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Assam floods: IIT Guwahati team to conduct survey of affected areas using drones, aide relief work

GUNJAN SHARMA | 19 June, 2022, 04:00 pm IST

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Ayman al-Zawahiri: Al-Qaeda leader killed in US drone strike

By Robert Plummer & Matt Murphy
BBC News

NDTV

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Swarm Drones System Inducted In Indian Army's Mechanised Forces

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Chinese Drone Tests Taiwanese Positions on Perimeter Island

Amazon Prime Air

A **case study** in context of Indian Market

 Presented by **Team FinAlCo**



Amazon in India

Business Statistics



300 million+
active users



10 million+ Prime
users



60 Fullfilment
centres (FCs)



₹16200 Cr Revenue
₹4768 Cr Loss



4000 orders placed
per minute



65000 employees
10 Lakh+ sellers



1 Lakh+ delivery
partners



30% market cap in
E-commerce



15000 Servicable
pincodes covering
many tier1-tier4

Business Model

- Amazon entered Indian market in **June 2013**
- Has expanded to following ventures: E-commerce, digital marketplace, payments bank, affiliate marketing, Logistics, digital streaming, web services, etc.
- Always sails in a **Red ocean** making the business labour and capital intensive
- Key pillars of the firm are-
 1. Infrastructure
 2. Technology
 3. Data
 4. Logistical network
 5. Customers

Supply chain & Operations



Revenues-

- Sales from website/app
- Seller commissions
- Prime subscription
- Logistical services

Expenditure-

- Transport cost
- Warehouse operating costs
- Infrastructure cost
- Inventory costs
- Employees
- Marketing and production cost

Customer Acquisition Cost

160 USD

Customer Retention Rate

Over 90%

Amazon delivery partner salary

10k-25k INR

Last Mile delivery charges

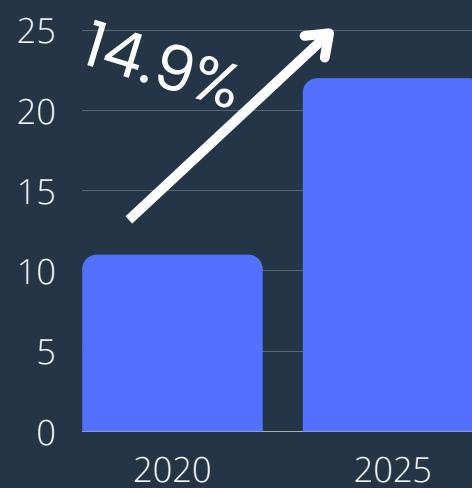
10-15 INR

Cost incurred for LMD

1500 Cr INR

Market Assessment

FMCG Segment in India



CAGR is 14.9% from \$110 billion in 2020 to \$220 billion in 2025



Packed food market will reach \$70 billion by 2025



11% share of E-commerce in FMCG by 2030



100% FDI allowed by govt. in equity and 51% in retail

E-commerce in India

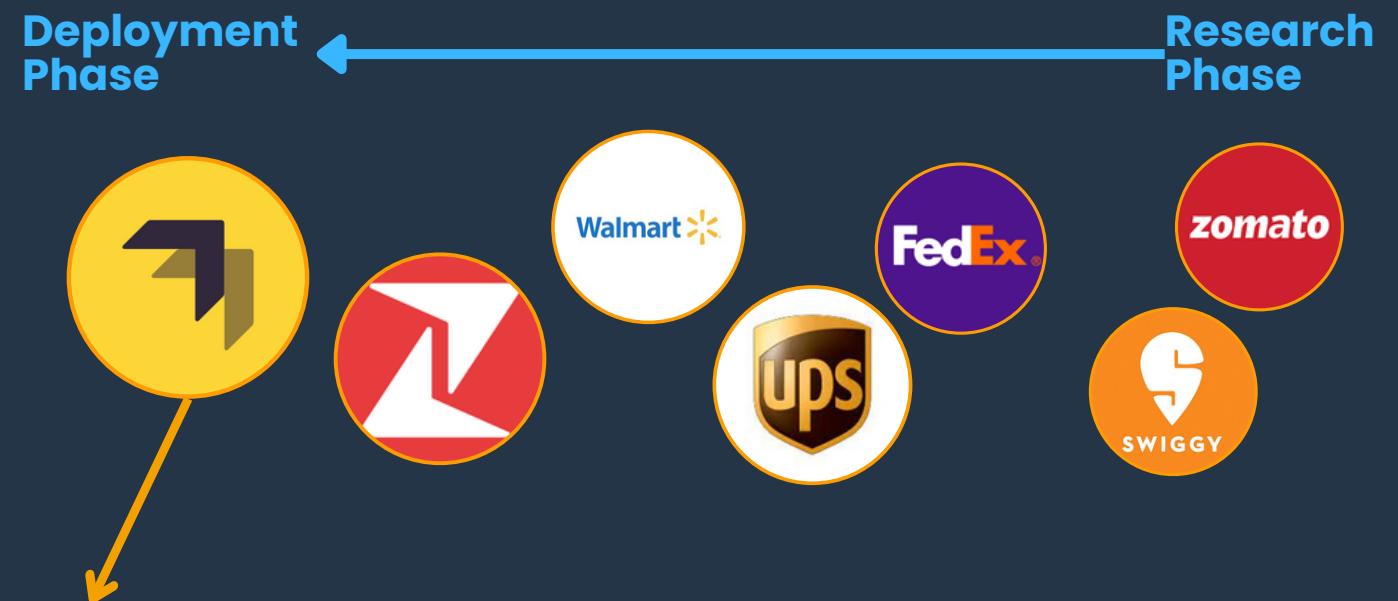
- India's e-commerce sector is anticipated to grow to 111 billion and 200 billion US dollars by 2024 and 2026, respectively
- While social commerce has the potential to expand to US\$16–20 billion in FY25, growing at a CAGR of 55-60%
- 100% FDI allowed
- Increase in digital literacy and internet penetration

Last mile delivery market

- The last mile delivery market is expected to become a 6-7 billion USD profitable market by next year
- Growing trend of decentralised inventory

Market Assessment

Global drone tech competitors



- Parent Company: Alphabet
- Received approval from US FAA
- 200000 drone deliveries worldwide

Domestic Challenge



- 12000+ micro warehouses in 7000+ cities
- Growing giant in FMCG segment
- Relaxed regulations
- Inventory based Model

Upcoming Marketplayers



- Both are Quick commerce firms
- Based on inventory model
- Delivers groceries in 30 mins



Has Future Plans

- *100 Billion USD spent on Drone Research*
- *37.9 Billion USD spent on shipping globally*
- *127 Billion worth of human effort can be substituted by drones*

Drone Delivery to the Rescue



"We believe that robots powering the last-mile delivery is an inevitable part of the future and hence is going to be a significant area of investment for us."

-CEO, Zomato, Mr. Goyal

SWOT Framework

Drone Specs



The maximum payload is 2.26 Kgs

Able to perform round trip of 16Km radius from FCs

Cost of Mfg. is 1.5-2 Lakh

Weight of drone 25Kg

Maximum flight height is 60m and maximum speed is 80Kmph

Effective reduction in cost of Last mile Delivery

\$2-\$6 → 0.5-1\$

- 75% of the total packages weigh less than 3Kgs

Strength:

- On Time Delivery
- Meeting QCD Expectations
- Limited Competition
- Highly Time Effective
- High Barrier To Entry

Weakness:

- Unclear ROI
- Weather Theft
- Vandalism
- Problem Of Range
- Landing In Every Location

Opportunity:

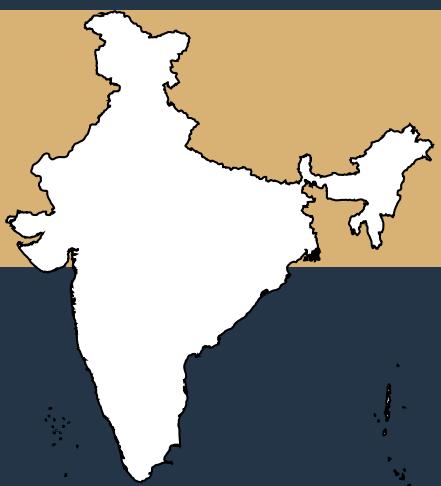
- Continued Expansion Of Business
- Ability To Develop Additional Customer
- Untapped Market
- Affiliate Relation With Related Vendors

Threats:

- Changes In The Regulations System
- Threat Of New Entrant
- Threat Of New Substitute
- Lack Of Retrofitters

Challenges to Amazon Prime Air

(PESTLE Framework)



Challenges in context of India



Drone Regulations 2022

- Narrowed customer base
- Restrictions on flight paths



High risk to gain ratio

- The lifetime delivery services provided by drone values much less than asset cost



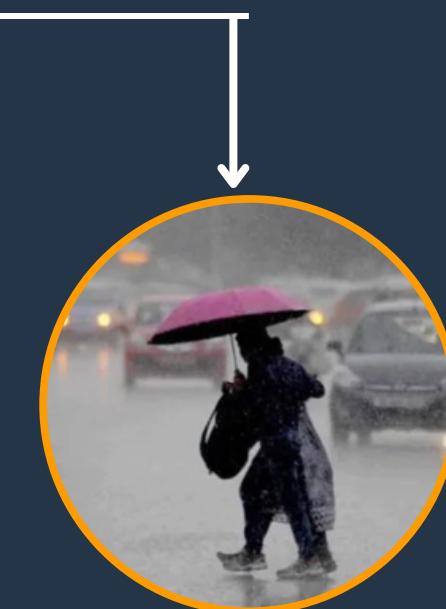
Huge capital investment

- Chip Shortage
- Atmanirbhar Bharat
- GPS issues
- Warehousing cost



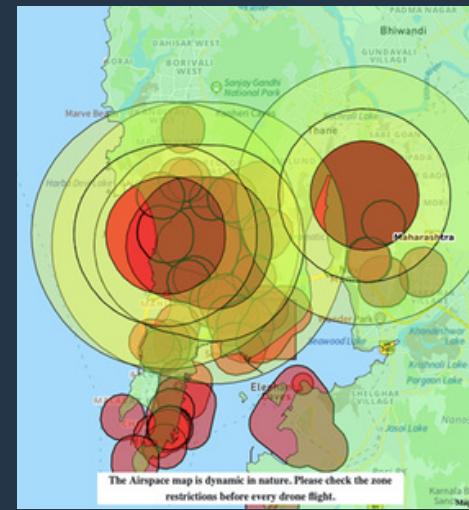
Demographics of India

- Apartment system and no sectorial distribution



Geography of India

- Unpredictable weather
- Migratory birds



OUR SOLUTION

```
graph TD; A[Virtual helipad Technology] -- yellow --> C[OUR SOLUTION]; B[OTP based zero datum delivery] -- red --> C; C[Hexagonal Sectorial distribution] -- blue --> C; D[Data-driven route optimization] -- light blue --> C; E[Penetration into Indian market by pseudo-warehousing] -- pink --> C; F[Partnership with Local vendors] -- purple --> C; G[Decentralised Inventory] -- yellow --> C; H[Metrics and KPIs for warehouse management] -- red --> C;
```

Virtual helipad
Technology

OTP based zero
datum delivery

Hexagonal Sectorial
distribution

Data-driven route
optimization

Penetration into Indian
market by pseudo-
warehousing

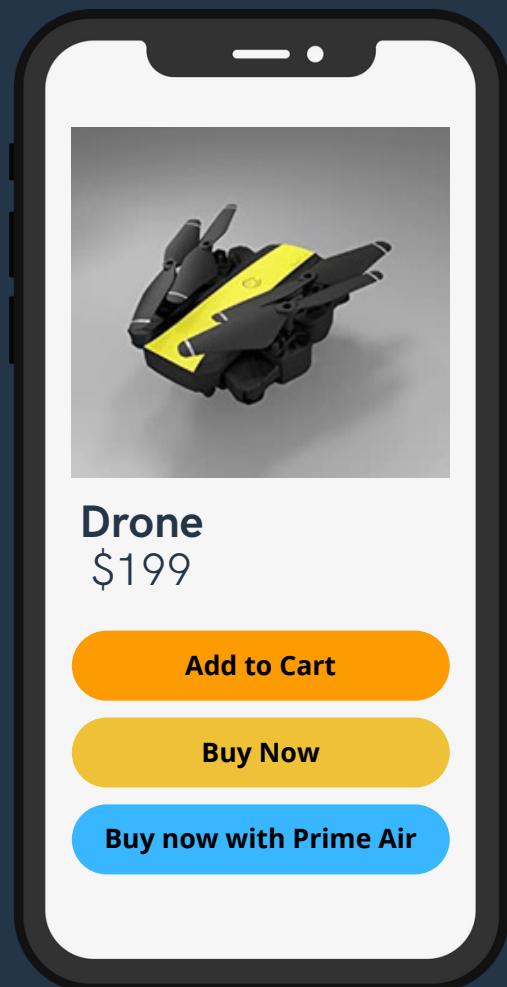
Partnership with
Local vendors

Decentralised
Inventory

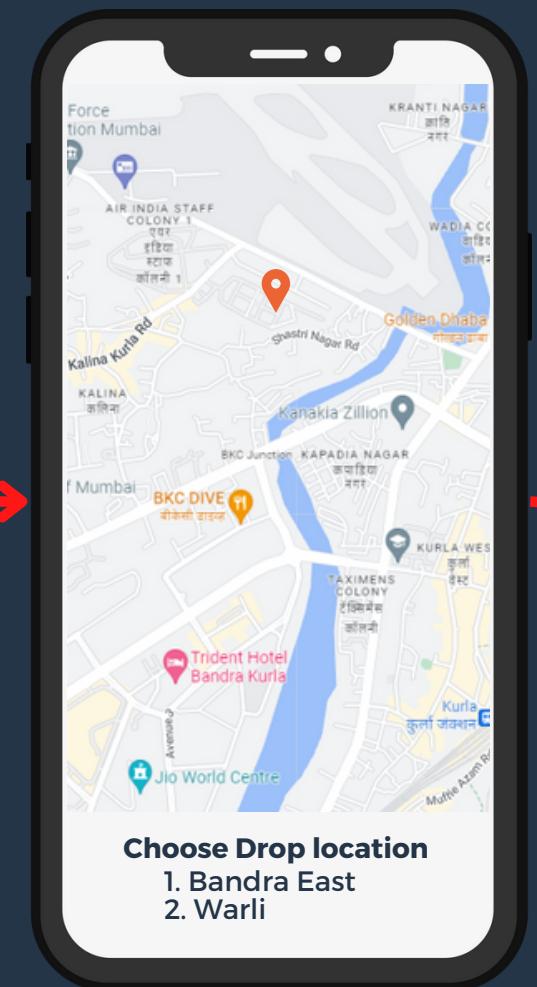
Metrics and KPIs for
warehouse managemet

Proposed Solution

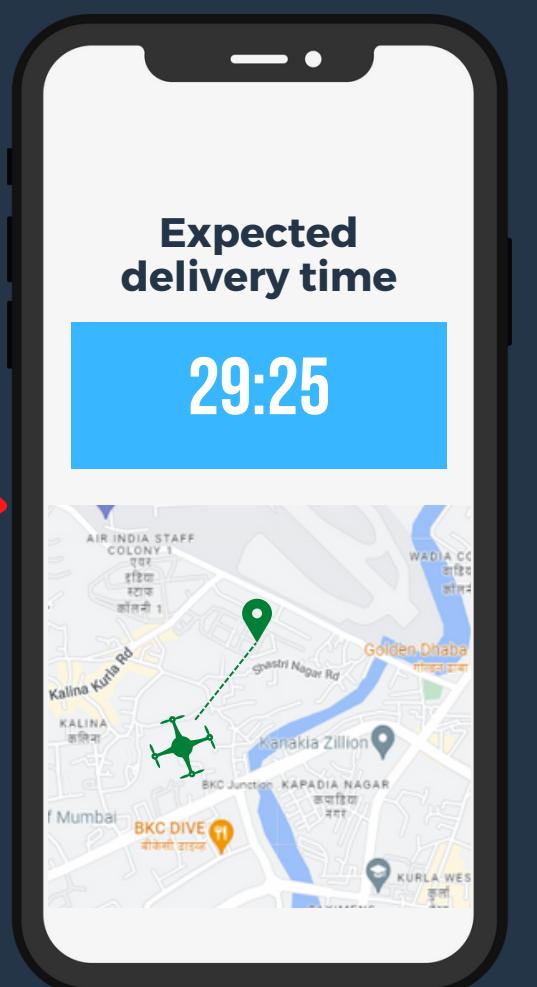
Customer Side Solutions



Customer will place order via amazon prime air



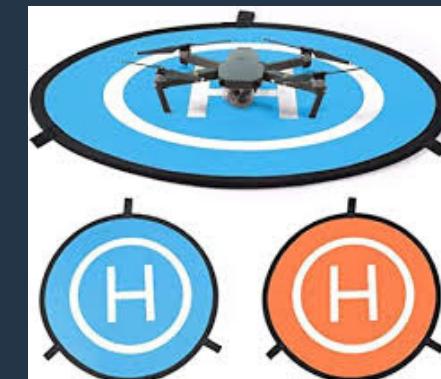
Choose Delivery Location



Drone can be traced via amazon app

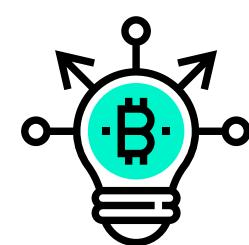
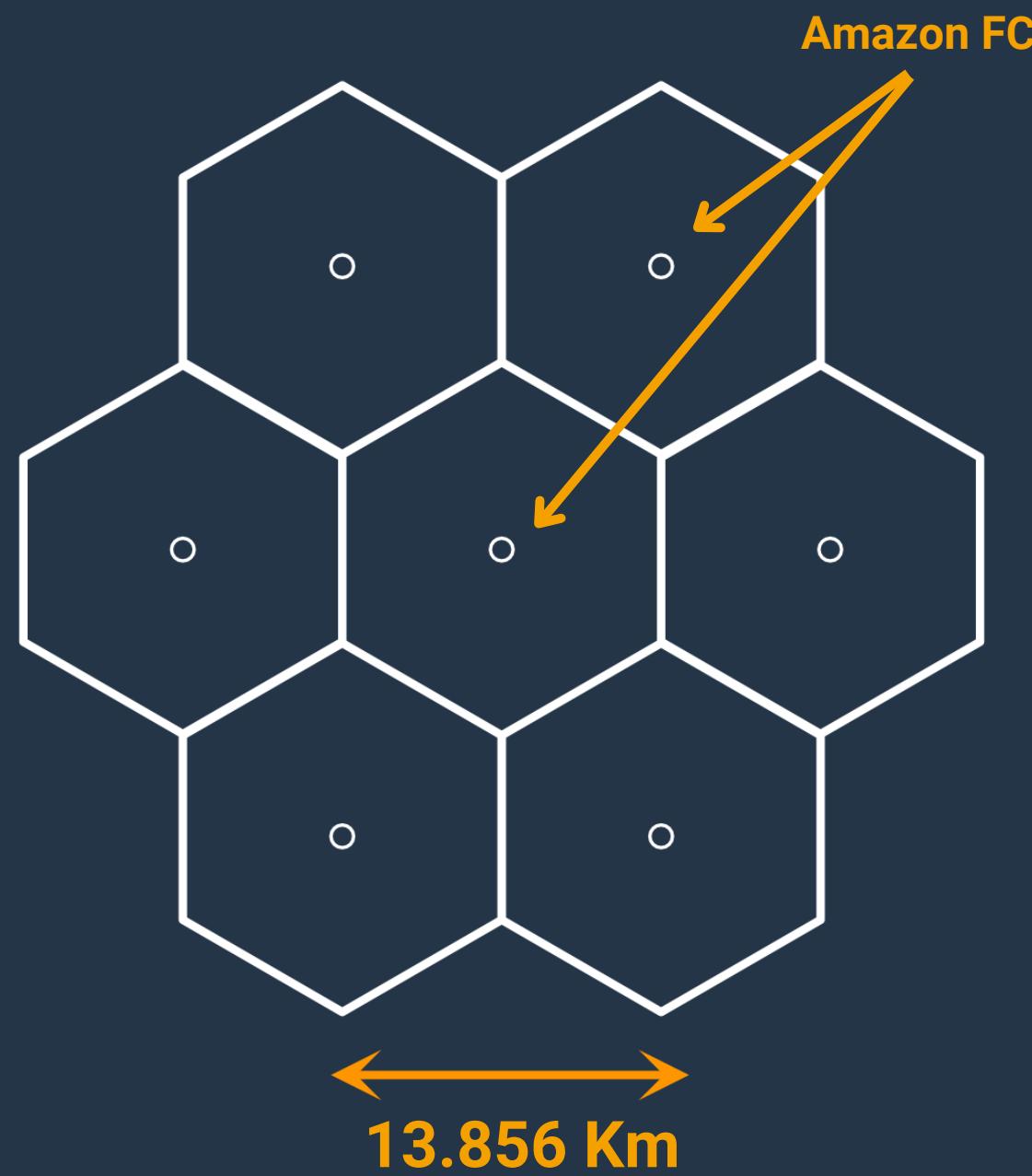
In further section, we have also discussed about the metrics to determine factors like eligible items, schemes and discounts, etc.

- An Amazon prime users is eligible to opt for **Amazon Prime Air**
- The wait time will vary depending on the **PESTLE** factors of the location
- Drone will fly at a height of ($H_{avg}+30$) meters
- The delivery location of amazon parcel will be fixed at **zero datum** and the drone will only land on the **Virtual Helipads** as prefixed by Amazon
- Once drone arrive at the delivery location, an **OTP** will be shared. The drone will only land if the OTP is entered correctly



Proposed Solution

Business Side



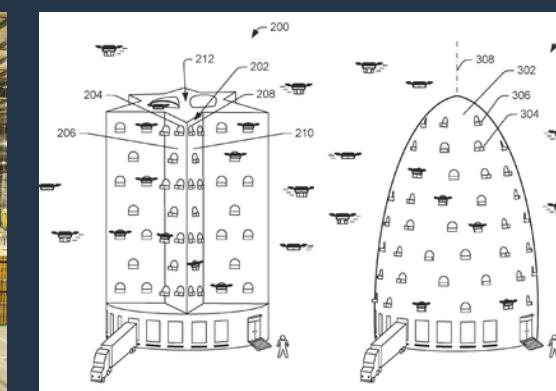
**DECENTRALISED
INVENTORY**



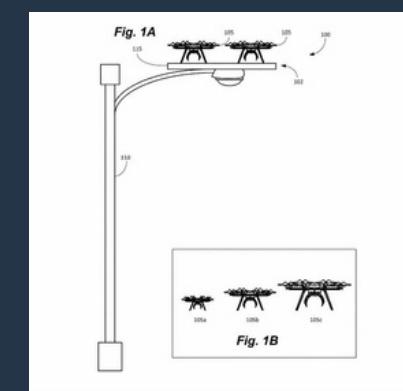
- A city's demographical areas are divided into interconnected regular Hexagonal shaped Zones with amazon FC or warehouse at the center
- Corner to center distance is 5 miles (8Kms) and
- Area of a single Hexagonal unit is 166.272 sq Km (64.2 sq mile)
- 2 Types of drones- Delivery drones and transfer drones
- All drones will be native to one single facility
- Drones will do Round trips to avoid ELOS
- Optimization of route parameters- Distance and availability
- Concept of Pseudo-Warehousing
- Empowering local vendors / small warehouses in domestics.



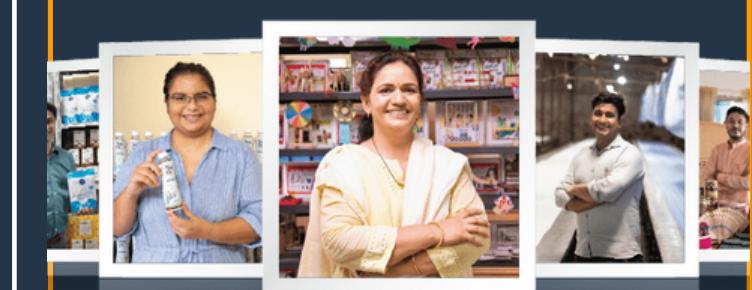
Amazon FC



Futuristic FC Patent

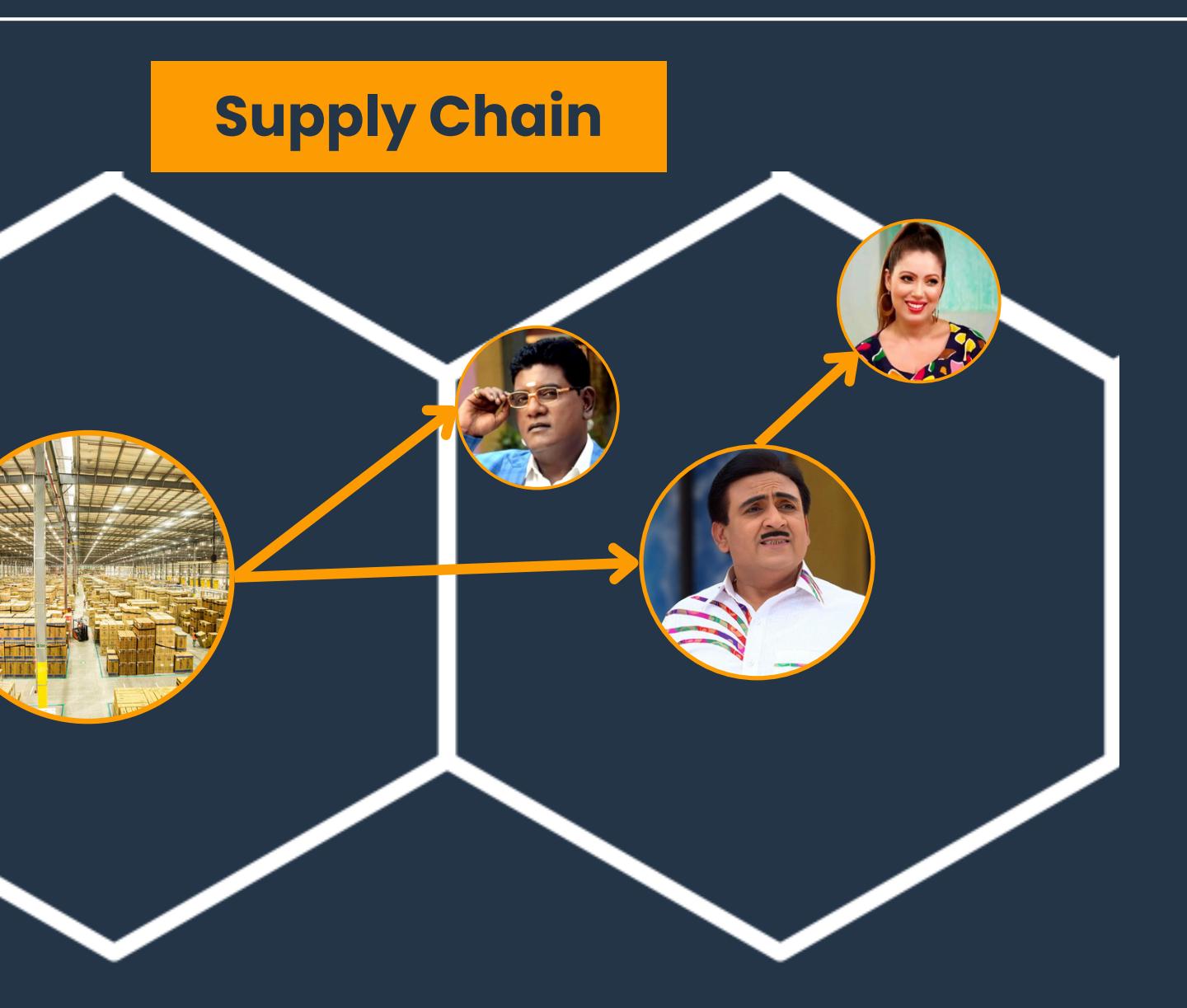


Charging tech



**Empowering
Local vendors**

Proposed solution



- These metrics will be used to find-
- What items to recommend
 - What charges to be levied, Discounts & offers
 - What commissions to give inventory units
 - What inventory items to keep
 - Targeted ADs

Success Metrics

- No. of Delivery
- On-Time Delivery
- Transit Time to Distance
- Sales to Distance
- Average Time Per Delivery
- **Cost-to-Weight Ratios**

Business Growth

Key Performance Index

- Inventory to sales ratio (ISR)
- Frequency or cycle of orders
- Retention Rate
- Sales Growth per Zone
- Profit Margin
- Inventory Turnover

Walmart's Potential Customer Base For A
Drone Delivery Service
US, Q1 2017



Finance Model

Revenues-

- Amazon Prime Subscription

Expenditure-

- Drone Manufacturing
- Drone maintenance
- Local seller comission

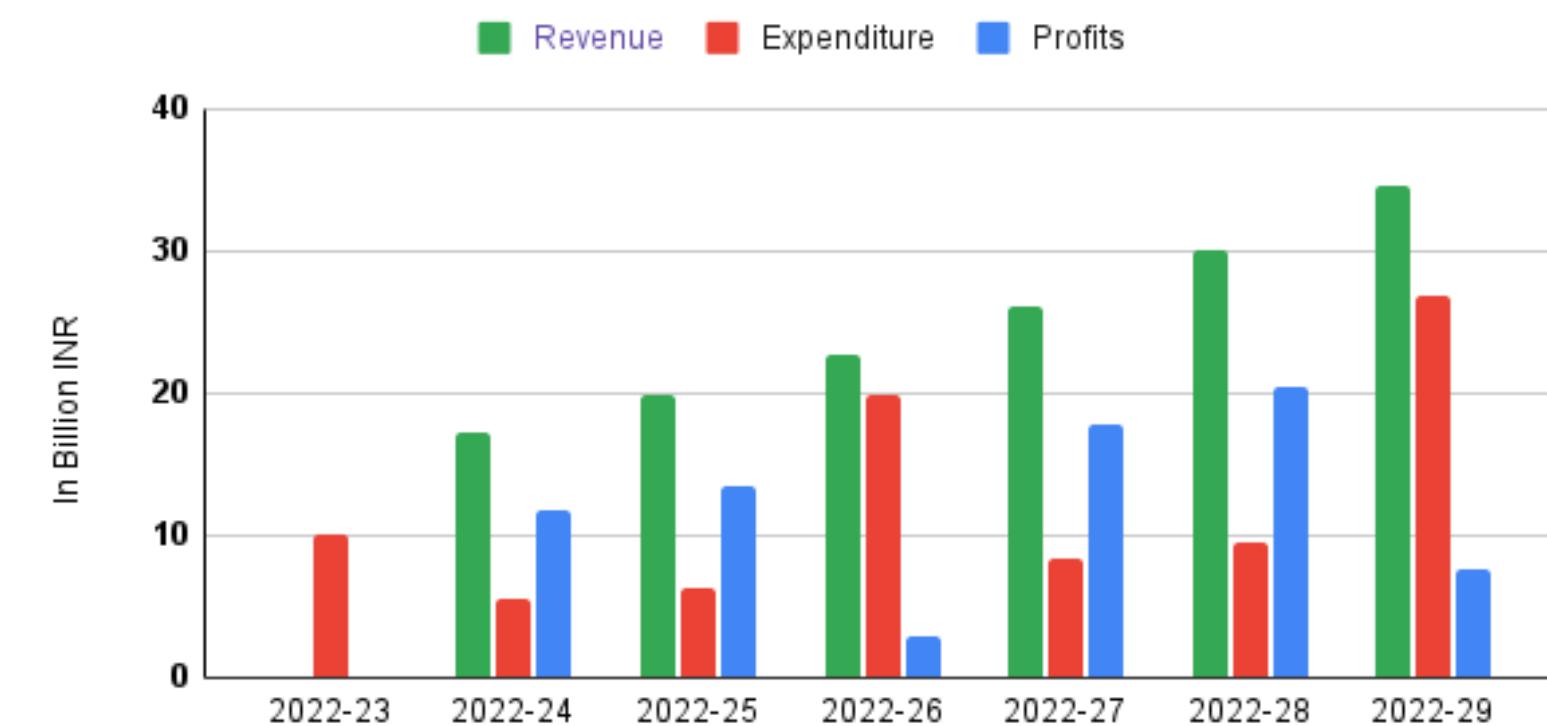
Guesstimate for Investment/Expenditure on drones

- A pincode on an average covers 5Km area
- Total number of servicable pincodes by amazon= 15000
- Total servicable area= $3.14*5*5*15000 = 11.78$ Lakh sqkm
- Number of hexagons= 7100
- No. of drone per facility = 6(tier1, 30%), 7(tier2, 50%), 4(tier3, 10%)
- Total number of drones= $40000 + 10000$ (Transfer drone)
- Price of one drone= 2 Lakh INR
- Total investment= 1000 Cr. INR

Assumptions

- Existing prime users are uniformly distributed
- Drone delivery acquires customers at a rate of 15%
- Prime air subscription charges= 1500 INR
- Each prime user 's order frequency= 48 per yr (kpi)
- Minimum bucket size of each order =500 INR
- Decrease in shipping cost from 50 INR to 10 INR
- No local vendor onboarding cost

Results-



Feasibility Analysis

Based on inventory model



Financial Year	Total Prime users	No of orders per year	Shipping cost per order	Expenditure via Prime		Profits
				Total shipping cost annually	Revenue via Prime	
2022-23	1.00E+07	2.40E+01	5.00E+01	1.20E+10	1.50E+10	3.00E+09
2022-24	1.07E+07	2.40E+01	5.00E+01	1.28E+10	1.61E+10	3.21E+09
2022-25	1.14E+07	2.40E+01	5.00E+01	1.37E+10	1.72E+10	3.43E+09
2022-26	1.23E+07	2.40E+01	5.00E+01	1.47E+10	1.84E+10	3.68E+09
2022-27	1.31E+07	2.40E+01	5.00E+01	1.57E+10	1.97E+10	3.93E+09
2022-28	1.40E+07	2.40E+01	5.00E+01	1.68E+10	2.10E+10	4.21E+09

Financial Year	Total Prime users	No of orders per year	Shipping cost per order	Expenditure via Prime		Profits
				Total shipping cost annually	Drone expenditure	
2022-23					1.00E+10	-1.00E+10
2022-24	1.15E+07	48	10	5.52E+09	0.00E+00	1.73E+10
2022-25	1.32E+07	48	10	6.34E+09	0.00E+00	1.98E+10
2022-26	1.52E+07	48	10	7.30E+09	1.26E+10	2.28E+10
2022-27	1.74E+07	48	10	8.35E+09	0.00E+00	2.61E+10
2022-28	2.00E+07	48	10	9.60E+09	0.00E+00	3.00E+10
2022-29	2.30E+07	48	10	1.10E+10	1.59E+10	3.45E+10
						Total return (6 Yrs)
						6.38E+10

Based on our model
Net Change in Profit
= 192%

There will be some Mini facility maintainence
cost of 100 Cr INR (12000/month/facility)



- ROI was 66.7% for a operational period of 6 years
- Key component here for profitability is the frequency of orders
- Hence there is a possibility of imposing limits on the number of orders
- Subscriber added generates more revenue compared to drone delivery

Conclusion & Suggestions

Conclusion

- The project first needs governmental clearance
- Introducing the Micro partnership facility helps drastically cut down warehouse costs and makes the supply chain quick and efficient.
- The model is only profitable if the number of drone deliveries to a prime customer is limited to a specific ratio
- Hexagonal Zones division helps cover every demographic area in India, ensuring optimum distance covered by the drones
- The smooth delivery process will need a complex and resilient backend operations team

Suggestions

- Invest in semiconductor market in India
- To introduce "drop-down" feature like Wing drones
- R&D required in object sensing during flight
- Pilot scale implementation in tier 2 city

Future Scope

- Fully-Automated Delivery System with controlled data-driven supply chain and logistics support



THANK YOU!



Team FinAICo



Aditya Naik



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