

THE DARK SIDE OF DRONE DELIVERIES: SECURITY, PRIVACY, AND PUBLIC PERCEPTION

Ilona Pawełoszek¹

¹Czestochowa University of Technology, ul Dąbrowskiego 69 42-201 Częstochowa, Poland

Keywords: drone delivery, sustainability, logistics, digital transformation

JEL Classification: L87, O33, Q56

1 INTRODUCTION

The use of drones for last-mile delivery is gaining interest as part of the digital transformation of logistics. While drone deliveries offer potential benefits such as faster delivery times, reduced traffic congestion, and lower emissions, they also raise significant societal concerns. The public perception of drone deliveries is often shaped by fears related to security, privacy, regulatory challenges, and environmental impact [1,2]. Understanding these concerns is crucial for businesses and policymakers planning to implement drone delivery services.

This study investigates public reactions to drone delivery services by analysing discussions on the Reddit platform. The findings provide insights into the most common concerns regarding this technology and its impact on sustainable logistics and urban environments [3].

2 MATERIAL AND METHODS

A dataset of 3,267 comments related to drone deliveries was collected from Reddit using Reddit API and processed using Python-based text analysis tools. Reddit was chosen as the data source because it is one of the largest online discussion platforms, where users engage in open and often critical debates on emerging technologies. Unlike other social media platforms, Reddit discussions tend to be more in-depth, making them a valuable resource for understanding nuanced public opinions [4].

The research methodology involved:

1. Data Collection – Posts containing the phrase „drone delivery“ from the last 12 months were retrieved.
2. Text Pre-processing – Comments were cleaned by removing punctuation, stopwords, and irrelevant symbols.
3. Sentiment Analysis – Using NLTK and VADER Sentiment Analysis, comments were classified as positive (1,268), neutral (1,021), or negative (978).
4. Topic Modelling – The Latent Dirichlet Allocation (LDA) model was applied to negative comments to identify dominant concerns.
5. Category Assignment – Key issues were categorized based on frequently occurring terms, and representative comments were extracted.
6. Analysis of Highly Upvoted Comments – The most liked comments were examined to assess major public concerns.

The study utilized PRAW (Python Reddit API Wrapper) for data collection, Pandas for data handling, Gensim for topic modelling, and Matplotlib for visualization.

3 RESULTS

The analysis of negative comments revealed seven main categories of concerns:

1. Delivery Accuracy & Reliability (218 comments): Users worry that drones may fail to deliver packages accurately, be affected by weather conditions, or malfunction.
2. Corporate Control & Market Dominance (175 comments): Fears that major corporations (e.g., Amazon, Walmart) will monopolize airspace and limit competition. Additionally, there are concerns that as drone delivery becomes more widespread, it could increase restrictions on private drone and recreational aircraft flights, limiting access to low-altitude airspace for hobbyists and small operators.
3. Airspace Management & Safety (150 comments): Risks of collisions, uncontrolled drone flights, and regulatory gaps in managing urban airspace.
4. Regulatory & Legal Issues (124 comments): Ambiguities in drone regulations, FAA policies, and liability concerns.
5. Environmental Impact (104 comments): Concerns about noise pollution, battery waste, and effects on wildlife.
6. Theft & Security Risks (55 comments): Drones are potential targets for theft or vandalism.
7. Privacy & Surveillance (27 comments): Fears of drones being used for unauthorized surveillance or data collection.

Highly upvoted comments emphasized security risks, ethical concerns, and scepticism about drone delivery becoming a mainstream service.

4 CONCLUSIONS

Public perception remains a crucial factor influencing the adoption of drone delivery services.

The discussion on drone delivery on Reddit shows that the public is concerned about the technology. While drones offer new possibilities in logistics, they also raise questions about their effectiveness, safety, environmental impact, and privacy. The most controversial issues are related to legal regulations, liability for accidents, and the potential impact on people's daily lives. The key to the future of this technology will be developing clear rules and mechanisms that will allow for its safe and effective implementation.

REFERENCES

- [1] BAFOUNI, A., VILLANUEVA, J., KALAKOU, S., DIAS, J. G. 2023. Upcoming drone delivery services: A perceptions-based clustering of citizens in Lisbon. *Technology and Society*. 73, 102250.
- [2] KOH, L., LEE, J. Y., WANG, X., YUEN, K. F. 2023. Urban drone adoption: Addressing technological, privacy and task-technology fit concerns. *Technology and Society*. 72(C), 2023
- [3] Melo, S., Silva, F., Abbasi, M., Ahani, P., Macedo, J.: Public Acceptance of the Use of Drones in City Logistics: A Citizen-Centric Perspective. *Sustainability*. 15(8), 102203.
- [4] MEDVEDEV, A. N., LAMBIOTTE, R., DELVENNE, J. C. 2020. The anatomy of Reddit: An overview of academic research. *arXiv preprint arXiv: 1810.10881v2 [cs.SI]*.

Contact information

Corresponding author's e-mail: ilona.paweloszek@pcz.pl