International Journal of Creative and Open Research in Engineering and Management
ISSN: **3108-1754 (Online)**
Volume 02 Issue 03 March-2026 | Impact Factor: 3.5

# AI-Driven Autonomous Drone Delivery: An Empirical Study of Consumer Awareness, Trust, and Adoption

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**How to Cite this Article**:

Sadh, S. N. ,. M. P. ,. T. (2026). AI-Driven Autonomous Drone Delivery: An Empirical Study of Consumer Awareness, Trust, and Adoption. International Journal of Creative and Open Research in Engineering and Management, 02(03). https://doi.org/10.55041/ijcope.v2i3.113



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## ABSTRACT

The rapid expansion of e-commerce has significantly increased the demand for faster and more efficient delivery systems. Traditional delivery methods often face challenges such as traffic congestion, high fuel costs, delays, and environmental concerns. In this context, Artificial Intelligence (AI)-enabled autonomous drones have emerged as a promising solution for last-mile delivery. This study adopts an empirical approach based on primary data collected through a structured questionnaire. It examines consumer awareness, perception, willingness to adopt, and trust in AI-based drone delivery services. The findings reveal that while awareness and perceived benefits are high, actual adoption remains limited due to concerns related to cost, safety, and trust. The study concludes that AI-driven drone delivery has strong future potential, but its success depends on improving affordability, regulatory support, and consumer confidence.

**Keywords:** Artificial Intelligence, Drone Delivery, Consumer Perception, Adoption Intention, Trust, Last-Mile Logistics, Delivery Speed

## INTRODUCTION

The fast development of e-commerce, urbanization, and digital technology has altered drastically in the manner of delivery of goods and services. Among the most effective modern advancement in the field of logistics is the application of autonomous drones in the delivery industry. Intelligence-driven drones could enhance the efficiency of the last-mile delivery, which is in most cases the costliest and the most time intensive aspect of the supply-chain. Some of the challenges associated with last-mile delivery include traffic jams, fuel prices, slow deliveries and pollution to the environment. The alternative solution is autonomous drones which will deliver goods quicker, eliminate reliance on road transportation, and decrease carbon emissions. Drones are applicable in urban and semi-urban regions with the assistance of intelligent navigation systems, which can assist these drones in route planning, avoiding any issues and performing their work with minimum human intervention.

### Objectives Of The Study

1. To examine the level of consumer awareness regarding drone delivery services.
2. To analyze consumer perception of drones as a delivery option.
3. To evaluate the willingness of consumers to adopt drone delivery services.
4. To assess the importance of delivery speed in influencing consumer preferences.
5. To analyze consumer willingness to pay extra for faster delivery.
6. To study online shopping behavior as a driver of delivery demand.
7. To evaluate the level of trust in AI-based delivery systems.

### Literature Review

The high rate of the development of artificial intelligence (AI) has acted as a major factor in the development of autonomous drone navigation and automation of logistics. The paper by Ansari et al. (2025) covered the revolution of last-mile delivery in e-commerce and logistics by AI-driven drones by coming up with models that can self-navigate, optimize routes, and detect obstacles through deep learning and computer vision. Their study showed significant efficiency in the delivery process and the drones delivered their goods up to a 40 percent faster than the ground deliveries and also minimized emissions and operational expenses. Although the outcomes were encouraging, the research found that there were still some challenges that may be linked to regulatory limitations and weather dependency and limitations in communication networks. In the same way, Miranda et al. (2022) created a delivery drones navigation system that is fully autonomous to enhance the speed and precision of parcel delivery. Their model incorporated GPS, barometer and ultra-wideband (UWB) sensors that were integrated through an Extended Kalman Filter (EKF) to add accuracy to the positional and stability of flight. The experimental findings of the authors showed that the drones were able to land accurately and follow a smooth route, which shows that the system was technically viable to be used in actual delivery operations. In their work, they highlighted the possibility of autonomous navigation systems to fulfill the growing delivery needs at the lowest possible human intervention. Joshi, Spilbergs, and Miķelsone (2024) researched in the sphere of defence and safety. AI-controlled drones were used to make decisions independently in the military. Their paper suggested a multi-tiered AI system comprising of machine learning, computer vision, and sensor fusion to support autonomic navigation and threat evaluation. Reinforcement learning enabled the drones to make mission-critical and autonomous decisions in both GPS-denied and communication-restricted areas. The study has demonstrated the potential of AI to improve the performance of national security, as well as ethical issues related to autonomy and responsibility in defence systems. Going further to robotics, Thangamani, Suguna, and Kamalam (2024) investigated the use of computational intelligence (i.e. fuzzy logic, neural networks and evolutionary algorithms) to improve the autonomy and adaptability of drones and robotic systems. They established that computational intelligence enables drones to sense, navigate, and cooperate better especially where there is uncertainty. Swarm intelligence was highlighted as a promising direction in the study that allows coordinating multi-drone activities in surveillance and logistics, but also recommends the 5G and IoT integration in the future. Caballero-Martin et al. (2024) conducted a

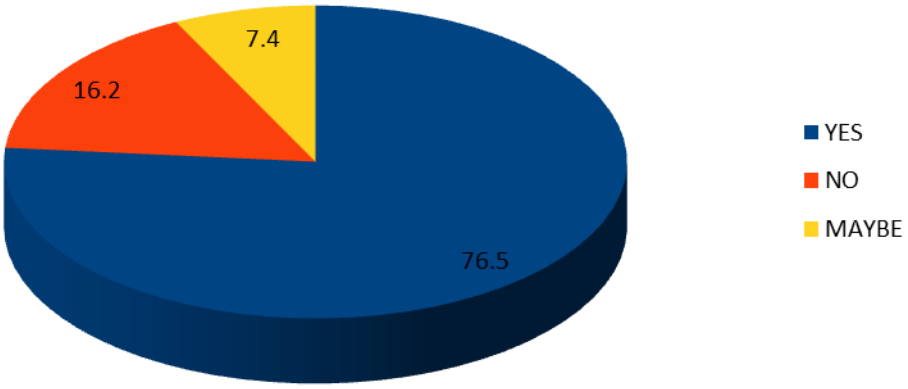
thorough review and gave an overview of the development of AI applications in drone control in terms of perception, decision-making, and multiagent coordination. The authors came to a conclusion that AI is the foundation of autonomy, and drones are able to perceive and plan autonomously. Vision systems have been developed based on deep learning with more than 95 percent accuracy in object detection and reinforcement learning has been used to develop better decision-making and flight stability. Nevertheless, the review also warned that the bottleneck is onboard processing power and energy limitation which still limits the scalability of the AI-controlled drone systems. Shaklab et al. (2023) provided some contribution to the discussion by introducing an AI-enhanced system of safety among autonomous robots and drones that deliver goods produced in urban settings. Their architecture used the LiDAR, GPS, and computer vision data with the deep learning models to forecast the movements of the pedestrians and prevent collision. Simulation and field tests revealed that AI was a key to making autonomous delivery systems safer and more socially acceptable, which opened the door to the actual implementation of AI-based systems in smart cities and campuses. Maharajan et al. (2024) also investigated the integration of AI in UAV navigation and they examined the role of AI-based learning models and optimization methods to enhance the efficiency and autonomy of unmanned aerial vehicles. Their research observed that dynamic response of models to complex environment enables drones to learn, whereas mathematical optimization reduces energy consumption and duration. Despite its possibilities, the study admitted continuing difficulties connected with regulatory policies, computational boundaries, and other ethical issues, associated with full autonomy. Mohsen (2024) presented a co-arrangement of AI, autonomous vehicles, and IoT to optimize the delivery in smart cities in the bigger picture of smart urban logistics. The system made use of real-time information to optimize routes and make demand predictions that led to a decrease in traffic congestion and carbon emissions. The author concluded that The use of AI in logistics would allow making cities more sustainable by enhancing efficiency and decreasing the ecological footprint of the transportation network. Bhatt, Verma, and Singh (2025) covered the future and modernization of autonomous navigation and how it has evolved over time to rely on AI-powered systems whereby the system uses real-time environmental data. They pointed out the need of sophisticated sensors, including LiDAR and radar, and the essentialism of AI algorithms of deep learning and reinforcement learning in the realization of dynamic decision-making. The authors outlined urban environment issues including the density of traffic and sensor limitations and provided sensor fusion and collaborative navigation models to resolve the reliability issues. Last but not the least, Sorooshian et al. (2022) observed the implications and issues of intelligent technologies in last-mile delivery. Their analysis has stated that the combination of AI and IoT has the potential to streamline the delivery processes, yet there are challenges including cybersecurity threats, distrust among people, and. infrastructure limitations impede the mass adoption. The authors promoted a progressive shift to complete automation, in which AI efficiency and human control will be used to guarantee reliability and social acceptance. All these studies imply the disruptive nature of AI in autonomous navigation and logistics and focus on enhanced speed, accuracy, sustainability, and safety. They also point out such areas of critical concern that need additional research such as ethical governance, regulatory frameworks and the scalability of AI-driven systems across different operational settings.

## DATA – ANALYSIS

The report analysis of the data indicates a rather positive and reserved attitude of the population to the use of AI-powered autonomous drones to deliver services. This relies on the answers achieved using a questionnaire. The results indicate that the level of awareness of drone delivery services is rather high. Approximately, three-quarters of surveyed persons indicated that they have heard of these services (76.5%). It implies that nowadays, drone logistics is no longer a foreign concept to people. Nonetheless, the 16.2% who have never heard of it and the 7.4% who do not know means that more efforts are required to create awareness by carrying out campaigns and exposing people in real life. On the question of the appropriateness of drones in delivery, most respondents of 58.8% believed that the drones were an appropriate method of delivery. This is an indication of trust on the technology to enhance logistics. Conversely, 27.9% said no, and 13.2 percent said they did not know. This brings up concerns of safety, reliability or feasibility. This pessimistic hope is reflected in the probability of drone delivery use. A clear desire to use the services of drones was expressed by only 33.8 percent of the respondents. In the meantime, 48.5 per cent were skeptical, and 17.6 per cent

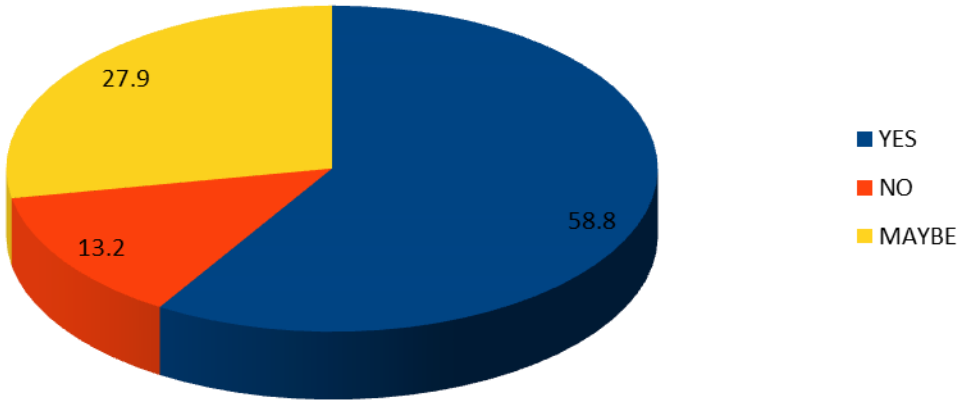
were uncertain. This is an indication that individuals perceive the advantages and many are reluctant to go all the way with the technology without establishing its reliability, definite rules and practical experience. Delivery speed came up as a significant factor of acceptability. Sixty-seven point six percent of the respondents responded to the fast delivery as very important, with 30.9 percent deeming it somewhat important. This supports the notion that AI-driven drones that are capable of providing faster last-mile delivery are attentive to customer demands. Surprisingly, a very small percentage (1.5) gave value to the non-importance of speed and this demonstrates that efficiency is a key consumer concern. The answers concerning the readiness to pay more and have the products delivered faster were inconsistent. Approximately 41.2 percent were ready to pay the premium and 33.8 percent were not ready, and 25 percent were not determined. This implies that sensitivity to costs is a major obstacle. The drone delivery service has to strike a balance between the speed and cost to attain a wide acceptance. The statistics on the frequency of online shopping also prove in favor of the necessity of the drone delivery systems. Only a little above 20.6% of respondents shop online on a daily basis and 38.2% do so on a weekly basis. This implies that about 59% of them are the frequent online shoppers and hence they would be the direct beneficiaries of accelerated and efficient delivery. On the contrary, 29.4% of the population shops on a monthly basis, and only 11.8% do it infrequently, which means that the demand is high. The level of trust in AI regarding delivery logistics seems to be average. The respondents were half trusting and 20.6 per cent were distrusting and 29.4 per cent were indifferent. This is a reflective attitude of transition. Individuals are receptive to the use of AI systems but fear safety, mistakes, privacy and responsibility. On the whole, the information indicates that the level of awareness and perceived advantages of AI-powered drone delivery is high, but real implementation requires the resolution of trust factors, the demonstration of safety and reliability, regulatory compliance, and low-cost solutions. This makes AIenabled autonomous drones a prospective but developing component of the future logistics system.

**1. Have you heard of Drone Delivery Services?**

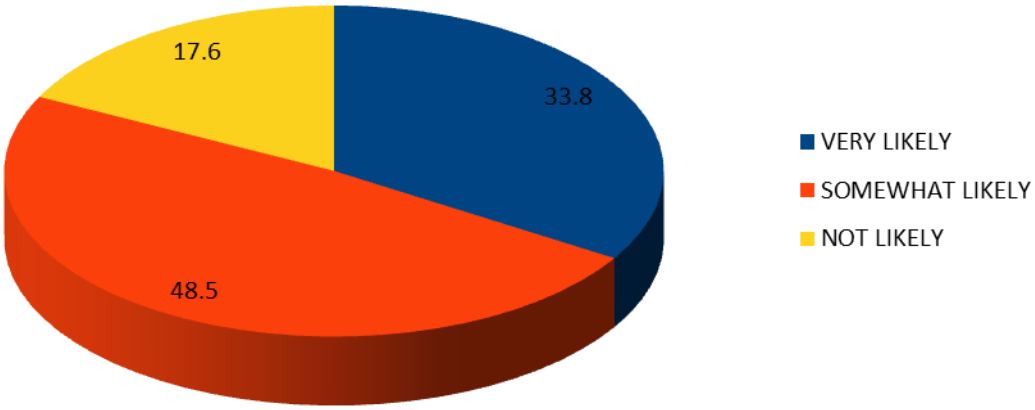



A majority of respondents (76.5%) are aware of drone delivery services, while 16.2% are not aware and 7.4% remain unsure.
This indicates that the concept has gained significant visibility, although a section of the population still lacks clarity.

**2. Do you think drones are a good option for delivering packages?**

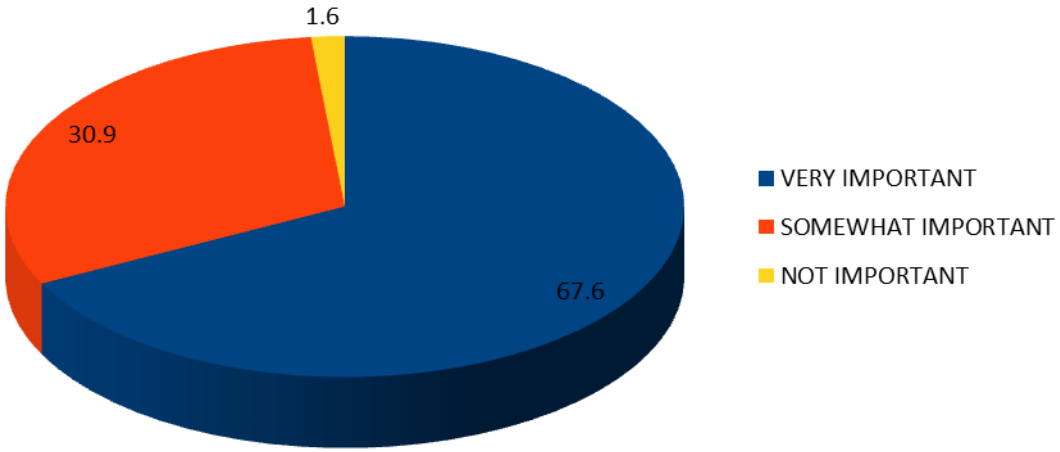



About 58.8% of respondents consider drone delivery a good option. However, 27.9% disagree and 13.2% remain uncertain. This reflects a generally positive perception, but also highlights existing concerns regarding safety and reliability.




**3. How likely are you to use drone delivery service if available ?**

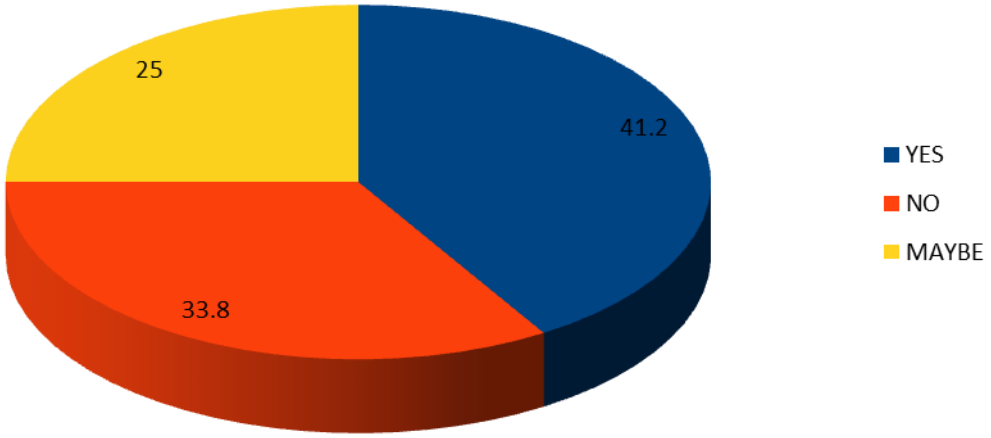
Only 33.8% of respondents expressed willingness to use drone delivery services. In contrast, 48.5% are doubtful and 17.6% are unsure. This shows a gap between awareness and actual adoption intention.




**4. How important is speed of delivery to you ?**

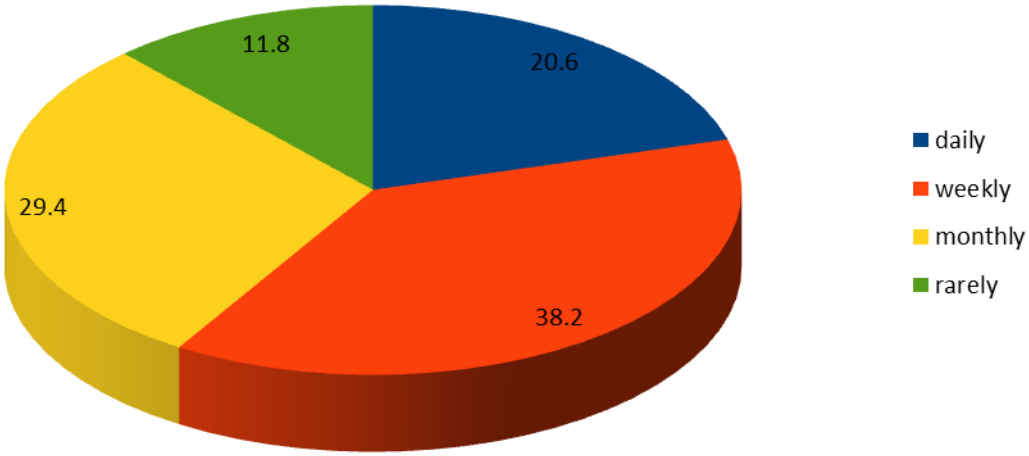
Delivery speed is a key factor, with 67.6% considering it very important and 30.9% somewhat important. Only 1.5% consider it unimportant. This clearly indicates that faster delivery is a major driver of consumer preference.

**5. Would you be willing to pay extra for faster delivery ?**



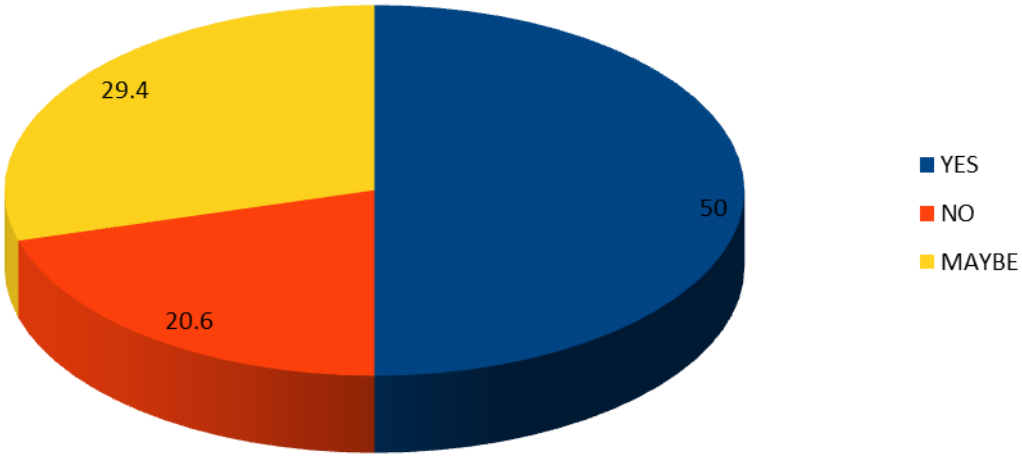

Around 41.2% of respondents are willing to pay extra for faster delivery, while 33.8% are not willing and 25% are unsure. This suggests that cost sensitivity remains a significant barrier.

**6. How often do you order prouducts online ?**




A considerable proportion of respondents shop frequently, with 20.6% shopping daily and 38.2% weekly. Monthly shoppers account for 29.4%, while only 11.8% shop rarely. This indicates strong demand for efficient delivery systems.

**7. Would you trust AI to handle your delivery logistics ?**




About 50% of respondents trust AI for delivery logistics, while 20.6% do not trust it and 29.4% remain uncertain. This reflects moderate trust levels, indicating the need for increased reliability and transparency.

**KEY FINDINGS**

**1. High Awareness but Partial Understanding**

The study reveals that 76.5% of respondents are aware of drone delivery services. This indicates that the concept has gained significant visibility among consumers. However, 16.2% are still unaware and 7.4% are uncertain, which shows that awareness is not universal. This finding aligns with the first objective and suggests that while initial exposure is strong, deeper understanding and familiarity are still developing.

**2. Positive Perception with Underlying Concerns**

A majority of respondents (58.8%) consider drone delivery a good option. However, 27.9% do not support it and 13.2% remain unsure. This reflects a generally positive perception, but the presence of a large proportion of negative and uncertain responses indicates concerns related to safety, reliability, and feasibility. This directly addresses the second objective and shows that acceptance is conditional rather than absolute.

**3. Low Adoption Intention Despite Awareness**

Although awareness is high, only 33.8% of respondents are willing to use drone delivery services. A significant 48.5% remain doubtful and 17.6% are unsure. This highlights a clear gap between awareness and actual adoption, indicating that knowledge alone is not enough to drive usage. This finding supports the third objective and suggests that practical trust and real-world confidence are still lacking.

**4. Delivery Speed as the Most Influential Factor**

The analysis shows that 67.6% of respondents consider delivery speed very important, while 30.9% consider it somewhat important. Only 1.5% do not value speed. This clearly establishes that speed is a primary driver of consumer preference. It also supports the advantage of drone delivery systems, which are designed for faster service. This finding strongly fulfills the fourth objective and indicates that speed can act as a key motivator for adoption.

**5. Cost Sensitivity as a Major Barrier**

When asked about paying extra for faster delivery, only 41.2% of respondents are willing, while 33.8% are not willing and 25% are unsure. This indicates that although consumers value speed, they are not equally willing to bear additional costs. This finding addresses the fifth objective and highlights that pricing strategy will play a critical role in adoption.

**6. Strong Demand Due to High Online Shopping Activity**

The data shows that 20.6% of respondents shop online daily and 38.2% weekly, meaning nearly 59% are frequent online shoppers.This indicates a strong and consistent demand for delivery services. It also suggests that drone delivery systems have a ready market base. This finding supports the sixth objective and emphasizes that consumer behavior already favors advanced delivery solutions.

**7. Moderate Level of Trust in AI Systems**

Only 50% of respondents trust AI for delivery logistics, while 20.6% do not trust it and 29.4% are unsure. This shows that trust in AI is still developing. A significant portion of consumers remain hesitant due to concerns about safety, errors, and privacy. This finding fulfills the seventh objective and indicates that building trust is essential for large-scale adoption.

The findings collectively indicate that AI-based drone delivery systems are well-recognized and appreciated for their speed and efficiency, but consumer readiness for adoption remains limited.

**Scope of**

This research is going to cover the discussion of the drone navigation systems implemented in last-mile delivery processes. The study is aimed at the effectiveness of modern technologies in navigation to improve the efficiency and safety of the delivery process. The evaluation of the performance by speed, cost-effectiveness, and environmental impact is conducted on both the simulated and real-world applications. The authors of the study primarily address urban and semi-urban

logistics settings and strive to comprehend the ways in which the systems of drone-based delivery can assist enterprises in enhancing quality of the service offered and minimizing environmental damages.

**Limitations**

Although drone delivery systems have some advantages, it has numerous limitations. Policies on airspace utilization are different in various regions and limit commercial drone operations. Strong winds, visibility, heavy rain, and so on are some of the weather conditions that may have a negative impact on the performance of drones. Moreover, this chapter is not extensive and lacks large scale commercial implementation because of time and resource limitations. The issues with privacy, safety, and surveillance also continue to be a matter of concern among the population and still need additional studies and policy formulation.

## CONCLUSION

There is enormous potential of transforming logistics and transportation industries through the use of AI in automated drone navigation during deliveries. Through the improvement of drones to fly independently, make decisions in real-time, and react to changes around, AI is allowing faster, more efficient, and cheaper delivery systems. Having benefits like shorter delivery times, less human intervention requirement, and scalability of services, Drone technology driven by AI is showing the future of last-mile delivery. However, in order that this evolution can succeed to its fullest, issues of regulatory compliance, weather and social opinion must be surmounted. As the sphere of technology continues to evolve, and AI systems continue to improve, automated drone navigation will be an increasingly central focus to smart cities and global logistics networks. To conclude, the use of AI in drone navigation of deliveries does not only promise to expand operational efficiencies but the first significant step in moving towards more sustainable, innovative and robust delivery solutions in the future. Delivery of the future is on air and AI will be the centre of this future.

**References (APA Style)**

Ansari, N. M., Khan, N., Iqbal, R., Ismail, M., & Gul, H. (2025). Autonomous drone navigation using AI: Revolutionizing last-mile delivery in e-commerce and logistics. *Kashf Journal of Multidisciplinary Research*, *2*(03), 217-231.

Caballero-Martin, D., Lopez-Guede, J. M., Estevez, J., & Graña, M. (2024). Artificial intelligence applied to drone control: A state of the art. *Drones*, *8*(7), 296.

Joshi, A., Spilbergs, A., & Miķelsone, E. (2024, June). AI-enabled drone autonomous navigation and decision making for defence security. In *ENVIRONMENT. TECHNOLOGY. RESOURCES. Proceedings of the International Scientific and Practical Conference* (Vol. 4, pp. 138-143).

Maharajan, M. S., Deepa, A., Bhargavi, C. H., Kannan, K. G., & Howard, E. (2024). Using AI to improve autonomous unmanned aerial vehicle navigation. *International Journal of Intelligent Systems and Applications in Engineering*, *12*(14s), 368-376. https://doi.org/10.18280/ijisae.1214s.060

Miranda, V. R., Rezende, A. M., Rocha, T. L., Azpúrua, H., Pimenta, L. C., & Freitas, G. M. (2022). Autonomous navigation system for a delivery drone. *Journal of Control, Automation and Electrical Systems*, *33*(1), 141-155.

Mohsen, B. M. (2024). AI-driven optimization of urban logistics in smart cities: Integrating autonomous vehicles and IoT for efficient delivery systems. *Sustainability*, *16*(24), 11265.

Singh, D., Verma, A., & Bhatt, A. J. (2025). Issues in Autonomous Navigation. In *Advances in Autonomous Navigation through Intelligent Technologies* (pp. 151-163). Apple Academic Press.

Shaklab, E., Karapetyan, A., Sharma, A., Mebrahtu, M., Basri, M., Nagy, M., ... & Dias, J. (2023). Towards autonomous and safe last-mile deliveries with ai-augmented self-driving delivery robots. *arXiv preprint arXiv:2305.17705*.

Sorooshian, S., Khademi Sharifabad, S., Parsaee, M., & Afshari, A. R. (2022). Toward a modern last-mile delivery: Consequences and obstacles of intelligent technology. *Applied System Innovation*, *5*(4), 82.

Thangamani, R., Suguna, R. K., & Kamalam, G. K. (2024). Drones and autonomous robotics incorporating computational intelligence. *Computational intelligent techniques in mechatronics*, 243-296.