

Research project: Innovative Methods for Delivering Fresh Foods to Underserved Populations

What's the issue?

Food deserts are areas that lack grocery stores, which offer a variety of fresh, healthy foods, and instead only have fast food outlets and corner stores. Transportation costs to access healthy foods eat into the budget for poor families. Rather than try to get people to distant grocery stores, this study evaluated ways to deliver fresh food to underserved populations and determined which delivery methods are the most cost-effective. These comparisons also offer valuable insights about food delivery in other situations, such as the current pandemic.

What did the research discover?

Six alternative combinations of delivery modes—conventional trucks, e-bikes, shared-ride transit, parcel lockers, pop-up stores, and independently contracted drivers—were identified and optimized. Then researchers compared the results with the system's total costs—both the user's and the service provider's.

Sensitivity analyses were conducted in terms of 1) time of delivery, 2) zone size, 3) user's value of time waiting for goods, 4) the optimal number of lockers and costs associated with them 5) combined deliveries at lockers as well as to customer's homes, and 6) re-delivery resulting from the failure of the first attempt. Parts of poverty-prone West Baltimore were used as a case study. Numerical results show that delivery by truck is the most cost-effective option for delivering fresh items, while the third-party delivery ranks second. Shared-ride services and electric cargo bicycles are far more expensive than truck delivery. This study provides comparisons and a model to help evaluate how best to achieve last-mile food deliveries, a critical step in addressing the issue of food deserts.



How can I implement this?

The developed model and the comparisons are useful for those designing a food delivery system.

Learn more:

Read the full report on our website:

https://www.morgan.edu/school_of_engineering/research_centers/urban_mobility_and_equity_center/research/completed_research/delivering_fresh_foods_.html

The Urban Mobility & Equity Center is a federally funded research consortium led by Morgan State University and includes the University of Maryland and Virginia Tech. www.morgan.edu/umec