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Consumer Study

- Consumers Perspective Towards Drone Food Delivery Service

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Abstract: Drone food delivery has a large possibility of being welcomed by businesses as it provides benefits that traditional delivery methods don't have. Such as reduced reliance on manpower and sunk cost, and improved customer satisfaction. Our study aims to measure the adoption and attitudes of consumers toward drone food delivery technology in order to help us assess the feasibility and effectiveness of the service. The study found that privacy has a huge negative impact on consumer attitudes towards drone delivery. However, the Green image had a significant positive effect. People in rural areas pay more attention to the performance of drones than those in cites. At the same time, the research result can be used to analyse the future of the drone food delivery industry and commercial plans prepared for companies.

Keywords: Drone, drone food delivery, privacy concerns, technology adoption, green image.

1. Introduction

Drone delivery is becoming more and more popular in modern societies. The concept of drone delivery has gained significant attention in recent years due to its potential to revolutionize the transportation and logistics industry. Faster delivery times, reduced costs, improved accessibility and contactless deliveries. An innovation to improve the efficiency of delivery companies.

Our aim in this research is to assess the feasibility and effectiveness of drone delivery as a viable method for fast and efficient package delivery, evaluate customers' adoption of drone technology in the context of food delivery services, to analyze the potential impacts of drone delivery on the environment and urban infrastructure, and identify any limitations and challenges associated with drone delivery.

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2. Literature Review

The data from Auterion's 2022 Consumer Attitudes on Drone Delivery report said [1]: "64% see drones becoming an option for home delivery. The minority, 36%, have their doubts, including whether the general public or governments will not approve of large-scale drone adoption for delivery. 58%, actively favour drone deliveries, with 29% saying they are curious to experience it."

From the data collected online, drone delivery is better as time passes. As time passes, drones' sales increase, the revenue of drones also increases. Drone delivery will be more popular in the future which means drones will replace many things we use to deliver now. The popularity and the benefits will increase quickly from 2023-2025 [2].

The most important advantage of drone delivery is that it is fast, the efficiency of it is fantastic. It can avoid traffic jams and speed if it is higher than cars and e-bikes. The cost of it is also lower than labour. The only cost is the price of it and the price of electricity. Providing fast delivery with high quality to society.

However, there are also some shortages of drone delivery. The battery life is the most noticeable problem. When they are working, maybe they can only fly for two hours or less and the battery will reduce quickly in some extreme weather, like rain, wind and snow, which will lower the efficiency of drone delivery. [3] We can consider optimized battery usage, battery management systems can optimize battery usage by considering factors such as the distance between delivery points, the weight of the packages, and the battery life of the drones.

The place for drones to stop is also a problem, the aim of drone delivery is to benefit people's lives. If drones cannot land close to where people live or work, drone delivery will be more complicated than traditional delivery. Management system is also a problem, as the development of drone delivery, more and more drones are flying above the sky. How to manage them is a big problem. Companies must avoid them hitting each other or hitting the building.

Public acceptance is essential for us to decide whether to operate the project. The survey that businesses conducted across six counties shows the publicity and ratio of adaptors. Articles give data of the amount of cost that consumers will favor. We will combine these factors and the information provided as a reference for our drone delivery project, which cooperates with other delivery companies.

3. Surveys

Following a qualitative approach, and we used a questionnaire survey for data collection. The questionnaire questions were found on the internet and proved to be useful as survey questions. Before starting to answer our questionnaire, the participants need to watch a short video in order to get detailed information relating to drones' food delivery service. The majority of the questionnaire items used a seven-point Likert-type scale ("strongly disagree" (1)— "strongly agree" (7) for measurement. Our sample is young people from around 16 to 26 as we think that young people would be more willing to pay attention to new technology and services and will have more fresh opinions toward that.

We interviewed 50 people in total and summarized the data we had obtained from them. While 95% of participants are between 16 to 26 years old, they are clear with ways of how technology works and are not surprised with the usage of a new technology like drone food delivery service. Because of their excessive exposure to technology, the respondents do not find anything new and exciting in an innovative service like drone food delivery. The survey showed that the performance and consideration of risks during the process of delivery did not get too much attention from the consumers, but privacy risks do affect the adoption of drone usage a lot.

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Privacy issues are a matter of great concern for people as they do not like snooping or cyber surveillance in their private spaces. The reason that people are fine with delivery risks is because they accept that new technology makes small mistakes through the innovation process. At the same time, we found out that since our respondents are young people and highly educated, they are familiar with what is going on with our current environment, so they are willing to pay for a service that has a green image, like a drone food delivery service as they want to reduce pollution.

4. Comments Analysis

According to the comments we looked at from consumers in Reddit, which is a discussion platform in the US, about 40% of consumers do not hold an optimistic attitude towards the establishment of drone food delivery service from several aspects:

(1). The sound of drone food delivery is way too noisy.
(2). It takes time as the customers had to walk down to the street instead of having a rider come to their door.
(3). It scares the birds which causes negative impacts to the ecosystem.
(4). Not reliable due to reasons like birds trying to attack them.

There are about 60% of consumers who think it is worth adopting a service like drone food delivery. Most comments refer to its efficiency and timesaving, as well as its green image. A lot of people are willing to pay for the environment's reputation. [4] We then analysed and summarised the comments we had seen so far and came to a conclusion on the different aspects of problems that consumers think drone food delivery has and what they are worried about.

5. Comments Mainly

5.1. Safety Concerns

One of the most prominent concerns among consumers is drone safety. Despite manufacturers' assurances regarding advanced obstacle avoidance systems and stringent flight protocols, many individuals still harbor reservations about potential accidents, especially in densely populated areas.

5.2. Privacy Issues

Drones equipped with cameras or other recording devices might inadvertently invade private spaces, capturing unwanted footage. This has led some consumers to question the trade-off between convenience and privacy.

5.3. Efficiency and Speed

On the brighter side, drone delivery offers unparalleled speed, especially in congested urban settings. For many, the promise of getting their takeout within minutes, avoiding the complications of traffic and human errors, is a significant draw.

5.4. Flexibility

Given the dynamic nature of urban environments, drones need to demonstrate adaptability. For example, delivering to high-rise buildings, changing locations, or ensuring deliveries during adverse weather conditions will play a role in how consumers evaluate the service.

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5.5. Transparency

Real-time tracking, clear communication about potential delays or any issues are crucial. A transparent delivery process can mitigate some of the apprehensions associated with this new mode of delivery.

6. Discussion

Evidence from the results indicates that a lot of consumers are willing to pay additionally for a green service, as demonstrated by numerous studies in other contexts, as people do hold concerns on how to reduce pollution, while social and creative aspects of this service have no significant influence on the consumer's attitude and options.

6.1. Factors affecting attitude towards drone delivery

6.1.1. Cross- Culture

There is little difference between research done on drones by different countries, for example, India’s survey results and ours. We reckon that the culture of a nation may play a role in the formation of response behaviors. [4,5]

6.1.2. Privacy

Our findings also showed the negative influence of privacy risk on drone delivery service adoption, as most of consumers are afraid that retailers may stock their purchase habits and privacy through cameras. [4]

6.2. Challenges

6.2.1. Technology

Drone delivery systems face several challenges, including weather impact, drone abuse, altitude, drone weight, navigable airspace, privacy laws, and limited experienced and skilled resources. [6] The initial set-up and implementation costs are high, and issues related to security, safety, and privacy may cause people to reject drone deliveries. Batteries remain the weakest link on any electric solution. Additionally, power lines are a problem. The drone delivery enterprise must work on overcoming these challenges, including using new technologies to handle weather conditions and developing safe landing areas for packages.

6.2.2. Human Resource

There is also a need for skilled and experienced experts to facilitate drone delivery, and we must consider the cost of setting up the launch pad, aligning drone movement, technology and software, licences, R&D, and training facility.

6.2.3. Government Regulation

As the popularity of drone delivery increases, it will be difficult to manage without a special system. Carelessness in management can cause serious problems, like security problems. The advent of drone food delivery brings forth a complex interplay of regulatory intricacies. Governments play a pivotal role in ensuring the harmonious integration of drones into urban landscapes. Primarily, there's a need for a streamlined process for operational permits, ensuring only qualified drones take to the skies.

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Additionally, with the potential overcrowding of airspaces, a dedicated air traffic management system for drones is indispensable. Beyond the operational aspects, there are valid concerns about data protection, privacy, and the potential misuse of on-board cameras; thus, stringent data collection and usage norms are a must. It's also vital for governments to enforce safety and hygiene standards to ensure that food remains uncontaminated during transit. Factor in the importance of demarcating 'no-fly' zones near sensitive areas, and it becomes clear that a comprehensive regulatory framework is essential not just for the viability of the drone delivery sector but also to address the concerns and aspirations of the public it aims to serve.

7. Conclusion

Drone delivery is considered promising. In the long run, the cost of operating drones may be less than the cost of operating vehicles, especially when considering the cost of fuel, drivers, maintenance, and insurance. Moreover, drone delivery is part of a broader push toward automation in various sectors of the economy, including transportation and logistics. It can provide a platform for further innovations in automation and AI technology, serving as a proof of concept for other uses of drones, such as surveying, agriculture, and emergency response. Since drone deliveries will become a part of our daily lives, it's essential to address public concerns about safety, noise, and privacy. Transparency about how drone deliveries work, and collaboration with communities during implementation stages will be key. Future delivery drones may need specific structures or platforms where they can safely land to deliver their packages – especially in urban settings. The development of 'drone ports' or designated landing pads will be needed. With drones that are automated and able to operate at all hours, we could see round-the-clock delivery services, bringing unparalleled convenience to consumers.

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Appendix

Following are our questionnaire statements:

1. Drone food delivery seems to be efficient.
2. Drone food delivery is likely to shorten the delivery time.
3. Drone food delivery seems to make my life more stimulating.
4. I am likely to think logically before I use drone food delivery.
5. Using drone food delivery could show that I am an early adopter.
6. Drone food delivery is more likely to succeed in environmental protection.

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7. Drone food delivery is good for environmental reputation.
8. The package the drone is carrying might be stolen.
9. Drone delivery might cause me to lose control over privacy.
10. Online retailers might track my shopping habits and history of purchases.
11. Using drone food delivery while ordering food is more likely to be negative/positive.
12. I will use drone food delivery while ordering food.