**LAST MILE DRONE DELIVERY AND ITS IMPACT ON THE RETAIL INDUSTRY**

**KROGER**

INTRODUCTION [ You can start your presentation with below sentences in 1-2 lines]

* Last mile delivery refers to the final leg of the delivery process, from a distribution centre to the customer's doorstep.
* Traditional last mile delivery methods have limitations in terms of speed, cost, and flexibility.
* The use of drones for last mile delivery has the potential to revolutionize the retail industry by addressing these limitations and offering a faster, more efficient, and cost-effective delivery option.
* The retail industry is highly competitive and companies are constantly seeking new ways to differentiate themselves and enhance their customers' experience.
* By adopting innovative technologies such as last mile drone delivery, companies like Kroger can stay ahead of the curve and potentially gain a significant competitive advantage

**Q1) Briefly describe the company’s current situation, as it relates to your topic. This may include current news, financial condition, financial statement results, inventory levels, industry trends, disruptive issues, competition, etc.**

COMPANY BACKGORUND

* Kroger Company operates over 2,700 supermarkets and multi-department stores in 35 states, serving almost 9 million customers daily.
* However, Kroger's financial results have been affected by the COVID- 19 pandemic and increased competition from online retailers like Amazon and Walmart. In Q3 2022, Kroger reported a net income of $446 million, down from $559 million in the same quarter of the previous year. The company's total sales for Q3 2022 were $30.5 billion, an increase from $28 billion in Q3 2021.
* Kroger's inventory levels have also been impacted by supply chain disruptions caused by the pandemic.
* In its Q3 2022 earnings release, the company reported that its inventory turns had decreased to 5.5, compared to 5.8 in Q3 2021.
* As a response to these challenges, Kroger has been focusing on expanding its online presence and investing in new technologies, such as automated warehouses and digital shelves.
* The company has also been piloting various last-mile delivery solutions, including autonomous vehicles and drones.
* As a response to these challenges, Kroger has been focusing on expanding its online presence and investing in new technologies, such as automated warehouses and digital shelves.
* The company has been piloting various last-mile delivery solutions with drones in order to compete with the e-retail business and expand too

**Q2) What is the current state of retail last mile drone deliveries around the globe. Who (what company, in what country/region across the globe) appears to be leading?**

CURRENT STATE OF RETAIL LAST MILE DRONE DELIVERIES

* The current state of retail last mile drone deliveries around the globe is still in its early stages, with various companies experimenting with different models and technologies.
* Amazon has been testing its Prime Air delivery service in the UK and parts of the US since 2016
* Currently, it appears that companies in China are leading the way in retail last mile drone deliveries. E-commerce giant JD.com, has been using drones to deliver packages in rural areas since 2016 and is expanding its operations to more cities. Another Chinese company, SF Express, has also been using drones to deliver packages in rural areas since 2017.
* In the US, companies like Amazon and Walmart have been conducting trials and experiments with drone delivery services, but have yet to launch widespread services.

**Q3) What does your team recommend this project look like as it is deployed and operationalized in the USA over the 8 quarter time-frame)?**

PROJECT OPERATIONALIZATION IN THE US

Our team recommends the following plan for the deployment and operationalization of the last mile drone delivery project in the USA over the 8 quarter time-frame

1. **City Selection**: Select five significant metropolitan regions that have appeal for staple conveyance benefits and are reasonable for drone conveyances in light of variables like populace thickness, geology, and guidelines.
2. **Drone Selection**: Buy 250 drones equipped for conveying a payload of up to 50 lbs, with a battery duration of 45 minutes flight time (with 15-minute save), and a scope of 20 miles (40 miles full circle) for delivery. Save 100 drones available for later for substitution
3. **Order Processing**: Develop a cycle for stacking orders onto the drones, which incorporates payload getting, drone pre-flight check, and battery trade out for the following flight. The request stacking time per drone flight is assessed to be 20 minutes.
4. **Daily Order Processing**: Process 300 drone orders each day, per city. This depends with the understanding that the typical retail worth of a request is $100, with a standard deviation of $25.
5. **Operationalization:** Convey and operationalize the drone delivery service in one city like clockwork. This will permit the group to finish organization in each of the five urban areas in 24 months or less.
6. **Marketing and Promotion:** Develop showcasing and advancement methodologies to elevate the support of expected clients in every city.
7. **Monitoring and Optimization**: Consistently screen and improve the drone delivery service for effectiveness and security. This will incorporate checking delivery times, request exactness, drone upkeep, and consistence with guidelines

**Q3 -a) What five cities are recommended?**

CITY RECOMMENDATIONS AND SPECIFICATIONS

Based on our analysis, we recommend deploying the project in the following five cities

New York City, Los Angeles, Chicago, Houston, Miami.

**Q3- c) Why did you choose those cities?**

* We chose these cities based on several factors, including population density, existing infrastructure, and economic development. These cities have a high demand for retail products, and their population density and traffic congestion make drone delivery a viable solution for last-mile logistics.

**Q3-b) What period of time (quarters), starting 1st quarter of next year, will you deploy in each city?**

* Specific sites for the drone operation bases will depend on the company’s available locations. However, we recommend setting up 3 operation bases in each city, strategically located to cover the maximum area and population. Each base will have its own loading area, drone maintenance facilities, and take-off and landing zones, to ensure smooth and efficient operations.

**Q3-d) What specific sites within those cities would you utilize for the drone operation bases (SPECIFIC to your company's available locations)? How many bases in each city, considering needs for loading orders onto drone, take-off and landing, and drone maintenance?**

We suggest conveying the task in every city north of a 2-quarter period, beginning in the first quarter of the following year. In this manner, the task will be completely operationalized in every one of the five urban communities toward 8 quarters' end.

**Q3) How would you set-up this fleet operation? Considering your company's current established operations, what daily/weekly/monthly tactical operational concerns needs to be considered when introducing a new program such as this into an established retail operation? Please take into consideration training, incremental operational costs, and costs of order/delivery (you will need to make assumptions here) when introducing this type of program into a well-established retail enterprise. (Note: Each of the companies you may choose from have established e-commerce and traditional retail choices for customers). Don't forget to consider loading, recharging, and overnight/weather related storage.**

OPERATIONS

To set up this fleet operation, several tactical operational concerns need to be considered, including

* **Training**: Staff individuals should be prepared on the robot innovation, flight guidelines, and request satisfaction cycles to guarantee protected and proficient activities.
* **Operational costs**: The expenses related with setting up and working the drone fleet, like purchasing the drones, employing and preparing staff, and keeping up with the drones, should be considered into the organization's spending plan.
* **Order/delivery costs:** The expenses of picking, packing, and conveying orders by means of robots should be assessed and contrasted with the expenses of conventional conveyance strategies to decide the most practical arrangement.
* **Loading and recharging**: Drones should be stacked with orders and re-energized at assigned bases, which should be decisively situated to enhance conveyance times and limit functional expenses..
* **Storage:** Short-term and climate related capacity arrangements should be laid out to shield the drones and their parts from damage.

**Q4) What would the deployment need to look like to increase total company sales (annualized) by 1%, 2% and 3%, respectively (three different simulations)? Totals are measured against the 2nd full fiscal year (4 quarters) ending fiscal quarter #8.**

**a) Average # of orders per each city?**

**b) Average # of flights per drone per day?**

**c) Site specific inventory investments to support this operation?**

**d) Dedicated drone fleet inventory personnel per site?**

**e) Impact to the overall inventories on the company's balance sheet?**

**f) Number of flights and orders necessary to achieve these sales increases for your company (for each fiscal quarter, 1 through 8)?**

**i) per day**

**ii) per month**

**iii) per quarter**

INCREASING SALES

To expand Kroger organization deals by 1%, 2%, and 3%, individually, the accompanying arrangements might be vital

For a 1% increase in sales:

* Average # of orders per each city: 250 orders/day
* Average # of flights per drone per day: 6 flights
* Site-specific inventory investments to support this operation: $500,000
* Dedicated drone fleet inventory personnel per site: 4 personnel
* Impact to the overall inventories on the company’s balance sheet: 2% increase
* Number of flights and orders necessary to achieve these sales increases for your company:
* per day: 1,500 orders, 250 flights
* per month: 45,000 orders, 7,500 flights
* per quarter: 135,000 orders, 22,500 flights

For a 2% increase in sales

* Average # of orders per each city: 500 orders/day
* Average # of flights per drone per day: 8 flights
* Site-specific inventory investments to support this operation: $1,000,000
* Dedicated drone fleet inventory personnel per site: 6 personnel
* Impact to the overall inventories on the company’s balance sheet: 4% increase
* Number of flights and orders necessary to achieve these sales increases for your company:
* per day: 3,000 orders, 375 flights
* per month: 90,000 orders, 11,250 flights
* per quarter: 270,000 orders, 33,750 flights

For a 3% increase in sales

* Average # of orders per each city: 750 orders/day
* Average # of flights per drone per day: 10 flights
* Site-specific inventory investments to support this operation: $1,500,000
* Dedicated drone fleet inventory personnel per site: 8 personnel
* Impact to the overall inventories on the company’s balance sheet: 6% increase
* Number of flights and orders necessary achieve these sales increases for your company:
* per day: 4,500 orders, 563 flights
* per month: 135,000 orders, 16,875 flights
* per quarter: 405,000 orders, 50,625 flights

**5) For each site, prepare a model/simulation of what these operations would look like for revenues, cost of goods (cost of sales), and inventories over the remaining (respective) 8 fiscal quarters, based on the remaining quarters once you deploy each city (for example, if you launch a city in the 1st quarter, you need to model the remaining 7 quarters. If you launch in the 5th quarter, model the remaining 3 quarters of the 8-quarter timeframe). Include various financial metrics you deem important, including (but not limited to) inventory turns, possible negative impact (cannibalization) of existing stores, etc. In other words, what metrics are important to measure this programs performance and success?**

**To prepare a model/simulation of the last mile drone delivery project,**

we would have to make specific assumptions and utilize historical information to assess incomes, cost of merchandise, and inventories.

**Assumptions:**

* The drone delivery service will be deployed and operationalized in one city every 90 days, and all five cities will be fully operational by the end of the 8 quarter time-frame.
* Each city will process 300 drone orders per day, based on the assumption that the average retail value of an order is $100, with a standard deviation of $25.
* The average number of flights per drone per day is 6 flights for a 1% increase in sales and 8 flights for a 2% increase in sales.
* Site-specific inventory investments to support the operation will be
* $500,000 for a 1% increase in sales and $1,000,000 for a 2% increase in sales.
* The dedicated drone fleet inventory personnel per site will be 4 personnel for a 1% increase in sales and 6 personnel for a 2% increase in sales.
* The impact to the overall inventories on the company's balance sheet will be 2% for a 1% increase in sales and 4% for a 2% increase in sales.

**Based on these assumptions, here are some possible financial metrics and numbers for the model:**

**[A] Revenue**

1. Assuming the average retail value of an order is $100, with a standard deviation of $25, and each city processes 300 drone orders per day, the daily revenue for each city would be $30,000 ($100 x 300).
2. With five cities fully operational, the daily revenue for the drone delivery service would be $150,000 ($30,000 x 5).
3. If the drone delivery service increases Kroger’s sales by 1%, the additional daily revenue would be $305,000 ($150,000 x 1.02), and the total daily revenue for Kroger would be $30,805,000.
4. If the drone delivery service increases Kroger’s sales by 2%, the additional daily revenue would be $610,000 ($150,000 x 1.04), and the total daily revenue for Kroger would be $31,110,000.

**Cost of Goods Sold**

* Assuming a gross profit margin of 25%, the cost of goods sold for each city would be $22,500 ($30,000 x 0.75).
* With five cities fully operational, the daily cost of goods sold for the drone delivery service would be $112,500 ($22,500 x 5).
* If the drone delivery service increases Kroger's sales by 1%, the additional daily cost of goods sold would be $229,125 ($112,500 x 1.02), and the total daily cost of goods sold for Kroger would be $22,929,375.
* If the drone delivery service increases Kroger's sales by 2%, the additional daily cost of goods sold would be $455,625 ($112,500 x 1.04), and the total daily cost of goods sold for Kroger would be $23,056,125.

**Inventory Turns**

• In light of the supposition that Kroger's stock goes diminished to 5.5 in Q3 2022, the drones delivery service is supposed to increment stock goes because of quicker delivery times and decreased stock holding costs.

• Assuming the drone delivery service increases Kroger's sales by 1%, ($22,500/$4,500,000), and the absolute stock turnover for Kroger would be 5.55.

• Accepting the drones delivery service expands Kroger's deals by 2%, the extra stock turnover would be 0.10

**The following metrics would be important to measure the program’s performance and success:**

1. **Return on Investment (ROI**): return on initial capital investment is a proportion of the benefit of a venture. It is determined by partitioning the net benefit by the expense of the venture. A high return on initial capital investment demonstrates that the venture is producing a critical return.
2. **Operating Margin**: Operating margin is the level of deals that is left in the wake of deducting working costs. Operating margin shows that the business is creating critical benefits.
3. **Cash Flow:** Income is how much money that is created or utilized by a business during a particular period. Positive income is essential to guarantee that the business has the assets to subsidize its activities and put resources into future development.
4. **Sales:** The revenue created by the drone delivery service would be a significant measurement to follow. We can assess deals by increasing the quantity of orders by the normal retail worth of a request.
5. **Cost of Goods Sold (COGS**): The cost of goods sold is the immediate expense of creating the merchandise sold. For the drone delivery service, this would incorporate the expense of the drones, batteries, and other gear, as well as the expense of working and keeping up with the drones.
6. **Gross Profit**: Gross profit is the difference between sales and COGS. This measurement is significant in light of the fact that it shows the productivity of the drones delivery service.
7. **Inventory Turns**: Inventory turns is a measure of how quickly inventory is sold and replaced. A higher stock turns proportion demonstrates that stock is being overseen proficiently.
8. **Negative Impact on Existing Stores**: The drone delivery service may adversely affect existing stores on the off chance that it brings about a lessening in people walking through or deals. It means quite a bit to screen this measurement to guarantee that the drone delivery service isn't tearing up deals from existing stores.

**6) What needs to be considered for 1) operations and 2) supply chain planning as this drone program is launched. In other words, from a SWOT assessment analysis, what must your chose company consider as this program is put into place over the next eight quarters.**

OPERATIONS CONSIDERATIONS

1. **Resource allocation**: Guarantee adequate resources are dispensed for the send off, support, and the executives of the drone fleet, including training and staffing
2. **Operational efficiency:** Streamline operational processes to amplify effectiveness, limit errors, and diminish downtime.
3. **Safety and compliance:** Guarantee consistence with guidelines and security principles to prevent accidents and safeguard clients, representatives, and the organization's standing
4. **Customer experience**: Guarantee a consistent and dependable client experience by setting sensible assumptions, giving convenient updates, and resolving issues immediately.

Supply Chain Considerations:

1. Inventory management: Streamline stock administration to guarantee ideal and precise request satisfaction and limit stockouts and overloads.
2. Network optimization: Streamline the distribution network to support the drone program, taking into account factors, for example, delivery zones, flight reach, and drone limit
3. Supplier management: Develop strong connections to guarantee timely delivery, quality items, and serious evaluating.
4. Risk management: Develop alternate courses of action to alleviate inventory network gambles, like climate related disturbances, specialized issues, or security breaks

**Q6-What are the executives underestimating or potentially not considering?**

The executives may potentially be underestimating the following factors related to launching and maintaining a fleet of drones:

* Regulatory Compliance: The organization should guarantee that they are in consistence with every single administrative body, including FAA guidelines. Inability to agree with guidelines can bring about lawful punishments and postpones in the send off of the program.
* Weather Conditions: Weather patterns can essentially influence the activities of drones, and the organization should consider the possible effect of harsh climate on their tasks.
* Technical Difficulties: Drones are complicated machines, and specialized challenges can emerge, prompting defers in the program's send off and expanded maintenance costs.
* Security Concerns: Drones can be vulnerable against cyberattacks, and the organization should have sufficient safety efforts set up to safeguard against such dangers.
* Skilled Workforce: The organization should have a labor force that is talented in drone tasks, support, and fix. This might require extra preparation and interest in Human resources.
* Maintenance Costs: Drones require ordinary support to guarantee that they work successfully, and the organization should calculate the related expenses of maintenance and fixes.

The company must consider the potential risks and challenges associated with launching and maintaining a fleet of drones and ensure that they have a well-thought-out plan in place to mitigate these risks

**Q7) Using fiscal 2021 and 2022 values (from published financial statements) as your baseline, what would be the potential projection(s) on TOTAL revenues, COGS, and inventory at the company level each quarter of the ensuing 8 quarters, based on your rollout schedule? Create a CONSERVATIVE and and AGGRESSIVE forecast**.

a potential projection for TOTAL revenues, COGS, and stock at the organization level each quarter of the following 8 quarters, in light of the rollout plan, involving financial 2021 and 2022 qualities as the baseline.

Baseline (FY2021):

* Total revenues: $60 billion
* COGS: $42 billion
* Inventory: $6 billion

Conservative forecast:

* Total revenues: $61 billion (+$1 billion incremental impact)
* COGS: $43 billion (+$1 billion incremental impact)
* Inventory: $6.5 billion (+$0.5 billion incremental impact)

Aggressive forecast:

* Total revenues: $63 billion (+$3 billion incremental impact)
* COGS: $41 billion (-$1 billion incremental impact)
* Inventory: $5.5 billion (-$0.5 billion incremental impact)

CONCLUSION

our presentation outlined a proposed drone delivery program for a retail company, with the aim of increasing revenues and improving customer satisfaction. We discussed the financial impact of this program, including projected revenues, cost of goods sold, and inventory turns. We also highlighted key considerations for launching and maintaining a fleet of drones, including operational and supply chain planning, as well as potential strengths, weaknesses, opportunities, and threats associated with this program. Overall, we believe that this drone delivery program has the potential to revolutionize the retail industry and position our company as a leader in innovation and customer service.