Taking Flight or Taking a Pass? Exploring Factors Influencing Consumer Willingness to Pay for eVTOL Travel

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The Advanced Air Mobility (AAM) industry has emerged as a modern and innovative mode of transportation, offering a convenient and efficient alternative to traditional means of travel. This industry consists of companies that will provide on-demand, point-to-point air transportation services to individual passengers. With the rapid technological advancements and increasing demand for efficient travel experiences, AAM has spurred tremendous interest, comprehensive research, as well as substantial financial investment.

Understanding consumer willingness to pay and adopting effective pricing strategies is crucial for the sustainability and profitability of AAM businesses. Companies can optimize their pricing models by studying consumer behavior and preferences to maximize revenue and attract a broader customer base. Additionally, pricing strategies directly impact consumer decision-making and market dynamics. Analyzing this aspect provides a deeper insight into the industry's competitive landscape and allows for more informed decision-making by industry stakeholders.

This study examined the available literature on factors influencing consumer willingness to pay (WTP) for AAM services, leveraging previous research on the effectiveness of various pricing strategies employed by service providers. The objectives of the current study included analyzing income and other demographic attributes as determinants of WTP and how convenience factors may affect consumer preferences. The scope of this study will cover various geographical regions and focus on the most prominent emerging players in the AAM industry.

Overview of the AAM Industry

Current State of the Industry

The AAM industry is currently witnessing a period of significant transformational evolution. In order to gain a comprehensive understanding of this industry, it is imperative to delve into its present state, which encompasses factors such as market size, growth rate, and the key players involved. Over the past few years, the market size of the AAM industry has expanded rapidly. According to a report by Smith et al. (2021), projections suggest that the market will reach a value of $45 billion by 2030, with a compound annual growth rate of 25% during the forecast period. This remarkable growth can be attributed to various factors, including the expansion of demand for personalized transportation, advancements in technology, and a burgeoning interest in sustainable travel options.

The AAM industry is characterized by intense competition, with a handful of major players dominating the market. AAM companies design and build aircraft meant to offer on-demand, point-to-point air transportation services to individual passengers. As highlighted by Kamijo et al. (2022), some of the prominent players in the industry include Joby, Archer, Beta, and Wisk. These companies have laid the foundations for market share development by entering into strategic partnerships, diligently working towards regulatory certification, receiving aircraft orders, making significant technology investments, and constructing operational networks.

The industry is poised to unlock immense potential in the future, driven by continuous technological advancements, such as improved battery technologies and evolving consumer preferences. A thorough analysis of prospects and emerging trends is crucial for industry stakeholders seeking to make informed decisions and capitalize on unfolding opportunities. AAM intends to rely heavily on electric vertical takeoff and landing (eVTOL) aircraft, which are purported to have the potential to revolutionize urban transportation. These cutting-edge aircraft offer a myriad of advantages, including reduced noise emissions, lower carbon footprints, and heightened operational efficiency (Jones, 2023). While the future is indeed promising, the AAM industry is confronted with a plethora of challenges that necessitate attention. One of the primary hurdles is securing regulatory approval for the widespread implementation of eVTOL aircraft. Policymakers and industry stakeholders must collaborate closely to ensure safety, establish robust infrastructure, and address airspace utilization concerns (Smith et al., 2021).

Factors Influencing Consumer Willingness to Pay

Several factors influence a consumer's WTP for a product or service, categorized broadly into intrinsic (personal) and extrinsic (external) factors. Intrinsic factors include demographics, psychographics, needs, preferences, and risk perception. Extrinsic factors entail product characteristics, marketing, price of substitutes (i.e., competition), context, and social factors. Some additional factors can include brand loyalty and customer service (Polydoropoulou et al., 2020).

Income level is typically a fundamental determinant of consumer WTP for transportation services. Existing research consistently demonstrates that individuals with higher incomes tend to exhibit a greater willingness to pay for premium transit (Kamijo et al., 2022; Wang & Wang, 2021). As disposable income increases, individuals are more likely to prioritize convenience and comfort when making purchasing decisions, including their mode of transportation. Therefore, a comprehensive understanding of the income distribution among potential customers becomes imperative for transportation providers in shaping pricing strategies that cater to different consumer segments (Polydoropoulou et al., 2020; Rice et al., 2020; Wang & Wang, 2021).

Convenience factors also play a role in shaping consumer preferences within the transportation industry. The time-saving benefits associated with transit, such as reduced travel time and avoidance of traffic congestion, appeal particularly to individuals leading time-sensitive lifestyles (Anderson et al., 2020; Brown, 2010; Long et al., 2023). Widespread availability and accessibility also emerge as vital considerations for consumers when selecting transit services. Service providers can enhance customer satisfaction and attract a larger customer base by offering flexible scheduling options and user-friendly booking platforms (Kamijo et al., 2022; Wang

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& Wang, 2021).

Safety is another concern that significantly impacts consumer WTP and willingness to use AAM. Perceptions of air taxi safety and trust in service providers directly influence consumer behavior. Service providers must prioritize implementing rigorous safety measures, ensuring highly trained pilots, and maintaining well-maintained aircraft to instill consumer confidence. Consumer trust in the safety of AAM will play a pivotal role in the industry's growth and success. Service providers must also effectively address service reliability and security concerns through transparent safety communication. Establishing trust becomes vital to consumer decision-making, making public outreach a mandatory business practice in the AAM space. Service providers will need to build a reputation for trustworthiness in order to attract and retain customers (Anderson et al., 2020; Kamijo et al., 2022; Wang & Wang, 2021).

New studies can enable researchers to gather detailed information on consumer expectations, preferences, and WTP. By comparing previous findings with new examinations of specific scenarios and flight preferences, researchers are likely to gain a comprehensive understanding of the factors that influence consumer decision-making processes and pricing perceptions (Kamijo et al., 2022; Long et al., 2023; Rice et al., 2020; Wang & Wang, 2021).

Pricing Strategies in the Transportation Industry

Importance of price sensitivity analysis

Understanding price sensitivity is of utmost importance within service industries and, thus, by default, within AAM. The resultant insight enables service providers to formulate effective pricing strategies that maximize revenue while meeting consumer demand (Wilson et al., 2006). By considering factors such as consumer preferences, competitive pricing, and market dynamics, service providers can gauge the elasticity of demand and create pricing models that align with market expectations (Wang & Wang, 2021). Price sensitivity analysis empowers service providers to make informed decisions regarding pricing structures, impacting their profitability and market positioning (Gomez-Lobo et al., 2022).

Traditional Pricing Strategies

Cost-plus pricing is a strategy that involves calculating the cost of providing the service and adding a markup to determine the final price. It is widely employed in the transport industry as it guarantees cost coverage while generating a reasonable profit margin. However, this approach does not take into consideration consumer demand or market conditions, which could potentially lead to suboptimal prices. Another approach service providers may adopt is competitor-based pricing, where prices are set based on the prevailing rates in the market. This strategy aims to maintain price parity with competitors and prevent a price war. Nonetheless, relying solely on competitor prices may overlook unique value propositions and consumer preferences, thereby limiting potential revenue and growth opportunities

(Anderson et al., 2020; Kamijo et al., 2022).

Impact of Pricing Strategies on Consumer Behavior and Profitability

Pricing strategies directly influence consumer behavior and profitability in the transit industry. The way consumers perceive the value and affordability of services directly impacts their choice of provider. Adopting appropriate pricing strategies, such as dynamic pricing models, can attract price-sensitive consumers during off-peak periods while maintaining profitability during peak periods. Furthermore, effective pricing strategies contribute to market competitiveness, customer satisfaction, and long-term profitability (Kamijo et al., 2022; Wang & Wang, 2021; Wu et al., 2022).

Surge pricing involves real-time adjusting prices based on demand and supply fluctuations (Brown, 2010). This model allows service providers to charge higher prices during peak periods or when demand exceeds capacity. Surge pricing helps manage demand and supply imbalances, maximizing revenue during high-demand periods. Demand-based pricing is a dynamic strategy that adjusts prices based on demand forecasting and consumer behavior analysis. This strategy utilizes data-driven insights to establish prices that align with consumer demand patterns. By accurately identifying peak and off-peak periods, service providers can optimize revenue and balance capacity utilization (Gomez-Lobo et al., 2022; Kamijo et al., 2022; Wu et al., 2022).

Effectiveness of Pricing Strategies in the Transportation Industry

In order to comprehensively evaluate the effectiveness of pricing strategies in the highly dynamic transportation industry, it is imperative to delve into case studies that have successfully implemented such strategies. A noteworthy study by Kamijo et al. (2022) focused on consumer willingness to pay for transit services while examining the influence of various pricing models on customer behavior. The extensive research conducted in this study highlights that dynamic pricing strategies, such as surge pricing and demand-based pricing, have the potential to boost revenue and enhance overall customer satisfaction. Furthermore, Wang and Wang (2021) carried out an insightful study on price sensitivity within the ride-sharing industry, which holds valuable lessons that can be applied to transportation. These research findings suggest that customized marketing strategies and customer loyalty programs can effectively shape consumer behavior and foster stronger customer loyalty, thereby providing tangible benefits to service providers within the sector (Wang & Wang, 2021).

While implementing various pricing strategies in the industry has yielded positive results, it is essential to acknowledge and address the challenges and limitations associated with specific pricing approaches. According to Anderson et al. (2020), determining appropriate pricing decisions within the aviation industry is heavily influenced by considerations related to risk and attributes. Specifically, for the transportation industry, service providers face the delicate task of striking a harmonious balance between competitiveness, profitability, and customer perceptions of fairness and value for money. Moreover, Brown (2010) emphasizes the importance of comprehending the decision-making environment for businesses operating within the aviation sector, considering factors such as regulatory frameworks, market conditions, and evolving customer preferences. By identifying and addressing these inherent challenges and limitations, service providers can derive effective pricing strategies tailored to the unique AAM industry (Brown, 2010).

In order to holistically assess the effectiveness of various pricing strategies in the transport industry, it is imperative to conduct a comprehensive cost-benefit analysis. Wilson et al. (2006) proposed that conducting such an analysis involves evaluating the costs involved in implementing and managing different pricing models and gauging the potential benefits of revenue generation and overall customer satisfaction. By meticulously comparing the costs and benefits of different pricing strategies, service providers within the air taxi industry can make informed decisions about the most optimal and effective pricing approaches for their specific business models (Wilson et al., 2006).

Pricing Issues Specific to AAM

Few studies have directly addressed price elasticity and preferences in AAM as of 2024. Available studies suggest that consumer willingness to pay for advanced air mobility is influenced by weather conditions, public acceptance, familiarity, perceived value, entertainment value, attitudes toward new technology, emotional responses, and the demand for discretionary trips. Additionally, Winter et al. (2020) found six primary predictors of consumer willingness to fly in air taxis, including familiarity, value, fun factor, wariness of new technology, fear, and happiness. Each of these seemingly will need to be priced into AAM fares at values correlating to the perceived importance of each factor.

Other recent studies have explored the market potential for AAM across different geographies using various variables such as cost, journey time, wait time, number of connections, value of time, and vertiport density to quantify consumer demand, potential mode share, and price elasticity for AAM. These studies suggested that large metropolitan areas such as New York City, the San Francisco Bay Area, Los Angeles, and London could be early adopter markets for AAM due to its high percentage of long-distance commuters and the presence of polycentric regions with multiple urban centers (Goyal et al., 2021; Roy et al., 2021).

Exploratory demand modeling and travel time analyses have been conducted, comparing AAM with private vehicle use and other modes of transportation. Studies have found that AAM demand is highly sensitive to cost and travel time, with a willingness to pay \$0.80–1.30 more per mile than ground transit, depending on travel time and distance (Goyal et al., 2021; Roy et al., 2021). For reference, the average ride-hailing service cost is \$1.00-2.00 per mile. Current estimates of AAM per seat mile costs range from three to six times that of ride-hailing services (Pertz et al., 2023). The qualities of any first- and last-mile connections will significantly impact price tolerance. For example, if one has to use a taxi or ride-hailing service on either or both ends of the trip, consumers are expected to want to pay less for the AAM leg (Coykendall et al., 2023).

Goyal et al. (2021) theorized that the AAM passenger mobility market segments may evolve from hub and spoke services to point-to-point air taxi services if the cost of flights decreases, adoption mainstreams, and infrastructure becomes more ubiquitous. However, challenges such as safety, air traffic management, noise, privacy, visual pollution, community acceptance, weather, environmental impacts, infrastructure limitations, and security could constrain the growth and mainstreaming of AAM.

The potential for air taxi commuting demand varies across cities and is influenced by higher-income households, regular commuters, and the availability of vertiports per capita. High-volume air taxi routes provide better connections to areas with population growth or lower-speed surface streets. Sensitivity analysis was conducted to identify the elasticity of demand estimates to different inputs, including air taxi access and egress times, eVTOL aircraft designs, passenger numbers, ride guarantee provision, and local population electric vehicle ownership percentages. The study found that access and egress times greatly impact potential air taxi demand and pricing, with eliminating these travel components increasing overall demand by a factor of four and boosting overall willingness to pay higher prices (Haan et al., 2021).

Rath and Chow (2022) examined the choice of air taxis for airport commutes, focusing on the taxi user population as the market from which users may shift. The choice of travel mode was found to be influenced by trip length and price. The findings of Roy et al. (2021) summarized the studies mentioned thus far in that there are complex interactions among vehicle performance, cost, population distribution, road infrastructure, traffic conditions, and airport location, all playing integral roles in affecting the expected user base and price tolerance for AAM airport shuttle and other air taxi services.

Methods to Study Willingness to Pay

Various methods are used to determine what consumers might be willing to pay for products. Moreover, price tolerance can be influenced by numerous internal and external factors that potentially change rapidly from day to day. Measures capable of capturing the nuances in price tolerances are critical to ensure valid and useful results. Detailing the array of methods is beyond the scope of this study, and available studies were used to select the simplest and most effective methods to garner willingness to pay for AAM services.

This study assessed two basic methods for potential adoption to measure willingness to pay. The first was the Van Westendorp Price Model (VWPM). The

VWPM has been used in numerous industries to ascertain the price consumers are willing to pay for a service or product. It is especially useful in cases where a service or product has yet to be introduced to the market. Furthermore, the VWPM asks simple questions concerning how much or too little to pay and what is considered a fair price (Kintler et al., 2023; Tkachenko & Popovych, 2022). The second was tradeoff-type situational questions such as those used in Eker et al. (2020), Binder et al. (2018), and Leonard et al. (2021). The types of questions used in these studies examined how much someone was willing to pay for an AAM trip in contrast to taking ground transit. In the simplest sense, respondents were given different scenarios to consider in order to decide on the value of time. For example, how much would someone be willing to pay for an AAM flight if it cuts the travel time by 25% or 50%? Another example could be that a ground taxi trip takes 30 minutes and costs $60; what combination of trip time and cost would someone be willing to tolerate to use AAM for the same itinerary? The two methods appeared to deliver a balance of simplicity and comprehensiveness (Binder et al., 2018; Eker et al., 2020; Leonard et al., 2021).

The scarcity of literature on the topic and the recommendations for further research on the willingness to pay for AAM services indicated a need for additional inquiry. Therefore, this study aimed to examine consumer willingness to pay for AAM services. The insights obtained from this research hold significant implications for industry stakeholders, including AAM service providers, eVTOL manufacturers, infrastructure interests, and policymakers. Service providers can leverage these findings to tailor their pricing strategies and enhance their understanding of consumer preferences, ultimately leading to improved customer satisfaction and profitability. Manufacturers need all available data to enhance their business models further and appropriately plan for market penetration. On the other hand, policymakers can incorporate these insights into developing regulations and policies that foster a competitive and sustainable environment for the AAM industry.

Methods

Preferences for transportation modes with specific characteristics, such as air taxis, influence passengers' WTP for AAM, as highlighted in both Stopka et al. (2018) and Larson et al. (2014). An essential aspect of effectively preparing for the introduction and acceptance of a product or service is the thorough examination of consumer price sensitivities of early adopters (Chhabra, 2015; Larson et al., 2014; Lipovetsky, 2006; Stopka et al., 2018). The current study polled individuals residing in the United States to evaluate their willingness to pay for flights on human-operated eVTOLs within the AAM framework. Detailed information on the sample and the survey instrument may be found in the subsequent sections.

Participants

The study employed Amazon's Mechanical Turk (MTurk) platform to enlist people for remunerated tasks. The objective was to obtain at least 1,000 replies to accurately replicate the demographics of the United States population (Pew Research Center, 2023). The minimal sample size required for the analysis employed in this study was evaluated using G*Power software, with a significance level (α) of 0.05 and a power ($1 - \beta$) of 0.80. The resultant minimum needed sample size was calculated to be 721, surpassed by the number of gathered responses.

Instrument

This study employed a survey modified from the VWPM scale described by Lipovetsky (2006) and Chhabra (2015). The development of the VWPM scale was prompted by the necessity to investigate price sensitivity in market analysis during the development of new products and services. The challenge of pricing new products lies in understanding customer reactions to pricing strategies, which can be challenging for market researchers when confronted with these decisions. VWPM determines fair prices and compares alternatives like AAM flights and ground transit. The instrument uses tradeoff-type situational questions to assess respondents' willingness to pay for different travel time and cost combinations. These methods balance simplicity and comprehensiveness, allowing respondents to weigh the value of time and travel time in different scenarios (Chhabra, 2015; Lipovetsky, 2006).

A group of aviation and survey technique specialists assessed the accuracy and reliability of a preliminary survey. The panel comprised five academic researchers, two mixed-method research experts, two graduate-level aviation faculty, and a survey methodologies specialist. The panel provided feedback on the repetitive nature of the VWPM, recommending limiting the total number of scenarios to minimize the burden on respondents. The second iteration of the survey was tested with a cohort of 181 participants, and the input obtained from the pilot study was utilized to finalize the survey that will be made available to the public. The poll concisely explained Advanced Air Mobility and future air taxi services. The poll concluded with demographic inquiries derived from metrics provided by the U.S. Census Bureau.

Procedure

The objective of this study was to assess the public's willingness to pay for AAM services provided through the use of eVTOLs. The study utilized a quantitative, non-experimental technique with a sample of sufficient size to provide insight into the public perception of WTP eVTOLs in the United States. The survey was constructed and disseminated using the Zoho Survey platform. Participants were recruited using Amazon's Mechanical Turk (MTurk) network, which is a platform that hires individuals to execute activities, such as surveys, in exchange for monetary compensation. Engagement and fulfillment of assignments were discretionary, and the MTurk platform guarantees the maintenance of confidentiality. The selection of MTurk was based on its proven efficacy in past aviation and non-aviation survey research projects (Farrell & Sweeney, 2021; Huff & Tingley, 2015; Rice et al., 2017; Rice et al., 2020; Winter et al., 2020; Zhang & Gearhart, 2020). Research findings have repeatedly demonstrated that the use of MTurk yields results that are equivalent to, and in certain instances, even better than traditional survey techniques in urgent research (Farrell & Sweeney, 2021; Huff & Tingley, 2015; Rice et al., 2017; Zhang & Gearhart, 2020). The survey was available through MTurk until the target sample size of completed responses was exceeded, which required approximately two weeks.

Results

During the data collection period, there were 3,033 visits to the survey, from which 2,110 individuals began the survey. Of those who started the survey, 1,622 participants completed it, resulting in a response rate of 85.8%, as defined by the American Association for Public Opinion Research (AAPOR) (2023). The revised VWPM-WTP scale was evaluated for reliability, which yielded a Cronbach's α = 0.964. Reliability was determined for the tradeoff scenario questions to be Cronbach's α = 0.971.

Prices Willing to Pay for AAM eVTOL Trips

The distribution of prices willing to pay on the VWPM was positively skewed, following a Log-normal distribution. A natural logarithm transformation did not rectify the normality of the distribution. As such, per the recommendation of Talis et al. (2023), the median was selected as the preferred measure of central tendency. Tables 1 through 4 summarize the responses to the VWPM price tolerance questions for the provided time savings scenarios. A Mood's Median test was conducted for each scenario and the accompanying pricing tolerance questions. Table 5 summarizes the results of this series of Mood's Median tests. Across scenarios, there were no statistically significant differences among median pricing responses.

The next section of questions inquired about the amount of time savings a respondent believed was necessary to select taking an eVTOL over a car for a specific trip. Results are shown in Table 6. Because the responses in this section were typically distributed, means were used to indicate central tendency. The percentage of time savings required for respondents to choose an eVTOL over a car was consistent across scenarios. Respondents expected, on average, a 62.5% savings in time in order to choose to take an eVTOL.

Next, respondents were asked to pick the price they would be willing to accept for an eVTOL trip taking a specified length of time. The hypothetical eVTOL trip is contrasted by a taxi/ride-hailing car trip for a certain time and cost. Because the responses in this section were typically distributed, means were used to indicate central tendency. The results are shown in Table 7. There did appear to be a premium assigned to time savings among the responses in this section, with a tolerance for an average price increase of 71.9%. The acceptable price increases ranged from $1.39 to $1.66 per minute of travel time saved.

Respondents were informed that typical ride-hailing services cost between $1 and $2 per mile based on market and current demand conditions. Considering these costs, those surveyed were asked what price they viewed as reasonable for eVTOL trips. Respondents were reminded to "be sure to consider potential time savings. Also, consider that the eVTOL may be unable to pick up or drop off at an exact location." Because the responses in this section were normally distributed, means were used to indicate central tendency. The mean price per mile deemed reasonable was $5.31 (*SD* = 2.99).

The last set of questions on pricing presented respondents with a scenario and then asked what price and trip time combinations they would be willing to accept for an eVTOL flight. The data distributions were found to follow a negative binomial distribution; therefore, the median was selected for measuring central tendency, per the recommendations of Volkov et al. (2022) and van de Ven and Weber (1993). The first scenario was "pick the price and trip time combination you would be willing to accept for an eVTOL flight. The trip by taxi/ride-hailing would normally take 30 minutes and cost $50." The median time reported was 30 minutes, costing $50. The second scenario was "pick the price and trip time combination you would be willing to accept for an eVTOL flight. The trip by taxi/ride-hailing would normally take 60 minutes and cost $100." The median time was 45 minutes, and the cost was $100.

Table 1

Question #1: You need to get to the airport from your current location. Assume that the airport is approximately a 30-minute drive away. The eVTOL can make the trip in 15 minutes.

	Median Price ($)
At what price would you consider the flight to be so expensive that you would not consider buying it?	200.00
At what price would you consider the flight starting to get expensive, so that it is not out of the question, but you would have to give some thought to buying it?	195.00
At what price would you consider the flight to be a bargain or a great buy for the money?	150.00
At what price would you consider the flight to be priced so low that you would feel the quality couldn't be very good?	100.00

Table 2

Question #2: You need to get to the airport from your current location. Assume that the airport is approximately a 60-minute drive away. The eVTOL can make the trip in 30 minutes.

	Median Price ($)
At what price would you consider the flight to be so expensive that you would not consider buying it?	200.00
At what price would you consider the flight starting to get expensive, so that it is not out of the question, but you would have to give some thought to buying it?	200.00
At what price would you consider the flight to be a bargain or a great buy for the money?	150.00
At what price would you consider the flight to be priced so low that you would feel the quality couldn't be very good?	100.00

Table 3

Question #3: You need to get to the airport from your current location. Assume that the airport is approximately a 60-minute drive away. The eVTOL can make the trip in 15 minutes.

	Median Price ($)
At what price would you consider the flight to be so expensive that you would not consider buying it?	200.00
At what price would you consider the flight starting to get expensive, so that it is not out of the question, but you would have to give some thought to buying it?	200.00
At what price would you consider the flight to be a bargain or a great buy for the money?	180.00
At what price would you consider the flight to be priced so low that you would feel the quality couldn't be very good?	100.00

Table 4

Question #4: You need to get to the airport from your current location. Assume that the airport is approximately a 60-minute drive away. The eVTOL can make the trip in 10 minutes.

	Median Price ($)
At what price would you consider the flight to be so expensive that you would not consider buying it?	200.00
At what price would you consider the flight starting to get expensive, so that it is not out of the question, but you would have to give some thought to buying it?	180.00

At what price would you consider the flight to be a bargain or a great buy for the money?	135.00
At what price would you consider the flight to be priced so low that you would feel the quality couldn't be very good?	100.00

Table 5

Summary of Mood's Median Tests Across All Four Time Savings Scenarios.

	Test Statistic *(U)*	*p-value*
At what price would you consider the flight to be so expensive that you would not consider buying it?	4.264	0.23
At what price would you consider the flight starting to get expensive, so that it is not out of the question, but you would have to give some thought to buying it?	2.110	0.55
At what price would you consider the flight to be a bargain or a great buy for the money?	1.371	0.71
At what price would you consider the flight to be priced so low that you would feel the quality couldn't be very good?	0.927	0.82

Table 6

Time Savings in Minutes Required to Select an eVTOL Over a Car

Car Trip Scenario	Mean Time Savings: eVTOL	Std. Deviation	% Saved
Normally, it takes 10 minutes	6.124	2.28	61.3
Normally, it takes 15 minutes	9.34	3.24	62.2
Normally, it takes 30 minutes	18.59	6.11	61.9
Normally, it takes 45 minutes	28.42	9.01	63.1
Usually, it takes 60 minutes	38.46	11.67	64.1

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Table 7
Price Willing to Accept for eVTOL Flight in Contrast to a Taxi/Ride Hailing Service Trip by Car

eVTOL Trip Length in Minutes	Taxi/Ride Hailing Minutes & Cost	eVTOL Mean Acceptable Price ($)	Std. Deviation	% Cost Difference
15	30 / $50	99.29	157.8	98.6
30	60 / $100	149.78	165.29	49.8
15	60 / $100	162.68	187.23	62.7
5	60 / $100	176.51	213.35	76.5

Demographics

The demographic attributes of respondents were collected primarily on the same metrics leveraged by the U.S. Census. The gender distribution was 41.5% female, 56.6% male, 1.3% preferred not to answer, and 0.6% noted as “other.” The most prevalent reported ethnicities were white (88%), Asian (3%), American Indian or Alaska Native (3%), and Black or African American (2.75%). All other ethnicities were reported as less than 1%. Among these, 67.3% were not Hispanic, Latino, or Spanish origin, while 30.7% were of such origin, and 2% preferred not to answer. The age of respondents followed a logistic distribution. Thus, the median was selected for reporting central tendency (Parkin & Robinson, 1993; Van Der Laan & Van Der Laan, 2000). The median age was 35 years. Respondent marital status was predominately noted to be “married, or domestic partnership” (81.9%), with 15% reporting to be “single” and the remaining 3.1% spread relatively evenly among “divorced,” “separated,” “widowed,” and “prefer not to answer.” The median number of persons in the participants' household was 4, with just under half of the responses indicating a household of this size (45.8%). The next most frequent size was 3 persons (28.1%), followed by two persons (15.7%). Just over 5% reported being the only person in the household, and the remaining 5.4% were in households of 5 or more.

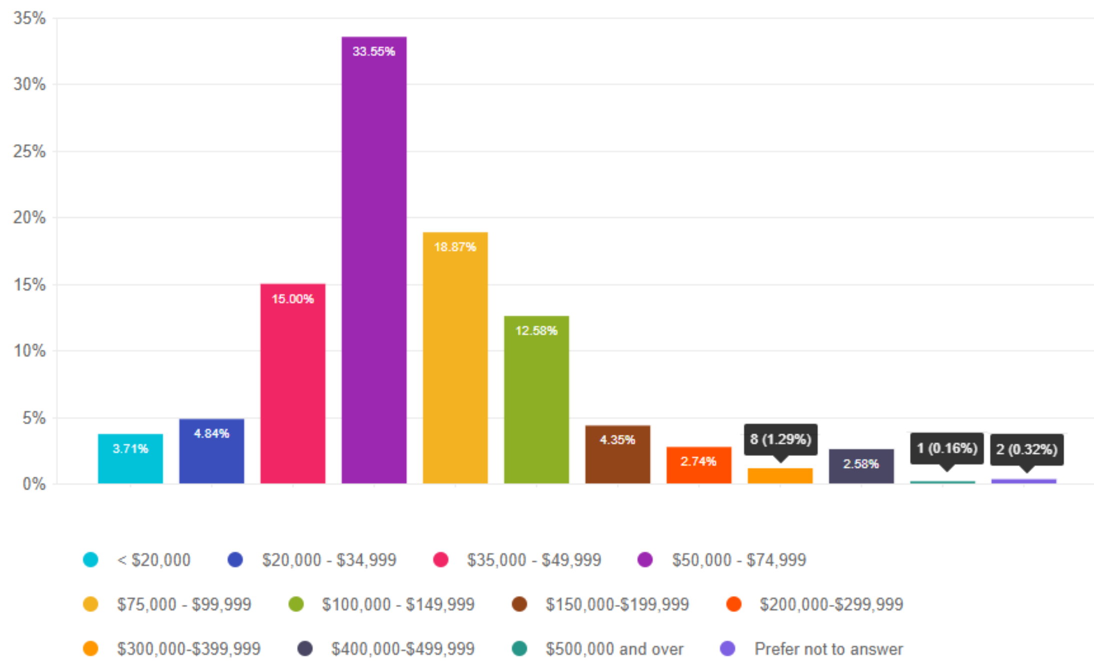
Most respondents reported being employed full-time (81.3%). Just over 8% reported being employed part-time, and 4.7% were self-employed. The remaining 6% were categorized as “out of work and looking for work,” “out of work but not currently looking for work,” “homemaker,” “student,” or “retired.” Over half of participants (55.5%) stated that they had attained a Bachelor’s degree as their highest level of education. Table 8 breaks down the education levels of participants.

Respondents were asked about their household income. The highest concentration of income was centered in the lower-middle to middle-class range of $50,000-$74,999 (33.6%) (Pew Research Center, 2020). Figure 1 shows the remainder of the distribution of income levels. As is shown, incomes were concentrated between $35,000 and $149,999.

Table 8
Highest Level of Education Achieved by Respondents

Highest Level of Education Achieved	Response (%)
Bachelor's degree	55.50
Associate's degree	15.90
Master's degree	9.00
Some college credit, no degree	7.70
High school graduate, diploma, or the equivalent	7.10
Some high school, no diploma	1.90
Trade/technical/vocational training	1.61
Doctorate	0.97
Professional degree (e.g., MD, JD)	0.32

Figure 1
Distribution of Participant Income Levels



Correlations and Comparisons Across Groups

Due to the primary distributions of the data, nonparametric inferential statistics were used when investigating relationships and differences across groups of responses. Relationships between demographic attributes and WTP were assessed across all cost levels (i.e., too expensive, getting expensive, a bargain, too cheap/low quality). Missing data and "prefer not to answer" responses were removed pair-wise. Specific categories were combined to simplify the presentation of findings, e.g., persons were classified as either married or unmarried – persons who were divorced or widowed were considered "not married." The variables with combined categories are described in this section.

Analysis of the higher price levels (too expensive, getting expensive) showed that marital status, income, and age were the only variables significantly correlated with WTP. Persons who were married showed a negligible positive correlation with a higher acceptable price (n = 1,599, r_τ = 0.05, p = 0.047). Persons with higher incomes had a negligible negative correlation with acceptable prices (n = 1,601, r_τ = -0.076, $p < 0.001$). A low negative correlation existed for age; as age increased, WTP decreased (n = 1,588, r_τ = -0.114, $p < 0.001$). A Kruskal-Wallis test was conducted to compare WTP across racial groups. No differences were indicated, H (5, n = 1,580) = 11.028, p = 0.051.

Analysis of the lower price levels (a bargain, too cheap/low quality) showed that as age increased, the price willing to pay was lower (n = 1,588, r_τ = -0.120, $p < 0.001$). There was a negligible correlation between living environment and a higher WTP, with urban areas tolerating higher prices than suburban and rural areas (n = 1,618, r_τ = 0.066, p = 0.030). Those who were married also had a higher WTP than those who were not married (n = 1,599, r_τ = 0.068, p = 0.033). A Kruskal-Wallis test was conducted to compare WTP across racial groups. No differences were indicated, H (5, n = 1,580) = 8.082, p = 0.141.

Relationships among demographic variables and the time savings needed to perceive the benefits of AAM were assessed. For age, the only significant correlation detected was time savings on trips when a car would take 60 minutes, but an eVTOL flight would take 10 minutes. In this case, a negligible positive relationship existed between age and the amount of time needed to be saved (n = 1,238, r_τ = 0.073, p = 0.008). A Kruskal-Wallis test across races indicated differences in desired time savings among one or more pairs (H [5, n = 1,580] = 12.181, p = 0.028). Pair-wise comparisons were made using the Dunn procedure with Bonferroni correction (p_{bc} = 0.0033), which indicated that the only groups among which the difference was statistically significant was between Asian (*Mdn* = 8.00) and American Indian or Alaska Native (*Mdn* = 6.00) respondents.

Lastly, the responses to what persons were willing to pay per mile compared to the $1 to $2 per mile average of car ride-hailing services were examined. There was no significant relationship between values reported and respondent age (n = 1,588, r_τ = -0.029, p = 0.302). There were no significant relationships between the price per mile willing to be paid and gender, education, employment status, marital status, income, race, and residential character (e.g., urban, suburban, rural) (H [5, n = 1,580] = 2.874, p = 0.738). A summary of relationships among variables is provided in Table 9.

Table 9
Relationships Among Variables

Variable	Direction	Variable	Direction
Married	✓	WTP High Price	⇧
Age	⇧	WTP High Price	⇩
Income	⇧	WTP High Price	⇩
Age	⇧	WTP Low Price	⇩
Urban (Density)	⇧	WTP Low Price	⇧
Married	✓	WTP Low Price	⇧
Age	⇧	Desired Time Savings	⇧

Discussion

This study investigated public perceptions of the WTP for AAM eVTOL trips. The survey achieved a high response rate, and the revised VWPM-WTP scale demonstrated strong reliability. The results indicated that participants were generally willing to pay a premium for AAM eVTOL trips. This suggests a tempered acceptance and interest in this emerging mode of transportation among the public.

The WTP appeared to result from combinations of price sensitivity, perceived time savings, demographic attributes, and contrasts with views on existing ride-hailing services. The distribution of WTP responses was positively skewed, indicating substantial sensitivity to price. The median price respondents were willing to pay for a relatively short flight across various scenarios ranged from $150 to $200. Furthermore, respondents were willing to pay an almost 72% premium for time savings. Regarding cost per mile, respondents were willing to pay between 2.5 and over 5 times as much compared to existing ride-hailing services. The willingness to pay more for convenience and speed aligns with studies by Coykendall et al. (2023), Goyal et al. (2021), and Roy et al. (2021).

Time savings emerged as a crucial factor influencing WTP. By emphasizing the convenience and efficiency of eVTOL trips, companies can position themselves as a preferred choice for commuters looking to save time on their daily travels. With the growing population in urban areas, the demand for efficient transportation options is on the rise. As noted in Goyal et al. (2021), Pertz et al. (2023), and Roy et al. (2021), as expected, urbanites tended to be notably keen on convenience and time savings. AAM eVTOL services offer a solution that saves time and reduces traffic congestion and carbon emissions. By promoting these benefits, companies can attract a larger customer base and establish themselves as leaders in the future of transportation. As more people become aware of the advantages of eVTOL

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technology, the market for these services is likely to expand rapidly, creating new opportunities for growth and innovation in the industry.

However, regardless of time saved, there were no significant differences among median prices considered too expensive, starting to get expensive, a bargain, or so cheap that the quality was in question. Also, when considering a ride-hailing trip of 30 minutes costing $50, persons indicated they would be willing to tolerate the same trip time but pay the same amount for traveling by eVTOL. For a longer, one-hour car trip, respondents wanted a 25% savings in time but were only willing to pay the same $100 price as being charged for ground transit. Perhaps respondents viewed the overarching time savings as worth a higher price but viewed the differences in time savings as too abstract to quantify their values.

Overall, the findings suggest a promising market for AAM eVTOL services among younger urban consumers. Younger participants were more willing to pay higher prices for AAM eVTOL trips than older participants. This could be attributable to younger participants being more tech-savvy and open to new transportation technologies. Moreover, as Winter et al. (2020) noted, younger age groups tend to have more favorable views of technology, be more familiar with innovation, seek entertainment value or “fun factor,” have less fear of new technologies and are more willing to try new things. These findings may indicate a potential market opportunity for targeting younger consumers in the future.

Age, income, and race showed minimal influence on WTP at higher price points. However, age and marital status had some influence on WTP at lower price points. Interestingly, race was only a factor between Asian and American Indian or Alaska Native respondents. Asian participants required slightly less time savings than American Indian or Alaska Native respondents. These findings suggest that promoting the time-saving benefits of eVTOL services is likely to appeal across most racial backgrounds. By tailoring marketing strategies to highlight the convenience and efficiency of eVTOL trips, companies can appeal to a wider audience and drive revenue growth.

Additionally, the study found that income level did not significantly affect willingness to pay more for eVTOL services, contrary to previous studies (Kamijo et al., 2022; Wang & Wang, 2021). The lack of variation in WTP across incomes may indicate that this mode of transportation may be palatable to a wide range of consumers regardless of their financial situation. This presents a promising opportunity for companies to market eVTOL as a convenient and affordable option for urban travel. By emphasizing the time-saving benefits and accessibility of eVTOL, companies can capture the interest of a diverse customer base and capitalize on the growing demand for efficient transportation solutions in metropolitan areas. Overall, these insights highlight the importance of understanding consumer preferences and tailoring marketing strategies to meet the needs of different demographic groups to maximize success in the emerging eVTOL market.

The average WTP per mile for eVTOL trips ($5.31) significantly exceeded the average cost per mile for car ride-hailing services ($1-$2). This suggests that consumers may be willing to pay a premium for the convenience and speed of eVTOL transportation. This aligns with the findings of Anderson et al. (2020), Brown (2010), and Long et al. (2023). This higher WTP on a per-mile basis across all respondent attributes shows a universal appeal of the advantages offered by eVTOL transportation, which also allies with previous research. By offering competitive pricing and highlighting the advantages of eVTOL over traditional ride-hailing services, companies can attract more customers and establish a strong foothold in the market. By highlighting the most attractive attributes of AAM, such as time savings, convenience, and accessibility, they further differentiate themselves from traditional ride-hailing services and appeal to a broad demographic audience. These strategies are in congruence with those outlined in Polydoropulou et al. (2020), Rice et al. (2020), as well as Wang and Wang (2021).

Limitations

The distribution of several attributes of respondents within the sample differed from those of the general U.S. population. However, this has been acknowledged in prior research using MTurk samples. The participants in this study were predominantly young, married, white males residing in urban areas. Reported incomes were predominantly within the middle-class range. It is a reasonable conjecture that the attributes of respondents resemble those of early adopters as they, by using the MTurk service, demonstrate technical sophistication and preference. The study relied on a self-reported survey, potentially introducing bias. Acknowledging that the sample may not fully represent the U.S. general population is also necessary.

Delimitations

The researcher selected the MTurk platform to recruit participants due to the substantial amount of research that has used MTurk to gather samples and the studies that have proven the quality and dependability of such samples. The researcher broadened the statistical analysis of the data to offer a more detailed examination of the findings than initially intended. The study was limited to U.S. residents to offer information specifically to U.S. researchers and stakeholders.

Conclusion

The study aimed to investigate public attitudes on their WTP for AAM eVTOL services. Data was collected via an updated VWPM-WTP robust scale, which showed that participants were typically willing to pay more for eVTOL trips. This indicated acceptance of this new method of transportation as long as a clear and attractive benefit was provided in exchange for higher fares. The WTP was affected by anticipated time savings, specific demographic characteristics, and comparisons with perceptions of current ride-hailing services.

Time savings was identified as the most critical element affecting willingness to pay. Companies may establish themselves as a top choice for commuters seeking to streamline their daily travel by highlighting the simplicity and efficiency of eVTOL trips. The average willingness to pay per mile for eVTOL rides was $5.31, much more than the average cost per mile for automobile ride-hailing services, ranging from $1 to $2. Consumers could be inclined to pay extra for the convenience and swiftness of eVTOL transportation. This is consistent with prior studies and indicates that businesses may increase user acquisition by providing competitive pricing and emphasizing the benefits of eVTOL compared to conventional ride-hailing services. The results of this study seemed to indicate that AAM providers should be very proactive in communicating the gains consumers receive by using the system.

In addition, companies should also focus on developing partnerships with airports, urban planning authorities, and other key stakeholders to ensure a seamless integration of eVTOL transportation into existing infrastructure. By collaborating with these partners, companies can overcome regulatory hurdles and expand their service offerings to a wider customer base. Overall, a well-rounded approach that considers pricing, advantages, safety features, environmental impact, accessibility, and partnerships will be crucial for companies to succeed in the rapidly growing eVTOL market.

Even in light of the overall willingness to tolerate higher pricing, only a few variables revealed a relationship with WTP. The results indicated a favorable market for AAM services among younger urban users. These participants showed a greater inclination to pay higher prices than older participants, likely attributed to their adeptness with technology and receptiveness to innovative transportation technologies. Age and income had negligible impact on willingness to pay (WTP) at higher prices, but age and marital status had some influence at lower price levels. Only Asian and American Indian or Alaska Native participants differed from one another, with the race of the remaining respondents not being identified as a factor in differences in WTP. This indicates that emphasizing the time-saving advantages of eVTOL services will likely appeal to a wide range of ethnic backgrounds.

In summary, AAM providers will likely be able to command a higher price structure than existing taxi-like services. Such increased fares will still need to appear sensible, providing value through time savings and convenience in exchange for higher pricing. This exchange of time for money appeared to be generally uniform across demographic and socio-economic groups. Understanding the preferences and willingness to pay of different consumers is crucial for designing effective marketing campaigns and pricing strategies for eVTOL services in the future. If specific, targeted marketing were to be undertaken, weak correlations might support a focus on younger, married, middle-class urbanites. By catering to this demographic, AAM providers could tap into what is potentially the most lucrative and promising market segment. The findings of this study could help companies tailor their offerings better to meet the needs and preferences of their target market, ultimately leading to increased adoption and profitability in the emerging mode of transportation.

In conclusion, this study provides valuable insights into public perceptions and potential demand for AAM eVTOL trips. While cost remains a significant consideration, the substantial value placed on time savings suggests a promising future for this emerging transportation technology. As the eVTOL market continues to expand and evolve, understanding consumer preferences and willingness to pay will be crucial for companies looking to capitalize on this growing industry. A more accurate picture of consumer demand and behavior can be developed by conducting research beyond self-reported surveys and incorporating real-world experiences. Despite the current limitations, the study's findings offer a positive outlook for the future of AAM eVTOL trips, highlighting the potential for widespread adoption as technology advances and costs decrease.

Recommendations

This study established a foundation for future research on consumer WTP for AAM services. To further advance understanding, it is recommended that researchers repeat this study using different sampling techniques and large sample sizes. Also, qualitative approaches such as interviews and focus groups will likely provide a richer, more in-depth understanding of consumer motivations to use AAM and the price they might be willing to pay to use the transportation system. Ideally, this would occur during periods of early adoption, such as at the Paris Olympics, the proposed use of AAM in the Los Angeles area by the end of 2024, or the 2025 Japan Expo. Deeper inquiry into specific consumer segments, considering variables beyond those investigated in this study that may influence willingness to pay, will also expand the knowledge on WTP for AAM. Additionally, studying the impact of personalized marketing and loyalty programs on consumer behavior could yield valuable insights for service providers. Furthermore, exploring the ethical implications of pricing strategies, particularly surge pricing, would contribute to the ongoing discourse in the industry. Lastly, further research that could explore real-world usage patterns and WTP through actual eVTOL flight experiences should be conducted as soon as possible.

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