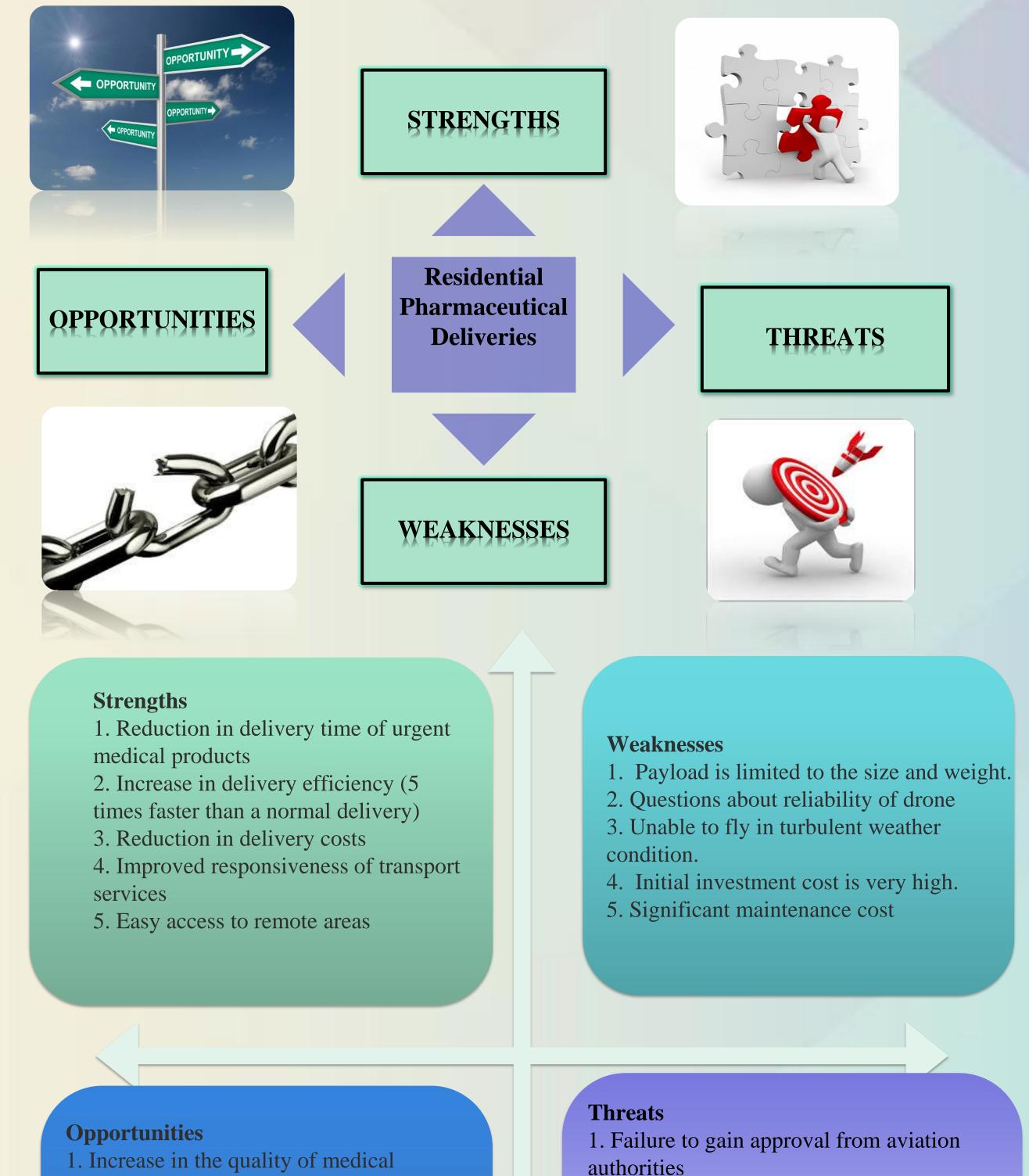# Residential Pharmaceutical Deliveries: SWOT and TOWS Analyses of Drone Delivery Service

Albishi Nadia ✳ Alharbi Noha ✳ Alkhamaiesh Saddam
Yemula Uday Kumar ✳ Maaz Muqtar ✳ Dr. Nasir Sheikh ✳ Dr. Arthur C. McAdams

Department of Technology Management, School of Engineering
University of Bridgeport, Bridgeport, Connecticut, USA

ABSTRACT

The purpose of this exercise is to evaluate drone delivery service in the healthcare sector as a proposed means for residential pharmaceutical deliveries. The study will use SWOT to analyze the internal and external environment. In addition, TOWS analysis technique is used to identify the relationship between factors and develop the best strategy for drone deliveries. SWOT and TOWS are an acronym for strengths, weaknesses, opportunities, and threats. PUBMED, ScienceDirect, and Google scholar are used to look for articles about drones. Articles about the use of drones in the military or warfare are excluded. Drones and their use in the health care sector are examined for their strengths and weaknesses. The external environment's opportunities and threats are also evaluated to be taken advantage of or avoided. The findings of this study reveal that drone delivery in residential markets will lower delivery costs, resulting in high demand for orders in the delivery market, which will benefit both medical care and the health industry.

SWOT AND TOWS ANALYSIS

As we are using SWOT and TOWS analysis as our method for this project and the main topic of the project is **Residential Pharmaceutical Deliveries: SWOT and TOWS Analyses of Drone Delivery Service**. So, our major focus is on timely delivery of pharmaceutical goods (e.g., medicines, test kits, and vaccines) to hard-to-access locations (e.g., rural and suburban areas) to residential areas by drone.

The image shows an octa-captor which we can build with the box attachment where we can keep medicines, vaccines etc. and deliver directly to the consumer. This drone has range have up to 20 km.

Strengths
1. Reduction in delivery time of urgent medical products
2. Increase in delivery efficiency (5 times faster than a normal delivery)
3. Reduction in delivery costs
4. Improved responsiveness of transport services
5. Easy access to remote areas

Weaknesses
1. Payload is limited to the size and weight.
2. Questions about reliability of drone
3. Unable to fly in turbulent weather condition.
4. Initial investment cost is very high.
5. Significant maintenance cost

Opportunities
1. Increase in the quality of medical transport(efficient in disaster handling).
2. Innovation of new transport services in health care market.
3. Service to remote areas.
4. Delivery of medical supplies in residential areas.
5. Increased operational range (like setting up charging stations and solar panels).

Threats
1. Failure to gain approval from aviation authorities
2. Possibilities of collision with birds – and related legal issues (The National Audubon Society)
3. Safety issues (occurrence of accidents and the safety of the transported equipment)
4. Rejection by the public (privacy, security, noise pollution…)
5. Overall project risk factors are high

THE METHODOLOGY

Step 1: Understanding the goal of the service
The goal is to analyze the drone delivery services using SWOT and TOWS methodology. Specifically, to verify whether a drone delivery will be successful in the health sector.

Step 2: Collect and analyze information about the Delivery service:
PUBMED and Google Scholar were used to find articles about drones. The use of drones in health care sector were examined for their internal strengths and weaknesses. Likewise, opportunities and threats the external environment were also evaluated so that they can be leveraged or avoided respectively.

Step 3: Come up with a strategy for providing the service
We hope to help develop policy frameworks that enable drone approval for this purpose. Create more jobs to ensure the instant delivery service around the clock.
Using the other alternatives such as cars or trucks to deliver items during turbulent weather.

Step 4: Evaluation and Control
evaluations and control entail measurement of performance, consistent viewing of the external and internal issues, and taking corrective measures that are appropriate accordingly. It also consists of the internal as well as external strategic planning.

SO Strategies	WO Strategies
S3 O1- Usage of drones in residential markets will result in reduction in the cost of delivery which will result in high demand for orders in delivery market	O1W1- Improving supply capabilities for important items (e.g., COVID vaccines and therapeutics, and blood supplies) to hospitals could be accomplished via large drone sizes (12 axis model)
WO Strategies	**WT Strategies**
UNABLE TO GENERATE STRATEGIES AS STRENGTH AND THREATS ARE NOT MATCHING WITH EACH OTHER	UNABLE TO GENERATE STRATEGIES AS WEAKNESS AND THREATS ARE NOT MATCHING WITH EACH OTHER

RESULTS

TOWS matrix appeared to be the most efficient strategy for this study. The TOWS matrix enabled us to maximize internal strengths and limit external weaknesses in the face of external opportunities. Based on the data analysis, drones' delivery in the residential markets will reduce the cost of delivery, resulting in high demand for orders in the delivery market. Therefore, the quality of medical transport increased as an external opportunity. Besides that, the delivery cost was reduced as internal strength. Therefore, this strategy solves the research question: What is the appropriate strategy for leveraging strengths and mitigating weaknesses in the face of opportunities and threats?

CONCLUSION

Drones in pharmaceuticals deliveries are now the fastest way. Also, drones are the future in terms of the advantages and ease of using this innovation. Amazon company is very high in developing research on drones. Amazon is trying to compete on the idea, such as DHL. This competition will benefit the target customer from this innovation; this service will be provided at competitive prices so that this competition will satisfy the customer.

FUTURE WORK

- Communicating with Amazon because it has a vast database that can be widely relied on.
- Expand the analysis of both SWOT and TOWS.
- Adopt several new technologies and add them in our study.

REFERENCES

Amukele, T., Sokoll, L., Pepper, D., Howard, D., & Street, J. (2015). Can unmanned aerial systems (drones) be used for the routine transport of chemistry, hematology, and coagulation laboratory specimens? *PLOS ONE*, *10*(7), e0134020. https://doi.org/10.1371/journal.pone.0134020

Balasingam, M. (2017). Drones in medicine-The rise of the machines. *International Journal of Clinical Practice*, *71*(9), e12989. https://doi.org/10.1111/ijcp.12989

EUCHI, J. (2021). Do drones have a realistic place in a pandemic fight for delivering medical supplies in healthcare systems problems? *Chinese Journal of Aeronautics*, *34*(2), 182-190. https://doi.org/10.1016/j.cja.2020.06.006

Ghajargar, M., Zenezini, G., & Montanaro, T. (2016). Home delivery services: innovations and emerging needs. *IFAC-Papersonline*, *49*(12), 1371-1376. https://doi.org/10.1016/j.ifacol.2016.07.755

Ghelichi, Z., Gentili, M., & Mirchandani, P. (2021). Logistics for a fleet of drones for medical item delivery: A case study for Louisville, KY. *Computers & Operations Research*, *135*, 105443. https://doi.org/10.1016/j.cor.2021.105443