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Analysis of potential impacts of urban air mobility in cities and their development Análisis de potenciales impactos de la movilidad aérea urbana en las ciudades y su desarrollo

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ABSTRACT Urban Air Mobility (UAM) is an emerging mode of urban transportation based on new aeronautical, electrical, and communications technologies. However, this will present a significant challenge for urban planners, as the planning and implementation of UAM must include and consider the development of new dedicated infrastructure, the socio-urban context, local needs, and an assessment of the impact it will have on cities and their development. Therefore, the objective of this review article, which uses a quantitative systematic review methodology, is to analyze the anticipated or potential impacts that this emerging mode of transport will have on urban development. As a result, this study presents an assessment of the impacts of UAM on urban infrastructure development, the existing urban transport system, the local economy, the urban environment and ultimately, society.

RESUMEN La Movilidad Aérea Urbana (UAM) es un emergente modo de transporte urbano, basado en nuevas tecnologías aeronáuticas, eléctricas y de comunicaciones. Ahora bien, esto representará un verdadero desafío para los planificadores urbanos, ya que la planificación e implantación de la UAM debe incluir y tener en cuenta el desarrollo de nuevas infraestructuras dedicadas, el contexto socio-urbano, las necesidades locales, y la evaluación del impacto que generará en las ciudades y su desarrollo. Entonces, el objetivo del presente artículo de revisión, que usa como metodología la revisión sistemática cuantitativa, es analizar los impactos previstos o potenciales que este modo de transporte emergente generará en el desarrollo urbano. Y a nivel de resultado, este estudio presenta una evaluación de los impactos de la UAM en el desarrollo de infraestructura urbana, en el sistema de transporte urbano existente, en la economía local, en el medioambiente urbano y finalmente en la sociedad.

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PALABRAS CLAVE movilidad aérea urbana, desarrollo urbano, infraestructura urbana, planificación urbana, sostenibilidad urbana

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1. Introduction

Urban Air Mobility (UAM) (for practicality, the English acronym will be used for reference) is an emerging technology in mobility for the (low-altitude) air transport of passengers and goods at the urban and interurban levels (EASA, 2021; Cohen et al., 2021; Roland Berger, 2018; Brelje and Martins, 2019; EASA, 2022; FAA, 2023; NASA, 2018a). For passenger transport, electric-powered vertical *takeoff and landing* (eVTOL) aircraft with a capacity of 2 to 6 passengers (plus the pilot) will be used. Meanwhile, cargo transport (initially limited to light parcels and courier services) will be carried out using small, remotely piloted unmanned aerial vehicles (better known as "drones") (Polaczyk et al., 2019; BOEING, 2018; Goyal et al., 2021; Anand et al., 2021; Fu et al., 2019).

On the other hand, UAM will have a physical (ground-based) support infrastructure known as a 'vertiport' (EASA, 2022; FAA, 2022a; SIAM-INECO, 2025) that serve as terminal stations for this new mode of transport (and whose dimensions may range from 2,000 to 10,000 m², depending on their functionality and level of services) (Brunelli et al., 2023; Preis, 2021). There will also be other infrastructure, such as 'vertistops,' similar to vertiports but much smaller in size (800–900 m²) and serving as simple stations or stopovers (Gouveia et al., 2022). On the other hand, 'vertihubs' are anticipated to support long-distance and/or regional interurban travel; these would be somewhat larger than a vertiport (Preis and Hornung, 2022; Qiu et al., 2019).

The implementation and integration of UAM in an urban area will require decision-making that affects both the city's innovation strategies and the fundamentals of urban planning. The introduction of UAM requires a holistic planning approach that encompasses not only integrating UAM into the existing transportation system but also developing urban infrastructure and enhancing the city's overall livability (Perperidou and Kirgiafinis, 2022). This is necessary to ensure the emergence and sustainable evolution of the UAM system (in all its aspects) (ASD, 2023). However, implementing UAM in cities could have various impacts, undermining its social acceptance and even its development and commercial success (Cohen and Shaheen, 2021; Cohen et al., 2021); therefore, it is advisable to identify and analyze the likely impacts.

The objective of this review article is therefore to analyze the anticipated impacts of UAM on cities and their development. The impacts analyzed here are exclusively urban in nature, such as urban infrastructure, existing urban transportation systems, and economic, environmental, and social aspects, all at the local level.

2. Methodology

The method implemented in this research is known as a quantitative systematic review, widely used in general thematic review studies such as this one. This method involves analyzing previously published works within a specific line of research (Turin and Chowdhury, 2019). The quantitative systematic review is conducted through a systematic search and analysis of published research and the extraction of information relevant to the study, which enables descriptive analysis to identify the state of a line of research (Ahmad, 2019). The review developed here has an exploratory and descriptive research scope, as its purpose is to identify or characterize a research phenomenon of interest (Dixon-Woods, 2006).

Quantitative systematic reviews are conducted according to well-defined phases, which have been implemented here, namely (Gough et al., 2012; Petticrew and Roberts, 2006; Sandelowski, 2008): (a) formulation of a research problem, (b) research questions, (c) definition of keywords, (d) inclusion and exclusion criteria, (e) searching for information in scientific databases, (f) searching for sources in the so-called 'gray literature,' (g) analysis and evaluation of collected studies (both scientific and from gray literature), and (g) presentation and discussion of the results.

The search was conducted in the 'WoS Core Collection Index' (WoS) and 'Scopus' databases, and the search period was set between 2015 and 2025. The descriptors (keywords) used for the search, in both Spanish and English, were all those related to the topic; Boolean operators (*and, or, not, around(x), in, define, weather*) were used to search efficiently. To filter the results of the search, the following inclusion/exclusion criteria were applied: (a) all scientific publications related to the study's topic were included; (b) studies published in English and Spanish were included; (c) case studies were included, provided they offered a relevant conceptual framework and concrete, measurable, and comparable results; (d) reports and/or technical studies with a solid scientific basis were included; (e) "gray literature" was included provided it presented a solid, rigorous, and formal theoretical foundation; (f) articles without a research design and without a well-defined research question were excluded; (g) tertiary reviews were excluded; and (h) press releases and/or opinion pieces were excluded. Finally, two filters were applied in the search and selection process: (a) first filter: article title, abstract, and keywords; (b) second filter: full text of the article.

Finally, it should be noted that approximately 1,000 studies were identified in the initial searches. However, after applying the aforementioned filters and criteria (and considering the journal's document length limitations), 78 studies/articles were selected for the final systematic analysis, all of which are cited and referenced in this paper. Figure 1 presents the identification, eligibility, and selection process according to the PRISMA (*Preferred Reporting Items for Systematic Reviews and Meta-Analyses*) guidelines for systematic reviews (PRISMA, 2025).

3. Results

3.1. Impact of new UAM support infrastructure

In addition to the existing pressure to develop new infrastructure in major cities due to their continuous growth, the development of UAM support infrastructure (vertiport, vertistop, vertihub) must be considered (Figure 2). According to studies, the infrastructure of vertiports is likely to vary in size and number across different cities depending on expected travel volumes and the average purchasing power of those cities; for example, it is estimated that between 85 and 100 vertiports will be needed in a large, densely populated metropolitan area (in cities in the developed world) (EASA, 2021). It is anticipated that the UAM will rely on central vertiports and feeder vertiports (vertistops) (Rimjha and Trani, 2021); central vertiports will be located in areas with high population density, employment hubs (industrial and/or business zones), or in residential areas with above-average income levels (Figure 3). The effectiveness of UAM passenger networks will depend on a minimum level of vertiport infrastructure to meet the basic needs of travelers within the urban center and in surrounding or peripheral areas (FAA, 2022b).

Studies estimate that, in the short to medium term (2028–2034), in large, dense urban areas (1.5–3.5 million inhabitants), approximately 10-18 vertiports would be needed to facilitate a UAM passenger network (EASA, 2021). Meanwhile, medium-sized, less-dense urban/suburban areas (0.5–1.5 million inhabitants) would require 7-21 vertiports (EASA, 2021). However, as the UAM passenger market grows and evolves, it is anticipated that more vertiports will be required.

3.2. Impact on the existing urban transportation system

UAM represents a paradigm shift in urban mobility by introducing aerial alternatives to conventional ground transportation. The integration of ground and air modes at the urban level involves a complex interplay of factors that shape travel behavior, infrastructure use, and regulatory dynamics within both ground and aviation systems alike (Krylova, 2022; Mueller et al., 2017). This subsection examines the potential impacts that UAM may have on existing ground transportation systems.

To effectively analyze the transformative change that UAM will bring to existing transportation networks and systems, this subsection presents a conceptual framework to systematically assess the short- and long-term effects of UAM across various dimensions of travel behavior and demand, as well as broader aspects of urban dynamics.

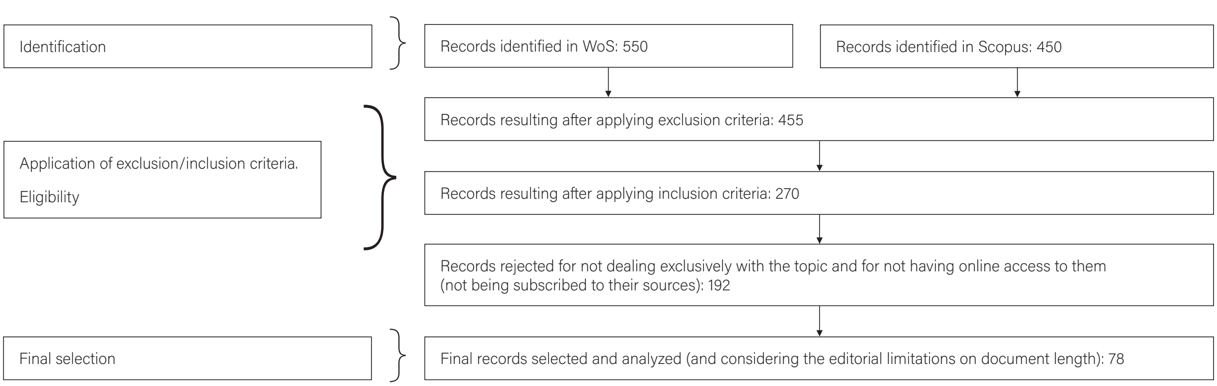

Figure 1: PRISMA flowchart for the development of systematic reviews. (2025)

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The approach considers three distinct categories: first-order impacts, second-order impacts, and third-order impacts/implications.

1. First-order impacts:

a) Efficiency in travel time
   - Reduced travel time due to direct flight routes and avoidance of ground traffic congestion.
   - Greater accessibility to remote or congested areas.

b) Modal shift and choice
   - Shift from ground transportation to the UAM for short trips.
   - Expanded modal options for travelers.

c) Traffic decongestion
   - Reduction of surface traffic congestion through aerial routes.
   - Reduction of ground traffic delays and gridlock.

d) Travel costs and value of time
   - Changes in travel costs due to the use of UAM.
   - Impact on the perceived value of travel time savings for different user groups.

e) Impact on other modes and infrastructure
   - Mitigation of congestion and road wear due to reduced demand for ground vehicles.
   - Potential influence on public transportation usage patterns and infrastructure.

2. Second-order impacts:

a) Land use and urban development
   - Possible alteration of urban spatial patterns due to new air corridors.
   - Impact on land-use planning around vertiports and UAM infrastructure.

b) Economic and business growth
   - Development of industries associated with UAM.
   - New business models and services related to UAM.

c) Environmental considerations
   - Visual pollution.
   - Noise pollution.

3. Third-order impacts/implications:

a) Equity and accessibility
   - Potential unequal access to UAM services based on location and socioeconomic factors.
   - Disparities in affordability and accessibility for various segments of the population.

b) Infrastructure development
   - Impact of vertiports on urban planning and investment decisions.
   - Interaction between existing ground infrastructure and newly developed UAM infrastructure.

c) Public acceptance and behavioral change
   - Evolution of public perceptions and attitudes toward UAM, impacting its adoption and social integration.
   - Potential changes in travel behavior patterns.

d) Rescheduling of activities and urban accessibility
   - Potential changes in daily activity schedules due to improved travel options.
   - Changes in accessibility to different parts of the city center via UAM connections.

e) Urban expansion
   - Impact on urban expansion patterns (the UAM will provide access to areas that were previously less accessible).
   - Consideration of land development in response to increased accessibility.

First-order impacts: First-order impacts refer to the immediate consequences of integrating UAM into existing ground transportation systems. These impacts directly influence travel behavior and demand, shaping the dynamics of urban mobility. Travel time efficiency is a key consideration, given the potential reduction in travel time from direct aerial routes, particularly in congested urban areas (Wang et al., 2023). Modal shift and choice examine how the introduction of UAM could influence travelers' decisions to switch from traditional ground transportation modes to shorter trips. Traffic decongestion examines the potential relief of road congestion through the use of air routes, leading to possible reductions in ground traffic delays. Furthermore, this category considers travel costs and the value of time, investigating changes in travel costs and their influence on the perceived value of time savings for different user segments. It also examines the effects of UAM on the distance traveled by aerial vehicles and its impact on other modes of transport, analyzing potential changes in overall road usage patterns (Vongvit et al., 2024; Riza et al., 2024; Pelegrín et al., 2022).

Second-order impacts: Second-order impacts extend beyond immediate changes in travel and influence urban development, economic growth, and environmental considerations. Key elements in this category include land use and urban development, with attention to potential changes in spatial patterns resulting from flight corridors and newly established vertiports (Karami et al., 2024). Economic and business growth explores how UAM could stimulate economic opportunities, fostering new industries and business models (Pacheco Prado, 2017). Environmental considerations analyze the impacts of UAM, particularly on noise, emissions, and public health, to advance sustainable mobility in cities (Rizzi et al., 2023; Kim and Lee, 2024).

Third-order impacts and implications: Third-order impacts encompass the systemic and structural changes arising from integrating UAM into existing transportation systems. These impacts extend to regulatory frameworks, equity considerations, and public acceptance. Key elements within this category include equity and accessibility, examining how UAM might affect equitable access to transportation services and potential disparities among different socioeconomic groups and geographic areas (Al Haddad et al., 2020; Fu et al., 2019). Additionally, this category explores public acceptance and behavioral change, considering how UAM could shape society's attitudes, behaviors, and preferences toward urban transportation (Ison, 2024). Activity rescheduling and urban accessibility examine the potential for changes in daily routines and accessibility to different urban areas. Finally, urban expansion explores the interaction between UAM and urban development, assessing how it could influence urban and regional patterns (Garus et al., 2022; Perperidou and Kirgiafinis, 2022).

3.3. Economic impacts

The arrival of the UAM holds significant promise for generating notable economic impacts at both the local and regional levels, some of which are listed below (McNab, 2024; Porsche Consulting, 2018, 2021; Coykendall et al., 2021; Roland Berger, 2018, 2020; Cohen et al., 2021; Kreimeier et al., 2018):

- Improved productivity (due to reduced travel times)
- Greater employment opportunities
- Opening of new markets
- Increased revenue for the city/region (e.g., through taxes)
- Domestic manufacturing opportunities
- Competition among existing markets
- Reduced transportation costs
- Higher quality of service due to competition
- Increased land value
- Reduced land availability.

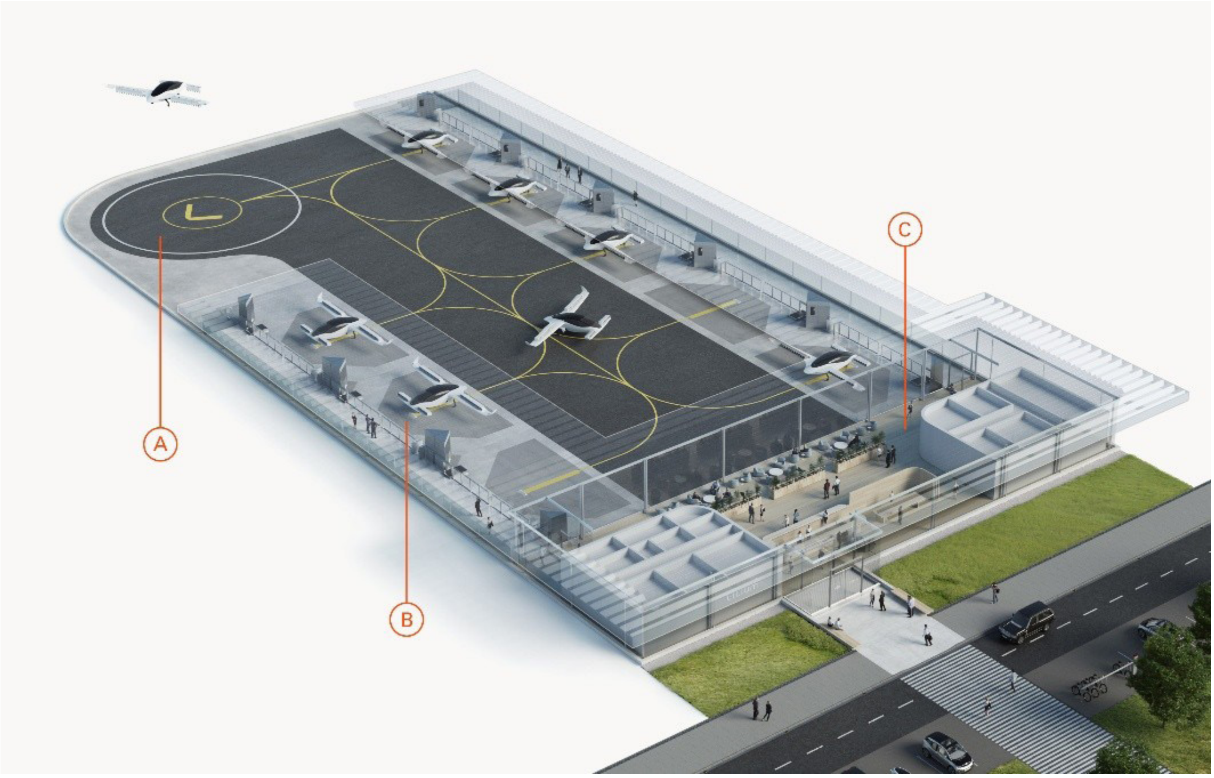

Figure 2: Proposed configuration of a vertiport. Legend. (A) VTOL aircraft takeoff and landing area; (B) VTOL aircraft parking bays; (C) terminal area (passenger handling). LILIUM (2020)

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3.4. Environmental impacts

Air pollution/emissions: Since UAM services have not yet been implemented, environmental impacts will be estimated for potential future scenarios under various assumptions. Most types of aerial vehicles that will provide UAM services will rely on electricity, and therefore, the amount of carbon dioxide produced will depend on the energy mix. The more renewable energy included in the mix, the less carbon dioxide will be produced overall (Liberacki et al., 2023).

Battery-electric cars consume less energy than eVTOL electric air vehicles, although ground travel time and mileage are greater than those of UAM air vehicles (Pukhova, 2019). Emissions from UAM flights increase compared to the equivalent ground distance traveled, since passengers would have to travel longer to access and exit a vertiport. However, when compared to internal combustion engine cars, a UAM-based trip has a smaller carbon footprint than the equivalent ground trip (Ng et al., 2024).

A study presented the potential benefits of an electrically powered air taxi compared to an electric road taxi using current technology (Donateo and Ficarella, 2020, 2022). The comparison with a fully electric road vehicle using current technology was unfavorable, but the "wheel-to-wheel" emissions, with a projected emissions intensity of 90 g/kWh, were quite low (67 g/km). That figure equates to 107.78 g of greenhouse gases per mile. While eVTOL aircraft do not seem to be able to compete with electric ground vehicles (yet), the situation is slightly different when compared to internal combustion engine vehicles (which use fossil fuels), as light vehicles emit 348 g/mile on average (U.S. Department of Energy, 2022), which means that the amount of emissions from eVTOL aircraft is 69% lower than those from internal combustion engine vehicles.

Internal combustion engine cars outperform eVTOL aircraft for trips up to 35 km, where flights are dominated by energy-intensive hovering (Kasliwal et al., 2019). For trips longer than 50 km, emissions from eVTOL vehicles fall well below those of internal combustion engine cars. An eVTOL aircraft has greenhouse gas emissions that are 35% lower than those of an internal combustion engine vehicle, but 28% higher than those of a battery-electric ground vehicle, for a 100 km trip. However, different passenger loads can make a trip in an eVTOL air taxi more environmentally friendly by distributing emissions per person compared to both internal combustion engine vehicles and battery-electric ground vehicles. Finally, another study introduced a specific type of eVTOL aircraft into a simulation and compared its greenhouse gas emissions with those of other ground transportation modes (Pukhova, 2019). The results show that when the eVTOL air vehicle travels a maximum distance of 47.25 km, it produces the same amount of CO2 emissions per kilometer as conventional diesel- and gasoline-powered vehicles. When considering a distance of 20 km or more, the amounts of NOx emissions released by an eVTOL air vehicle are lower than those released by diesel-powered vehicles.

Noise pollution: On another note, eVTOLs have the potential to be quieter than traditional helicopters and airplanes, but they are still likely to generate significant noise (Yunus et al., 2023). The impact of noise pollution from UAM vehicles could be significant, especially in urban areas where noise is already a major problem. In a recent study, Kalakou et al. (2023) identified noise impacts as one of the most important barriers UAM will face. Assessing the noise levels of different aircraft and community tolerance levels will play a key role in the siting of vertiports, particularly due to higher noise levels in the departure and arrival corridors of aerial vehicles traveling to and from vertiports (Eissfeldt, 2020; Gao et al., 2023; NASA, 2020; Cohen et al., 2021).

In a recent study, Kalakou et al. (2023) identified noise impacts as one of the most significant barriers UAM will face. The assessment of noise levels from different aircraft and community tolerance levels will play a significant role in siting vertiports, particularly given higher noise levels in departure and arrival corridors (Eissfeldt, 2020; Gao et al., 2023).

Visual pollution: First, it should be clarified that there will be strict, standardized management of urban airspace and air traffic associated with UAM, both to streamline flight flow and prevent aviation accidents, as UAM activity in urban skies is expected to increase over time.

Figure 3: Probable location of a vertiport in a city center (in the example, on the roof of a parking garage). PS&S (2025)

Current regulations establish the following distribution of urban airspace use (Figure 4): between 46 and 122 meters (above ground level) would be reserved for small drones (surveillance, public safety, recreational, etc.); next, a no-fly zone is planned between 122 and 152 meters; subsequently, altitudes from 335 to 503 m would be allocated for logistics drones; and finally, the range between 503 and 1,981 m would be reserved for VTOL passenger transport aircraft. Thus, in the context of UAM, visual pollution could result from an increase in aircraft numbers, which may be considered intrusive and disruptive to cities' visual landscapes. Visual pollution refers to intrusive visual elements that detract from the overall aesthetics of a particular environment (Borowiak et al., 2024). This visual pollution, caused by the excessive presence of UAM aircraft in urban airspace, can have a significant negative impact on the quality of life of people living or working in the affected areas (Thomas and Granberg, 2023; Vongvit et al., 2024).

One study has suggested conducting tests to identify acceptable densities as perceived by people on the ground, as well as creating air corridors over existing roads to reduce visual pollution (Uber Elevate, 2016). Based on these simulations, regulations should be established to set the acceptable frequency threshold for operations on each route and in each zone. Certain areas, such as tourist attractions, require greater attention to visual impacts because they depend on the view offered to visitors, and visual pollution could negatively affect their economic returns (Deng et al., 2021; Radic et al., 2024).

3.5. Social Impacts

This subsection delves into a comprehensive exploration of the social consequences of integrating UAM into urban life. Social acceptance of UAM will depend on three key social-impact areas: safety, privacy, and land use.

The main barriers for potential users of UAM services are safety concerns, costs, and infrastructure limitations (Lee et al., 2023). Among these, addressing safety concerns is of paramount importance for improving UAM acceptability. Experts have emphasized the need for a safety assurance process to create a positive perception of UAM and convince the public of its safety (Torens, 2021). For example, conducting pilot tests to directly demonstrate the safety aspect of such services would be beneficial. Furthermore, establishing government systems to manage UAM safety and setting standards are critical steps to ensure safe UAM operations (Cinar and Tuncal, 2023; Almenar-Muñoz, 2024). The key factors influencing UAM acceptance across all phases are affinity for UAM and willingness to pay. As safety concerns are addressed, cost becomes the second most important factor, and those who view UAM as a viable alternative mode of transportation are more inclined to use the service (Coppola et al., 2024). Studies conducted in the United States (NASA, 2018b) and Europe (EASA, 2021) show that young people and high-income groups are more likely to be the first (and most frequent) users of UAM services.

Accessibility and Affordability: One of the main equity issues with UAM is access to the service. If UAM services are accessible only to a specific segment of the population, this could lead to greater disparities in transportation and mobility options (Biehle, 2022). The logical approach would be to follow market demand and focus on locating vertiports in high-demand areas. However, this strategy could create an uneven distribution of accessibility within a network, leaving many people without easy access to UAM services. The inclusion of groups with mobility restrictions and of low-income groups is also an important parameter to consider (Biehle, 2022; Al Haddad et al., 2020; EASA, 2021; Shon et al., 2024; Jin et al., 2024). In short, several studies conclude that accessibility for all users may not be a priority in the initial phase of UAM, but it is expected to be addressed as the system develops (Uber Elevate, 2016; Cohen and Shaheen, 2021; Straubinger et al., 2021; Schuchardt et al., 2023; Grote et al., 2022).

Privacy: How UAM will operate without crossing the line into violating people's privacy is a concern for communities, according to several related opinion polls (Zeiser, 2019). Concerns about data privacy could be a reason people are skeptical of UAM, as data collection, storage, and management could infringe on someone's privacy (Cohen and Shaheen, 2021).

Figure 4: Descriptive diagram (not to scale) of the distribution and use of urban airspace for the UAM. Shrestha et al. (2021)

A consent requirement regarding residential properties is needed to protect people's privacy and earn public trust (Uber Elevate, 2016). Unmanned aerial vehicles (drones) will redefine the concept of privacy as traditionally understood (the right not to be observed or disturbed on private property or to be observed in public beyond the line of sight) (Ravich, 2020; Ravich et al., 2023).

4. Discussion

This review article delved into the multifaceted realm of Urban Air Mobility within the broader context of a city and its development, as well as its likely impacts (limited to those dimensions relevant to the study's urban focus). The study involved not only identifying potential benefits and challenges but also examining the implications—both positive and negative—of integrating this new mode of urban transportation into cities' urban development. By addressing environmental, social, and safety concerns, as well as risk factors, the study completed the analytical framework for the future integration of UAM services into cities' existing transportation, mobility, and infrastructure landscape.

For the UAM to become a reality, it must be socially accepted in the broadest sense. Here, acceptance encompasses sociopolitical, community, and market acceptance. Thus, UAM must meet the expectations of all stakeholders in the ecosystem—such as potential users, industry, governments, public institutions, regulators, and indirectly affected third parties—while reconciling their respective motivations, expectations, and concerns. To this end, the UAM ecosystem must be designed to promote benefits and minimize risks, so that it, as part of the future urban transportation system, is safe, affordable, accessible, environmentally friendly, economically viable, and, ultimately, sustainable.

Therefore, to transform the anticipated impacts of UAM on cities into challenges and/or opportunities for the successful introduction of the ecosystem, its drivers/promoters—especially local public officials—could take the following considerations into account:

1. Impact on existing transportation systems:

a) Consider zoning and land-use planning regulations that integrate UAM services. Foster proactive engagement with urban planners and policymakers to advocate for the development of adaptable zoning regulations that can accommodate the evolving needs of UAM services.
b) Invest in the expansion and improvement of existing ground transportation infrastructure, identifying areas that require expansion and modernization to accommodate the projected increase in demand for UAM services.

2. UAM Support Infrastructure:

c) Establish a comprehensive framework for the development of vertiports, while ensuring integration with existing transportation infrastructure.
d) Develop and implement rigorous safety and certification standards for infrastructure, vehicles, and related technologies, in line with evolving aviation safety regulations.
e) Coordinate with national aviation authorities to integrate UAM into existing air traffic management systems, ensuring seamless coordination and minimizing urban airspace congestion.
f) Further examine land use and spatial requirements, and how the necessary UAM infrastructure can be integrated into urban networks and dense areas.

3. Environmental, social, and economic impacts:

g) Foster community engagement initiatives to address any social concerns and ensure equitable access to UAM services, particularly in underserved communities, while promoting inclusion and accessibility for all segments of society.
h) Consider economic incentives, such as tax exemptions and subsidies, to encourage UAM adoption, thereby fostering innovation, job creation, and economic growth in aviation and related industries.

5. Conclusions

In today's global urban context, population density is expected to continue increasing, and people will continue to make daily commutes to travel between home and work. If this trend continues, UAM must be integrated into cities' transportation networks from a broad-system perspective.

Considering the current landscape of urban mobility, both urban and interurban travel are characterized by high complexity and diversity. The integration of UAM is expected to impact the existing urban transportation system. Urban and transportation planners, as well as the responsible authorities, must consider that aerial vehicles providing UAM services could complement existing mobility services to create an integrated passenger transportation system.

The results of many related studies indicate that elements related to transportation characteristics are viewed as opportunities, while certain socioeconomic aspects are characterized as threats, opportunities, or weaknesses. More specifically, the main strengths of UAM include its potential to reduce emissions and to automate and electrify transportation. In contrast, the main weaknesses are public awareness of UAM, the range (coverage) of UAM vehicles, and prevailing weather conditions.

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UAM appears to have many solid opportunities for growth, including existing urbanization trends, people's perception of the fun of traveling in an aerial vehicle (e.g., in an air taxi), and current urban traffic congestion. In contrast, the most important opportunity for UAM is its integration with other mobility services in the city/region. Last but not least, cybersecurity is one of the most significant threats to UAM development.

The considerations presented here could serve as input for planning the integration of UAM into cities as such integration unfolds. However, its timing will depend on the actual rollout of UAM, which will go through several stages of evolution and development in the coming years. According to several related studies, the adoption of UAM services is expected to occur in several phases. These phases will correspond to the expansion of UAM services from a few (large) cities to multiple locations/metropolitan areas in many countries. The first phase is already underway, during which the entire regulatory, normative, and legal framework for this new mode of transportation is being formulated. This phase is estimated to extend at least until the end of the current decade. Once this phase is complete, UAM services (in their various "business models") can begin, as planned for the start of the next decade, at different paces across cities and countries around the world. It is estimated that by the middle of the next decade, the UAM ecosystem will already show solid consolidation.

Finally, future research, which could build upon the study presented here, could focus on addressing many other essential aspects affecting the implementation of UAM in the context of the future era of mobility, such as climate disruptions, commercial supply-and-demand assessments (business models), and policy analysis.

Conflict of interest. The author declares no conflicts of interest.

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