**Title**:

**Assessing feasibility of bike light-weight freight deliveries. A case study in Logan, Utah**

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# Problem statement and objective(s):

There is a growing demand for home delivery of meals and groceries(Oviedo-Trespalacios et al., 2022). Sustainable transportation, such as bikes, could be good practice for delivering lightweight stuff to close destinations because bikes are accessible, affordable, and sometimes more adapted to the environment. In some cases, bikes offer more flexibility and maneuverability than motorist vehicles in crowded urban areas (Dybdalen & Ryeng, 2022). Furthermore, more important, bikes are much more environmentally friendly than other means of transportation. Moreover, the bike rider could do a workout and make money simultaneously (Nematchoua et al., 2020).

Hopefully, most food and stuff delivery apps in the United States of America, such as Uber Eats, Door Dash, Amazon, Postmates, and Grubhub allow bicycles for their deliveries and connect drivers, customers, and shopping or food centers. As a result, riders could get orders from different services and minimize wait times. Moreover, some food shopping would employ bike food deliveries directly.

However, bike deliveries should be economical for cyclists to join bike delivery services. This study aims to assess the hourly income of a bike service from shopping centers such as Walmart branches and food services such as dominos and burger king in Logan. Furthermore, one purpose is to find the best location to increase per-hour earnings effectively. Parameters that determine the best location are the density of food services in each TAZ, population density or potential customer within 2 miles of each interest points proxy for frequency of orders and travel distance, built environment such as existence of bike lane, hilly area, and slope of the road.

A picture containing graphical user interface

Description automatically generated

Figure 1: Uber allows bicycle rider to deliver food.

# Procedures and elements:

# - Find shopping centers and fast food or restaurant that need delivery (points of interest) and define 2 miles radius around each POI as a rational travel distance area for a bike.

# - Define population density and estimate potential customer frequency orders around each POI. Estimate frequency and wait time for each POI. Define origin and destination travel route.

# - Consider the quality of bike lanes and slope for each route and assess the travel time and efforts of the rider.

# - Estimate an average income per hour for a bike delivery and rank points of interest, and define the best location for bike delivery.

# - Compare derived mean hourly income for a bike and vehicle delivery from other studies

# Results:

# The result could help bicyclists know how much money can be made by delivering light stuff or food and finding the best area to work. Moreover, this study could encourage policymakers to extend bike lanes, provide bike parking, and support sustainable light freight transport.

# References:

Dybdalen, Å., & Ryeng, E. O. (2022). Understanding how to ensure efficient operation of cargo bikes on winter roads. *Research in Transportation Business & Management*, *44*, 100652.

Nematchoua, M., Deuse, C., Cools, M., & Reiter, S. (2020). Evaluation of the potential of classic and electric bicycle commuting as an impetus for the transition towards environmentally sustainable cities: A case study of the university campuses in Liege, Belgium. *Renewable and Sustainable Energy Reviews*, *119*, 109544.

Oviedo-Trespalacios, O., Rubie, E., & Haworth, N. (2022). Risky business: Comparing the riding behaviours of food delivery and private bicycle riders. *Accident Analysis & Prevention*, *177*, 106820.