Model (TAM)" by many researchers, tests the behavior of individuals to accept and use new technologies (Yavas and Tez, 2021).

TAM is used to measure consumer behavioral intentions for technologies developed in various fields and industries. In this study, the Urban Air Transport Acceptance and Use Model Scale (UAM-AUM), developed specifically for the field by Yavas and Tez (2021) was used to determine the attitudes of leisure participants towards the acceptance and use of UAM technologies in the field of tourism and recreation.

Since the service related to flying cars is not yet operational, observed or used, the Urban Air Transport Acceptance and Use Model Scale (UAM-AUM) developed by Yavaş and Tez (2021) was used to identify the most influential factors in the adoption time horizon of UAM. The scale consists of 30 items and 7 sub-dimensions, and the scale has a five-point Likert scale rating of (1) Strongly Disagree, (2) Disagree, (3) Undecided, (4) Agree, (5) Strongly Agree.

The lowest score that can be obtained from the Perceived Usefulness factor, which consists of 6 items and represents the items related to the convenience, changes and gains that will be provided to the leisure time participants with the use of the UAM system, is 6 and the highest score is 30. The lowest score that can be obtained from the 5-item Intention to Fly factor, which represents the attitudes of consumers towards how willingly they are to use the UAM system, is 5, and the highest score is 25. The lowest score that can be obtained from the 4-item UAM Affordability factor, which represents the attitudes of leisure participants towards the price they may be willing to pay for using the UAM system, is 4 and the highest score is 20. The lowest score that can be obtained from the Environmental Consciousness factor consisting of 4 items, which represents the positive gains of the UAM system for a sustainable environment and the attitudes of the leisure time participants towards their choice of using these vehicles in line with these gains, is 4 and the highest score is 20. The lowest score that can be obtained from the 4-item UAM Conceptual Intention factor, which represents the attitudes of leisure participants towards the use of the UAM system and the mood during use, is 4 and the highest score is 20. The lowest score that can be obtained from the 4-item Behavioral Intent to Use factor, which represents the attitudes of the leisure time participants to prefer these tools after the production of the UAM system, is 4 and the highest score is 20. The lowest score that can be obtained from the General Reliability factor, which consists of 3 items, representing the items regarding the trust for the manufacturers of the UAM system and the safety precautions during use, is 3 and the highest score is 15.

In the research, Cronbach Alpha coefficients for the sub-dimensions of the scale are 0.92 for “Perceived usefulness”, 0.91 for “Intention to fly”, 0.82 for “UAM Affordability”, 0.90 for “Environmental Consciousness”, 0.90 for “UAM Conceptual Intention”, 0.90 for “Behavioral Intent to Use”, and 0.71 for “General Reliability”.

Data Analysis

Since the face-to-face application of the data in the research is difficult due to the Covid-19 pandemic and measures, an "Online Form" was created through the "Google Form", and the data were collected by sharing the link regarding the scale form through various social media platforms in Turkey. The participants were asked to participate in the application by making a statement that they participated voluntarily by providing the necessary information about the research in the scale form. The application of the scale took approximately 10 minutes.

The data collected were transferred from the Microsoft Office Excel program to the SPSS program and the data were made ready. Analyzes were performed with the SPSS 24.0 program. The normality distributions of the data were evaluated by looking at the Q-Q graph, median, mean, kurtosis and skewness values (Table 1). The significance level in the study was accepted as $p<0.05$. The t-test, One Way ANOVA and Post-hoc tests were used to test the hypotheses. The significance level was accepted as $p<0.05$ in the study. The t-test, One Way ANOVA and Post-hoc tests were used to test the hypotheses.

Table 1. Normality Distributions for UAM

	x̄/ss	Median	Variance	Skewness	Kurtosis
Intention to fly	21.14 ± .246	22.00	16.310	-1.454	1.816
UAM Conceptual Intention	14.39 ± 3.417	14.00	11.673	-0.312	0.095
Perceived usefullness	22.87 ± 4.591	23.00	21.080	-0.567	0.789
Behavioral Intent to Use	14.67 ± 3.124	15.00	9.761	-0.308	0.234
General Reliability	12.91 ± 1.879	13.00	3.531	-0.937	1.098
Environmental Consciousness	15.44 ± 3.016	16.00	9.095	-0.540	0.563
UAM Affordability	9.93 ± 3.605	10.00	12.998	0.563	0.252
The Urban Air Mobility Acceptance and Usage Model Scale (UAM-AUM)	111.34 ± 15.537	111.00	241.401	-0.285	0.888

-1.96<skewness, kurtosis<1.96

As can be seen in Table 1, when the normality values of UAM were examined, the skewness and kurtosis values were between ± 1.96, indicating that the data were normally distributed and it was appropriate to use parametric tests.

RESULT

Table 2. Descriptive Statistics of Leisure Participants

Variables	Group	F	%
Gender	Female	128	47.4
	Male	142	52.6
Age	20-25 years	148	54.8
	26-30 years	26	9.6
	31-35 years	34	12.6
	36-40 years	23	8.5
	Above 41	39	14.4
Education level	High School	12	4.4
	BS	28	10.4
	MS	152	56.3
	PhD	78	28.9
Monthly income per	1-10.000 TL	148	54.8
	10.001-20.000 TL	79	29.3
	20.001-30.000 TL	11	4.1
	30.001-40.000 TL	12	4.4
	40.001 TL and above	20	7.4
Flight Purpose	Entertainment / travel	184	68.1
	Leisure Experience- Recreation	86	31.9
City	Istanbul	82	30.4
	Ankara	14	5.2
	Izmir	55	20.4
	Kocaeli	24	8.9
	Bursa	13	4.8
	Other	82	30.4
Travel Frequency	at least once a week	28	10.4
	at least once a month	52	19.3
	at least once every three months	42	15.6
	at least once in 6 months	38	14.1
	at least once a year	110	40.7

n=270

Demographic information of the participants is shown in Table 2. Accordingly, the ages of the participants mostly vary between 20 and 25, followed by 41 years and over, 31 and 35 years, 26 and 30 years, and 36 and 40 years old. It consists of 270 participants, of which 142 are male and 128 are female. The participants are from 38 cities

in Turkey, especially in Istanbul, Ankara, Izmir, Kocaeli, and Bursa, and a small number of them are from abroad. Moreover, the participants mostly had entertainment/travel, and leisure experience-recreation as the 'purpose of flight'. In addition, 12, 28, 152, and 78 participants completed their high- school, undergraduate, master's, and doctoral education, respectively. The monthly household incomes of the participants vary between 1–10.000 TL and 10.001–20.000 TL. The participants' air travel frequency of 'at least once a year was the most common result.

Table 3. Analysis Of The Differences Between The Gender Variable Of Leisure Participants And Uam

					Levene Test			
	Gender	n	x̄	ss	F	p	t	p
Intention to fly	Female Male	128 142	20.71 21.54	3.975 4.070	0.344	0.558	-1.680	0.094
UAM Conceptual Intention	Female Male	128 142	13.85 14.87	3.301 3.458	0.976	0.324	-2.459	0.01**
Perceived usefullness	Female Male	128 142	22.22 23.46	4.228 4.836	2.892	0.090	-2.230	0.02*
Behavioral Intent to Use	Female Male	128 142	14.28 15.02	2.993 3.208	0.511	0.476	-1.953	0.052
General Reliability	Female Male	128 142	13.00 12.83	1.792 1.957	0.839	0.361	0.737	0.462
Environmental Consciousness	Female Male	128 142	15.43 15.44	2.907 3.121	2.362	0.125	-0.038	0.970
UAM Affordability	Female Male	128 142	9.89 9.96	3.546 3.671	0.305	0.581	-0.152	0.879

*p<0.05; **p<0.01; n=270

As seen in Table 3, a statistically significant difference at 99% confidence level was found between the Intention (N) sub-dimension scores of the leisure time participants for UAM scale and their gender (t=-2.459; p=0.000; p<0.01) while a statistically significant difference was established between the "UAM Conceptual Intention" sub-dimension and gender at the 95% confidence level. According to these results, it was observed that the male participants' intention levels (x̄=14.87) for the use of the UAM system and the psychological mood during use were higher than the female participants' intention levels (x̄=13.85). Similarly, it has been determined that the "Perceive usefulness" levels (x̄=23.46), which represent the attitudes of male participants regarding the conveniences, changes and gains that the UAM system will provide, are higher than female participants (x̄=22.22).

Table 4. Analysis of the Differences Between the Age Variable of Leisure Participants and UAM

	Age Group	n	x̄	ss	F	p	Difference Scheffe
Intention to fly	20-25 years	148	21.49	3.829			
	26-30 years	26	21.85	3.319			
	31-35 years	34	21.53	3.440	2.279	0.061	-------
	36-40 years	23	19.57	4.998			
	Above 41	39	19.97	4.788			
UAM Conceptual Intention	20-25 years	148	15.18	3.025			
	26-30 years	26	14.08	3.174			
	31-35 years	34	12.94	3.781	5.498	0.000**	3<1
	36-40 years	23	12.74	3.756			4<1
	Above 41	39	13.82	3.698			
Perceived usefullness	20-25 years	148	23.10	4.447			
	26-30 years	26	22.42	3.744			
	31-35 years	34	23.03	4.914	1.192	0.315	--------
	36-40 years	23	21.00	5.760			
	Above 41	39	23.26	4.546			
Behavioral Intent to Use	20-25 years	148	14.96	3.010			
	26-30 years	26	13.77	2.875			
	31-35 years	34	14.56	2.798	1.355	0.250	------
	36-40 years	23	13.78	3.503			
	Above 41	39	14.79	3.650			
General Reliability	20-25 years	148	12.87	1.967			
	26-30 years	26	12.81	2.315			
	31-35 years	34	12.79	1.666	.247	0.912	--------
	36-40 years	23	13.09	1.621			
	Above 41	39	13.13	1.576			
Environmental Consciousness	20-25 years	148	15.71	2.968			
	26-30 years	26	15.42	2.788			
	31-35 years	34	14.91	3.108	.819	0.514	-------
	36-40 years	23	14.87	2.865			
	Above 41	39	15.21	3.357			
UAM Affordability	20-25 years	148	9.91	3.622			
	26-30 years	26	9.73	4.257			
	31-35 years	34	9.68	3.169	1.008	0.404	--------
	36-40 years	23	9.09	3.356			
	Above 41	39	10.85	3.565			

*p<0.05; **p<0.01; 20-25 years=1; 26-30 years=2; 31-35 years=3; 36-40 years=4; Above 41 =5 n=270

As indicated in Table 4, it has been determined that there is not a statistically significant difference between the age variable and the sub-dimension scores of Intention to fly, perceived usefulness, Behavioral Intent to Use, General Reliability, Environmental Consciousness and UAM Affordability of the UAM scale while no statistically significant difference was found between the UAM Conceptual Intention sub-dimension scores at the 99% confidence level (F=5.498; p = 0.000; p< 0.01). According to this result, the intention levels of the participants between the ages of 20-25 for the use of the UAM system and their psychological mood during use (x̄=15.18) were found to be higher than both participants between the ages of 31-35 (x̄=12.94) and participants between the ages of 36-40 (x̄). =12.74).

Table 5. Analysis of the Differences Between the Education Variable of Leisure Participants and UAM

	Education level	n	x̄	ss	F	p	Difference Scheffe
Intention to fly	High School	12	21.50	3.417	0.675	0.568	
	BS	28	21.04	3.954			-------
	MS	152	20.88	4.864			
	PhD	78	21.65	4.761			
UAM Conceptual Intention	High School	12	14.33	2.828	1.034	0.378	
	BS	28	15.07	3.468			-------
	MS	152	14.09	3.139			
	PhD	78	14.73	3.030			
Perceived usefullness	High School	12	23.00	1.477	2.693	0.04*	
	BS	28	23.57	1.656			3<4
	MS	152	22.20	1.942			
	PhD	78	23.91	1.875			
Behavioral Intent to Use	High School	12	15.00	3.361	0.616	0.605	
	BS	28	14.39	3.881			
	MS	152	14.51	2.983			-------
	PhD	78	15.04	2.650			
General Reliability	High School	12	13.00	1.477	1.103	0.348	
	BS	28	13.00	1.656			
	MS	152	12.74	1.942			-------
	PhD	78	13.21	1.875			
Environmental Consciousness	High School	12	14.75	3.361	1.132	0.337	
	BS	28	15.39	3.881			
	MS	152	15.24	2.983			-------
	PhD	78	15.94	2.650			
UAM Affordability	High School	12	10.17	2.918	1.119	0.342	
	BS	28	10.96	3.873			
	MS	152	9.65	3.192			-------
	PhD	78	10.05	4.288			

*p<0.05;**p<0.01; High School=1; BS =2; MS=3; PhD =4; n=270

As can be observed from the Table 5, it has been determined that there is not a statistically significant difference between the education variable and the sub-dimension scores of Intention to fly, Behavioral Intent to Use, UAM Conceptual Intention, General Reliability, Environmental Consciousness and UAM Affordability of the UAM scale while a statistically significant difference was found between the Perceived usefullness sub-dimension scores at the 95% confidence level (F=2.693; p = 0.04; p< 0.05). According to this result, it has been determined that the "Perceived usefullness" levels (x̄=23.91), which represent the attitudes of the graduate participants regarding the conveniences, changes and gains provided by UAM system, are higher than the undergraduate participants (x̄=22.20).

Table 6. Analysis of the Differences Between the Monthly Household Income Variable of Leisure Participants and UAM

	Monthly income per	n	x̄	ss	F	p	Difference
Intention to fly	1-10.000 TL	148	21.24	3.656	1.200	0.311	
	10.001-20.000 TL	79	20.48	5.196			
	20.001-30.000 TL	11	22.09	2.914			--------
	30.001-40.000 TL	12	21.33	2.015			
	40.001 TL and above	20	22.40	2.393			
UAM Conceptual Intention	1-10.000 TL	148	14.72	3.194	1.601	0.174	
	10.001-20.000 TL	79	13.81	3.627			
	20.001-30.000 TL	11	13.27	3.952			-------
	30.001-40.000 TL	12	13.75	3.841			

	40.001 TL and above	20	15.20	3.412			
Perceived usefullness	1-10.000 TL	148	23.16	4.172	0.678	0.608	
	10.001-20.000 TL	79	22.29	4.876			
	20.001-30.000 TL	11	22.82	4.875			--------
	30.001-40.000 TL	12	22.00	6.060			
	40.001 TL and above	20	23.55	5.424			
Behavioral Intent to Use	1-10.000 TL	148	14.74	2.928	1.096	0.359	
	10.001-20.000 TL	79	14.66	3.385			
	20.001-30.000 TL	11	14.45	3.446			--------
	30.001-40.000 TL	12	13.00	3.618			
	40.001 TL and above	20	15.30	2.958			
General Reliability	1-10.000 TL	148	12.84	1.796	1.648	0.163	
	10.001-20.000 TL	79	12.71	2.083			
	20.001-30.000 TL	11	13.73	1.272			
	30.001-40.000 TL	12	13.17	1.642			--------
	40.001 TL and above	20	13.65	1.899			
Environmental Consciousness	1-10.000 TL	148	15.49	2.759	1.416	0.229	
	10.001-20.000 TL	79	15.10	3.153			
	20.001-30.000 TL	11	15.27	3.069			
	30.001-40.000 TL	12	14.83	3.460			--------
	40.001 TL and above	20	16.80	3.806			
UAM Affordability	1-10.000 TL	148	10.30	3.621	1.410	0.231	
	10.001-20.000 TL	79	9.63	3.599			
	20.001-30.000 TL	11	8.64	2.767			--------
	30.001-40.000 TL	12	10.25	5.065			
	40.001 TL and above	20	8.80	2.587			

*p<0.05; **p<0.01; 1-10.000 TL=1; 10.001-20.000 TL=2; 20.001-30.000 TL=3; 30.001-40.000 TL=4; 40.001 TL and above =5; n=270

As presented in Table 6, no statistically significant difference was found between the monthly household income variable and the sub-dimension scores of "Intention to fly, UAM Conceptual Intention, Perceived usefulness, Behavioral Intent to Use, General Reliability, Environmental Consciousness and UAM Affordability of the UAM scale.

Table 7. Analysis of the Differences Between Flying Purpose Variable of Leisure Participants and UAM

	Flight Purpose	**n**	**x̄**	**ss**	**F**	**p**	**Difference**
Intention to fly	Entertainment / travel	185	21.36	3.855	1.628	0.203	
	Leisure Experience- Recreation	85	20.68	4.400			-------
UAM Conceptual Intention	Entertainment / travel	185	14.30	3.312	0.388	0.534	
	Leisure Experience- Recreation	85	14.58	3.646			-------
Perceived usefullness	Entertainment / travel	185	22.90	4.396	0.029	0.865	
	Leisure Experience- Recreation	85	22.80	5.016			--------
Behavioral Intent to Use	Entertainment / travel	185	14.84	3.013	1.805	0.180	
	Leisure Experience- Recreation	85	14.29	3.341			--------
General Reliability	Entertainment / travel	185	13.05	1.770	3.174	0.076	
	Leisure Experience- Recreation	85	12.61	2.076			--------
Environmental Consciousness	Entertainment / travel	185	15.64	2.884	2.766	0.097	
	Leisure Experience- Recreation	85	14.99	3.257			--------
UAM Affordability	Entertainment / travel	185	9.82	3.734	0.491	0.484	
	Leisure Experience- Recreation	85	10.15	3.318			--------

*p<0.05; **p<0.01; Entertainment / travel=1; Leisure Experience- Recreation =2; n=270

As can be observed in Table 7, no statistically significant difference was found between the flying purpose variable and the sub-dimension scores of "Intention to fly, UAM Conceptual Intention, perceived usefulness,

Behavioral Intent to Use, General Reliability, Environmental Consciousness and UAM Affordability of the UAM scale.

Table 8. Analysis of the Differences Between City of Residence Variable of Leisure Participants and UAM

	City	n	x̄	ss	F	p	Difference
Intention to fly	Istanbul	82	21.13	4.444			
	Ankara	14	20.79	2.577			
	Izmir	55	21.11	3.720	0.070	0.997	-------
	Kocaeli	24	20.88	4.456			
	Bursa	13	21.23	3.833			
	Other	82	21.30	4.030			
UAM Conceptual Intention	Istanbul	82	14.28	3.746			
	Ankara	14	13.86	3.255	0.520	0.761	--------
	Izmir	55	13.96	3.707			
	Kocaeli	24	14.92	3.161			
	Bursa	13	14.31	2.250			
	Other	82	14.72	3.148			
Perceived usefullness	Istanbul	82	23.50	4.619			
	Ankara	14	21.64	5.048			
	Izmir	55	22.56	5.069	0.716	0.612	---------
	Kocaeli	24	23.42	4.491			
	Bursa	13	22.54	3.777			
	Other	82	22.55	4.321			
Behavioral Intent to Use	Istanbul	82	14.56	3.348			
	Ankara	14	14.64	2.763			
	Izmir	55	14.93	3.393	0.241	0.944	---------
	Kocaeli	24	14.21	2.570			
	Bursa	13	15.08	2.753			
	Other	82	14.68	3.026			
General Reliability	Istanbul	82	13.28	1.694			
	Ankara	14	12.07	2.165			
	Izmir	55	13.04	1.805			
	Kocaeli	24	12.88	1.650	1.780	0.117	--------
	Bursa	13	12.23	1.964			
	Other	82	12.72	2.050			
Environmental Consciousness	Istanbul	82	15.71	3.203			
	Ankara	14	14.43	1.950			
	Izmir	55	15.64	3.027	1.745	0.125	--------
	Kocaeli	24	16.50	2.414			
	Bursa	13	15.69	2.213			
	Other	82	14.85	3.143			
UAM Affordability	Istanbul	82	10.17	3.607			
	Ankara	14	10.00	4.224			
	Izmir	55	10.00	3.528	0.448	0.815	---------
	Kocaeli	24	10.21	2.686			
	Bursa	13	10.46	2.436			
	Other	82	9.45	3.963			

*p<0.05;**p<0.01; Istanbul=1; Ankara=2; Izmir=3; Kocaeli=4; Bursa=5; Other=6; n=270

As can be observed in Table 8, no statistically significant difference was found between the city of residence variable and the sub-dimension scores of "Intention to fly, UAM Conceptual Intention, perceived usefulness, Behavioral Intent to Use, General Reliability, Environmental Consciousness and UAM Affordability of the UAM scale.

Table 9. Analysis of the Differences Between Air Travel Frequency Variable of Leisure Participants and UAM

	Travel Frequency	n	x̄	ss	F	p	Difference
Intention to fly	at least once a week	28	21.93	4.578			
	at least once a month	52	20.04	4.432	1.987	0.097	------
	at least once every three months	42	20.95	3.478			
	at least once in 6 months	38	22.24	3.506			
	at least once a year	110	21.16	3.997			
UAM Conceptual Intention	at least once a week	28	15.04	3.191			
	at least once a month	52	14.48	3.467			
	at least once every three months	42	14.45	3.172	0.362	0.835	--------
	at least once in 6 months	38	14.21	3.743			
	at least once a year	110	14.21	3.459			
Perceived usefullness	at least once a week	28	23.18	4.659			
	at least once a month	52	22.13	4.665			
	at least once every three months	42	22.74	4.628	0.511	0.728	--------
	at least once in 6 months	38	23.37	4.258			
	at least once a year	110	23.02	4.675			
Behavioral Intent to Use	at least once a week	28	14.39	3.489			
	at least once a month	52	14.38	3.151			
	at least once every three months	42	14.10	3.312	0.903	0.463	--------
	at least once in 6 months	38	14.92	3.388			
	at least once a year	110	15.01	2.843			
General Reliability	at least once a week	28	12.79	1.524			
	at least once a month	52	12.73	1.838			
	at least once every three months	42	12.79	2.301	0.588	0.671	--------
	at least once in 6 months	38	13.29	1.814			
	at least once a year	110	12.95	1.837			
Environmental Consciousness	at least once a week	28	15.11	2.998			
	at least once a month	52	14.87	2.937			
	at least once every three months	42	15.12	3.117	1.183	0.318	--------
	at least once in 6 months	38	15.74	2.835			
	at least once a year	110	15.81	3.067			
UAM Affordability	at least once a week	28	9.68	3.486			
	at least once a month	52	9.33	3.451			
	at least once every three months	42	10.29	3.782	0.604	0.660	--------
	at least once in 6 months	38	10.29	4.398			
	at least once a year	110	10.01	3.355			

*p<0.05; **p<0.01; at least once a week =1; at least once a month=2; at least once every three months=3; at least once in 6 months=4; at least once a year =5; n=270

As can be observed in Table 9, no statistically significant difference was found between air travel frequency variable and the sub-dimension scores of "Intention to fly, UAM Conceptual Intention, Perceived usefulness, Behavioral Intent to Use, General Reliability, Environmental Consciousness and UAM Affordability of the UAM scale.

DISCUSSION AND CONCLUSION

This study is important in terms of determining the attitudes of leisure participants towards the acceptance and use of these technologies (flying cars, drones, etc.) designed today in the field of recreation and tourism. In addition, the study is one of the few examples in the literature. It also plays an important role as the first study performed in the recreation and tourism sector, both in Turkey and in the international literature.

In this research, 270 leisure time participants completed the “Urban Air Transport Acceptance and Use Model Scale (UAM-AUM).” With this tool, the attitudes of leisure time participants towards the acceptance and use of flying cars in the field of recreation and tourism were measured in terms of different variables.

UAM remains one of the most fashionable concepts in the world in terms of aviation technology. Perhaps the most important step in the process of developing such technologies and making them ready for use is the acceptance of such technologies by consumers. Accordingly, the study provides an opportunity to understand the perceptions and behaviors of leisure participants as potential users of the UAM system. Although the adaptation of leisure time participants to rapidly changing and transforming technological innovations differs, this process was carried out in the study to make sense of UAM. The findings of the study can provide valuable information about leisure participants' acceptance and use of these technologies for stakeholders developing the UAM system. The results showed that male participants' scores were higher than female participants' scores according to the "Intention" sub-dimension scores representing the leisure participants' attitudes towards flying car use. In the "Perceived usefulness" sub-dimension of leisure time participants' flying car use, male participants' scores were higher than female participants' scores. The biggest factor in the emergence of these results in this way is inequality between men and women. That is to say, an example of the inequality experienced by women in all areas of life regarding this problem is leisure time. Women have more responsibilities for housework, child care, meal preparation, shopping, and many other issues than men. Therefore, many women do not have time to spare for themselves. Another factor is the small community outside of this group. Although the women in this community have a special time to spare for themselves, they are exposed to some physical and psychological barriers by society when they want to experience any leisure time. As a matter of fact, in the study, men's intention to use technology compared to women and the fact that these technologies are more prominent in terms of perceiving and using them can be explained by cultural values and women's exposure to psychological barriers. Gender is an important factor in determining people’s attitudes towards piloted flight and auto-pilot in flying car technologies. This perception, which stems from cultural biases about traveling with a male or female pilot, can affect trust in a pilot in terms of flight safety. Therefore, understanding the factors that impact gender attitudes in piloted flights is important for the adoption of UAM technologies during the design stages and for taking precautions in this context (Shaheen, Cohen and Farrar, 2020). McCarthy et al. (2015) observed that women face greater challenges than men in aviation and reported that passengers are less likely to trust a female pilot than a male pilot. Anderson (2014) is of the opinion that men are more skilled as pilots than women. Walton and Politano (2014) reported that there is no gender difference when examining accident rates in studies related to plane crashes.

The literature also underlines the connection between environmental attitudes and environmental behaviors. Specifically, it has been reported that women are more environmentally conscious and concerned than men (Banerjee and McKeage, 1994; Webster, 1975; Luo and Deng, 2008; Xiao and Hong, 2010; Oerke and Bogner, 2010). Mehta, Rice, Winter and Eudy (2017) have reported that male Indian passengers are less willing to fly with a female pilot than male American passengers. These results indicate that women face greater challenges in working as pilots and gaining acceptance. With the introduction of UAM systems in the future, the fact that the

pilots who will provide remote control services are women may affect the adoption of the UAM system. Furthermore, female pilots may encounter cultural prejudices and obstacles, just as they do in every field. For this reason, (McCarthy et al. (2015) recommend focusing on the findings of gender-based differences and successful female pilots for possible future solutions. Rice et al. (2014) have put forth similar research findings that American passengers view the piloted UAM system more positively than Indian passengers and react more negatively to the autopilot system. These findings can be considered a variable for future studies. At the same time, companies may consider the attitudes of passengers towards automatic flights with or without a pilot as an emotional reaction to UAM systems that are still in the design stage. Also, findings that will shed light on trust in systems with a pilot and autopilot will be presented.

While gender was stated to be significantly related to environment-friendly behaviors [Straughan and Roberts, 1996; Diamantopoulos et al., 2003; Lee, 2008; Xiao and Hong, 2010; Kheiry and Nakhaei, 2012; Lee et al., 2013; Chang and Wu, 2015; Meyer, 2016), several studies have reported that there is no significant relationship between gender and environmental variables (Rice, 2006; Chen et al., 2011; Chen et al. 2011).

In the present study, according to the “UAM Conceptual Intention” sub-dimension scores, which represent the attitudes of the leisure time participants towards the use of flying cars and the psychological mood experienced during this use, the intention levels of the leisure time participants aged 20–25 were higher than those participants aged 31–35 and 36–40. When this situation is evaluated, it can be said that the younger participants, which we can call the technology generation, have grown up with technology since childhood. Namely, although those aged 30 and above have caught the age of technology from one end, they can be called a generation that has grown traditionally and sees technology only as a necessity. However, technology is an indispensable element for the generation under the age of 20-25. This directly affects young participants' intentions to use technology.

In most studies investigating the correlation between age and environmental behavior, the results are positively correlated with age (Rowlands et al., 2003; Lee, 2008; Oerke and Bogner, 2010; Chen et al., 2011; Chen et al., 2011; Samarasinghe, 2012; Pavalache-Ilie and Unianu, 2012), and some other studies indicate a negative correlation with age. Surprisingly, very few studies (Kinnear et al., 1994; Kheiry and Nakhaei, 2012) reported no association between age and environmental behavior.

It has been reported that the increase in environment-friendly behavior and awareness is positively related to age; it has been determined that young people are more sensitive about being environment-friendly consumers than older adults (Roberts and Bacon, 1997; Getzner and Grabner, 2004). These results clearly show that the results for the age variable are not consistent. For this reason, it is recommended that various age groups be considered in future studies on UAM systems.

In the "Perceived usefulness" sub-dimension of the leisure time participants participating in the research, the scores of the graduate participants were higher than the scores of the undergraduate participants. When this situation is evaluated, it can be said that perceiving such technologies, keeping up with change, and ease of use will increase in direct proportion to the level of education. For this reason, in the future, it will be important to

focus on automatic systems, piloted systems, or easy-to-use systems in order to overcome the education level barrier in the production of these technologies in terms of increasing demand.

No statistically significant differences on the sub-dimensions of the UAM scale were found for the variables of total monthly household income, flight purpose, or air travel frequency.

The fact that no difference can be found in terms of total monthly household income and attitudes towards UAM technology stems from the thought that such technologies can be equivalent to pricing with today's technologies (airplane, taxi, etc.). In the study, the pricing policy of the participants regarding the UAM technology is shown on a table. At this table, leisure-time participants were asked to assess the situation in which they would prefer to use these technologies. In the table, UAM technologies can be used by individuals to use personal cars, taxis, airplanes, etc. When considering their attitudes towards whether they prefer technologies if they are equivalent to technologies or if they have a very low price, it is normal that there is no difference considering that the household income of the majority of the leisure time participants in the study is 1-10.000 TL and 10.001-20.000 TL. UAM technologies will provide convenience to people in terms of both time and comfort compared to today's technological tools.

Various negativities, such as air, water, and soil pollution in the city; congestion caused by population growth, personal obligations, and obligations, problems arising from social problems; and the monotony of life wear people out. People want to get out of the influence of these negative conditions to be renewed physically and spiritually. Achieving this is possible thanks to tourism and recreation, as in many developed countries. Individuals as leisure time participants seek physical and spiritual renewal, whether for leisure and recreation purposes or travel and sightseeing purposes. In the study, it can be said that the lack of difference between the sub-dimensions of the UAM scale according to the flight purpose variable is because both recreation and tourism are two concepts that complement each other and should be considered together.

Similarly, the inability to find a difference in terms of travel frequency, city variables, and attitudes towards UAM technology can be explained by the fact that individuals, as leisure time participants, do not have to travel in search of physical and mental renewal. Because individuals have the opportunity to perform their leisure time experiences and recreation, or travel and trip over short distances. Individuals' free choices do not leave them dependent on a travel obligation. Similarly, those living in rural areas and those living in urban environments, climatic conditions, etc., affect the leisure experiences and travel preferences of leisure time participants. While those living in regions with cold climates can enjoy winter tourism by taking advantage of the region they live in, those living in regions with warm climates can enjoy water sports, etc., and realize their recreational experiences. From this point of view, leisure participants should not be expected to travel out of necessity for such experiences. UAM technologies can be considered as an opportunity to facilitate the travel experiences of leisure participants.

LIMITATIONS AND DIRECTIONS FOR FUTURE RESEARCH

The behavioral intent to use sub-dimension The importance of this variable is emphasized because it is related to the leisure time participants' attitudes towards using flying cars. System acceptance is defined as the tendency to use a particular system (eg flying cars). At this point, it has been reported that there is a high level of relationship between intention and behavior and that user behaviors can be measured by usage intentions (Yavas and Tez, 2021). For this reason, it is recommended that a model be created that considers “behavioral intent to use” as the dependent variable in future studies. In addition, the evaluation of the results with the same variables will shed light on the literature and yield more consistent results. Moreover, variables related to the attitudes of leisure time participants regarding the time spent on the road for leisure experiences, traffic density, and so on were not considered. Therefore, it would be useful to further investigate the role of traffic and the time spent on the road as an indicator of the attractiveness of the use of flying cars. In addition, determining which types of leisure activities will increase the probability of using flying cars could also have important implications. It is expected that such research on the acceptance and use of the UAM system will fill an important gap in the recreation and tourism literature.

Abbreviations

UAM: Urban Air Mobility; UAM-AUM: The Urban Air Mobility Acceptance and Usage Model Scale; eVTOL: Vertical Takeoff and Landing; QoL: quality of life

Declarations

Ethics Approval and Consent to Participate.

The study was conducted according to the guidelines of the Declaration of Helsinki and The study has been approved by the Ethics Committee of the University of Ege, (protocol code E-85553214-050.06.04-155812, protocol number: 930). After obtaining approval, participants were invited to an online meeting where we presented the aims of the project and were asked to approve the informed consent form. Participants were informed that they could cancel the participation agreement at any time.

Consent for Publication. No individual or indemnifiable data are being published as part of this manuscript.

Funding. This research received no external funding.

Availability of data and materials. The datasets used and/or analyzed during the current study are available from Ö.Y.T author on reasonable request.

Author's contributions. Conceptualization, Ö.Y.T, P.G.G, M.E.D., methodology, Ö.Y.T, P.G.G, M.E.D., data collection, Ö.Y.T, analysis, Ö.Y.T, writing—original draft preparation, Ö.Y.T, P.G.G., M.E.D, writing—review and editing, Ö.Y.T, P.G.G, M.E.D. All authors have read and agreed to the published version of the manuscript.

Competing interests. The authors declare that they have no competing interests.

Acknowledgement. The authors appreciate all those who contributed to this study.

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