



## Is India ready for drone based food delivery in lieu with Covid 19 impact: Challenges and opportunities

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### Abstract

It is well known that Covid 19 outbreak has shaken the entire mankind with its adverse effects on mental health, economy and many other things. On the other hand the entrepreneurs always seek to find new opportunities to penetrate in to a market and find a favorable position. The hotel industry is a primitive part of service sector that employs a huge population as well as generates huge revenue. This study unearths the new modes of food delivery through drones, with the breath taking challenges and opportunities that can change the revenue parameter of the industry. This study is designed with several criteria under challenges and opportunities that can be highly useful in implementing the drone technology in the service sector. It also can pave way for further research in this domain and possible usage in various other sectors as well.

**Keywords:** Covid 19, drones, food delivery, hotel industry, service sector, lockdown

### Introduction

Indian hotel industry is notable among the Asian countries with its range of hotels that affords all economic classes of population. It stretches from high end luxury hotels to that of road side food vendors. With this simple outlook the hotels in India are classified under many sects like branded, independent, accommodation, traditional, chain of restaurants, joint ventures etc. The estimated revenue generated by the hotel industry stands out to be US\$ 194 Billion and it also provides 50 million jobs (IBEF report 2019). At present the industry is witnessing several transformation processes that include technology based services. The online food home delivery is one among the fast growing and highly popular service among tier 1 cities in India (Manivannan *et al.*, 2020). Contemporarily the emergence of the COVID-19 virus has resulted in a worldwide pandemic with enormous changes across several service industries. The lockdown scenario and non-commuting due to lockdown has propelled the hotel industry to think of several new steps. This has taken their innovation to levels of drone based delivery, No contact delivery and hub based delivery etc.

### Background of the study

People are advised that not to make physical contact, as the virus spreads through this medium. Safety measures like proper and regular sanitization, wearing masks and maintaining social distancing are being advocated by experts worldwide. Even though such measures are taken, the virus is being transmitted socially. Due to this pandemic situation, people are obviously affected in many ways like not being able to lead their normal life, not being able to buy

things they need, and not being able to get food as well as proper medications on time, etc.

If the pandemic situation persists, the lifestyle of people has to be entirely changed in such a way that they do not come in contact with the virus. New methods of living have to be adopted for all aspects that need touch with service vendors. When buying food and medicines from restaurants and drug shops respectively or through online websites, no-contact delivery of products is recommended as the virus can be transmitted from one person to another when there is physical contact. In lieu with this a new leap is being thought to enable no-contact delivery, which is the use of drones or unmanned Aerial Vehicles that seems to be an progressive future of online food delivery platform.

### Objectives

- To understand the present food delivery operations
- To compare the present method with proposed drone delivery system
- To analyze the challenges and opportunities associated with drone based delivery

### The present scenario

Let us consider the Indian scenario with regard to the online food delivery platform. Today the industry is highly prevalent in the Tier 1 cities and also slowly penetrating in to the Tier 2 towns and semi urban towns as well. This picking up pace of the industry is highly popular today due to the lock down restrictions and stay at home advise by the state government and central government. Since people are restricted to move out of their home; the food delivery option is the only source of getting staples at time.

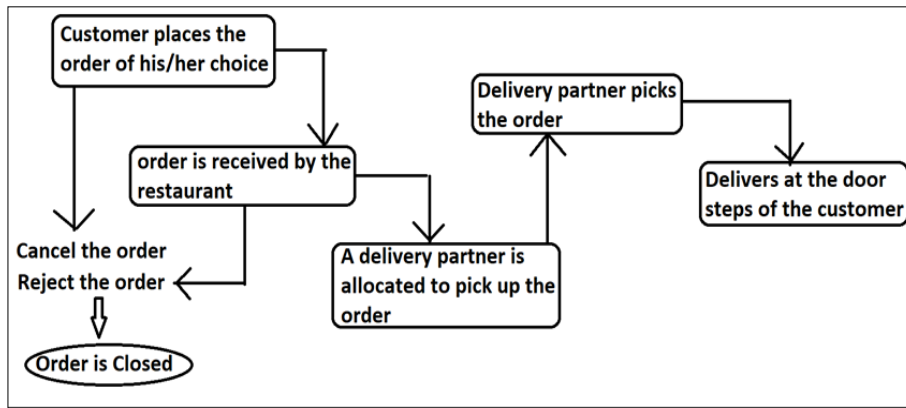


Fig 1

The present ordering method is completely based on mobile app platform with lot of flexible service. Contemporarily the delivery is fully relied upon the partners without any doubt. The delivery partners’ face several constrains like traffic, rain, bad roads, natural calamities, petrol price hike etc. once the order is placed by the customer of his choice, the restaurant confirms/cancels the order as per their situation. Then the assigned partner picks the order and delivers it. There is a stipulated charge for the partner on every delivery varies with distance of travel. The delivery persons are assigned with multiple orders on most of the instance to reduce the cost of delivery. There is also an option to give extra tip for a delivery partner if the customer wishes to do. Time for delivery is calculated on the real time basis in accordance with the traffic, climatic conditions, distance etc.

**Need for no contact delivery**

The present safety norms as instructed by the central as well as the respective state governments from time to time in lieu with the Covid pandemic situation has several impact on the food industry also. As per the safety norms formulated; the sector is allowed to handle only take away mode of delivery and home delivery through respective restaurants or through

online food delivery platforms. The delivery agents are instructed to carry out NO contact delivery in order to avoid any possible virus spread through these deliveries. Even the online food ordering platforms offer more of no contact delivery methods to break the virus spread chain. In this regard the drones can be of effective ones against disease spread mechanism.

**Drone based food delivery**

A simple risk and parameter check is carried out to identify the level of risk associated with drone based delivery and several comparisons have been mandated towards human partner based delivery.

Risk level is notified with composite scoring and representing alphabet. Higher the score more is the risk. Lower the score less is the risk.

Table 1: Risk / Possibility parameters

Risk level	Very high risk	High risk	Moderate risk	Low risk	No risk
Rating	E	H	M	L	N
Score	5	4	3	2	1

Table 2: Physical risk

Variables	Possibility/level of risk	Score for drone based	Partner based	Risk associated
Safety of drones	H	4	1	Damage to drones
Safety for customers	M	3	1	Accidental damage because of drones for customers
Usage against climatic conditions	E	5	2	Suitability towards all climatic and geological scenarios
Collusion	H	4	2	Impact with any objects/birds
Other external risk	H	4	2	Stealing/ purposeful damage

Table 3: Operational risk

Variables	Possibility/Level of risk	Score for drone based	Partner based	Risk associated
Landing issue	M	3	1	Issues during delivering the food packets
Technical errors	H	4	2	Battery failure/ Propeller jam and other technical issues
Weight holding capacity	M	3	1	Quantum of weight that can be loaded should be up to the prescribed standards
Network issue	M	3	2	GPS failure/ network failure/ other issues
Wrong delivery	E	5	2	Food may be wrongly delivered to other persons
COD	E	5	2	Cash on delivery is not possible

Table 4: Financial aspects

Variables	Possibility/Level of risk	Score for Drone based	Partner based	Risk associated
Theft	E	5	2	High risk of food item or the drone itself may be stolen
Maintenance	H	4	2	Cost of battery, propeller blade, remote and other components are still costly
Investment	M	3	2	Many low cost drones have arrived in the market

**Table 5:** Cost aspect

Variables	Possibility/Level of risk	Score for Drone based	Partner based	Risk associated
Cost per delivery	M	3	4	Per delivery cost will be moderate using drones for shorter distance
Maintenance	M	3	3	Charging at time and maintenance is comfortable in recent days
Cost Escalation	M	3	5	Since drones are completely relied on battery, there is less chance for cost escalation

**Table 6:** Usage during pandemic

Variables	Possibility/Level of risk	Score for Drone based	Partner based	Risk associated
Chance of Virus Transmission	L	2	5	Virus transmission is possible while delivered by humans
Health Risk of delivery agents	L	2	5	The health is concern for humans during delivering
Reaching Patients	L	2	5	Drones can be easily used to deliver to patients while humans cannot
Faster Delivery/ Emergency delivery	L	2	4	Drones can be used to deliver faster than humans for shorter distance

**Table 7**

Parameters of risk and consideration	Delivery through human intervention (Composite Score)	Delivery through drones (Composite Score)
Physical Risk	8	20
Operational Risk	10	23
Financial Aspects	6	12
Cost Aspects	12	9
Usage during Pandemic	19	8
Outcome during normal scenario	Moderate Risk	High Risk
Outcome during Pandemic scenario	High Risk	Low Risk

Based on the above risk and parameter checks; Drones are better during Pandemic scenario under health and cost aspects. While on the other hand; contact based delivery is better during normal scenario with better advantage under several variables. It is evident that drones can be used for shorter distance and emergency purpose with proper implementation technology during the pandemic situation.

**Ecstasy of using drones**

Drones can be used for efficient and effective delivery of food and medicines from stores to the consumers. The usage of drones is briefly discussed below;

- **No-contact delivery:** Delivery of food items and medicines can be made without any human contact to the consumers through drones, which is helpful in preventing the spread or transmission of the virus from one person to another as it enables no-contact delivery.
- **Covers long distance:** Drones can be used to deliver food and medicines for longer distances. Drones can reach rural areas and hilly areas, where it is difficult for humans to go to those places, and deliver the food and medicines to the people living in those areas.
- **Time Saving:** Drones can cover distances in a short period of time compared to vehicles driven by humans, as drones fly in the sky. Drones can be used to deliver the food or medicines quick and fast to the consumer.
- **Energy saving:** Delivering food and medicines through land vehicles uses up a lot of fuel and man power energy. But drones do not need a lot of fuel to run. So, drones save energy and contribute to the development of the environment.
- **Better safety:** Drones provide better safety to humans. While delivering the products, there will be no accidents, as there is no role for personnel to deliver the products instead, they have the role of controlling the

drone, thereby providing better safety to the life and health of the personnel.

**Proportion of challenges**

Though usage of drones for delivering food and medicines can be useful and helpful, they also have certain difficulties in them. The difficulties in using drones for delivery are briefly discussed below;

- **Landing issues:** Drones may have landing issues at the right and exact location. Not every place will have a proper place for the drones to land. Drones cannot deliver in the exact address for long distance.
- **Technical errors:** Technical errors might occur in drones. There might be errors in the programming of the drones, which may lead to not delivering food and medicines in the correct location or late delivery of food and medicines.
- **Climatic conditions:** Change in climatic conditions can be posing challenges for the delivery of products using drones. India experiences monsoon and the usage of drone at this time for delivering food and medicines can be difficult and challenging. It may cause malfunctioning of the drone and can damage the condition of the products carried by them.
- **Weight of products:** Drones can carry only the products that weigh up to a certain capacity. Drones cannot carry products that weigh more than their carrying capacity. Even if drones manage to carry heavier products, the drones might drop them down while flying or it can cause damage to the drone itself.
- **High investment:** Using drones for delivering for food and medical companies will need high investment. Drones are quite costly. Expenses for maintaining the drones can be high, and also it requires trained professionals to operate the drones properly.

- **Drone collision:** If only drones are used for delivering food and medicines, there will be a large number of drones being operated that fly in the sky. This may result in air traffic among the drones. If the operator is not aware of other drones around their drone, it might lead to the collision of drones and cause damage to the drone, the products being carried and other properties underneath.
- **Unemployment of personnel:** If drones are used for the delivery of food and medicines, there will be widespread unemployment of delivery personnel and it will lead to poverty. Many people will be jobless and will not be able to afford a living.

### Suggestions and recommendations

Though there are some difficulties in using drones for the purpose delivering food and medicines to the consumers, some innovations can be used to reduce or erase those difficulties. The innovations that can be adopted are briefly discussed below;

- **Drone detector:** To prevent drones from colliding with other drones flying in the sky, a drone detector has to be attached to the drone so that the drone can detect the drones around it and also the position of other drones and fly accordingly without colliding with other drones.
- **Aerial web map:** Feeding the aerial web map of the proper delivery route and the exact delivery location to the drone through software can help in the delivery of the food and medicines to the consumers properly.
- **Operation by employees:** The existing employees of the delivery companies can be trained to operate the drones and use them to deliver the products. This will reduce unemployment of the employees, will increase the number of deliveries, and will ensure proper and timely delivery of food and medicines.
- **Increasing load capacity:** The load carrying capacity of drones can be increased to enable them to carry heavier products without causing any damage to the products being carried, to the drone and to the property underneath.
- **Adapting drones to climate:** Implementing drones that are modified according to the climatic conditions prevailing in India can increase the longevity of the drones. It also enables the drone to deliver food and medicines up to long distances and hilly and rural areas of India.
- **Motivating startups:** Motivating startup aero-research establishments to make drones at economical price can help in reducing the investment that is made in buying drones. It also helps in creating jobs for young enthusiasts, improves the business of those startups and also reduces the problem of unemployment among young citizens.
- **BVLOS:** Enabling drones to fly Beyond Visual Line of Sight (BVLOS) can be very effective in the delivery of food and medicines to the consumers at the proper location of delivery. It helps in paying less manual attention on monitoring the activities of the drone.

### Conclusion

There are many theories about the implementation and usage of drones for delivering food and medicines in India. All those theories have their own unique views and concepts. Drones can be helpful and useful at this time of

pandemic; it can help prevent the spread of virus and help people stay safe and healthy. It also promotes the availability of food and medicines at all parts of the country, including rural and hilly areas. It takes less time to deliver the product to the location and ensures the safe delivery of food and medicines. Drones can be of great help to the nation at this time of pandemic. It will promote no-contact deliver and it will reach the location of delivery fast. It promotes safe delivery. Therefore, using drones for delivering food and medicines in India can be overall very helpful, efficient and effective.

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