

“Green Button Project” Consumer Preference for Green Last Mile Home Delivery

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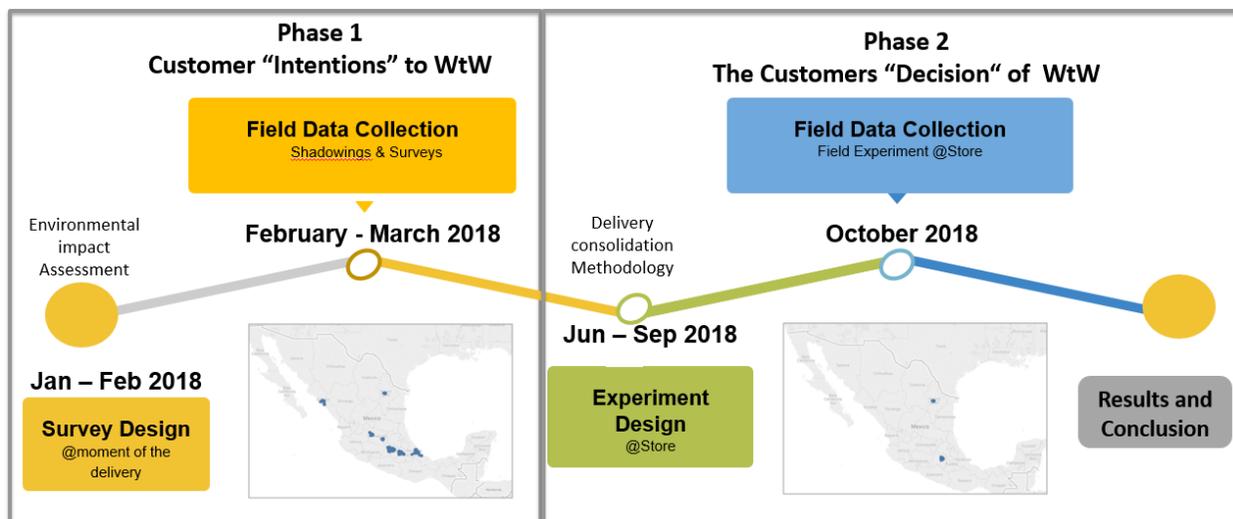
In the era of e-commerce and climate change, sustainability in last-mile delivery operations has a pivotal role. The boost of online shopping and increasing expectations of fast shipping means more vehicles on the road with lower utilization, higher frequency of deliveries, and more stops per route. These conditions have a direct impact on the environmental footprint of e-commerce.

This situation raises the question of whether consumers’ behavior can be influenced by providing information about the environmental footprint of the shipping option they select for their home delivery. We are interested in learning what are the key drivers that motivate consumers to wait for their home deliveries and how can this outcome enable decision-makers to not only reduce CO2 emissions but also save fuel costs.

“...Providing an option that says ‘**same-day delivery is equivalent to killing 300 trees**’ compared with one that says ‘**if you wait three to four days, then it’s equivalent to killing 10 trees, and by the way we are going to plant 15,**’ can really drive behavior.” ([Huffpost](#), 2017)

Our study proposes a framework to understand customers Willingness to wait (WtW) for their home deliveries when given a set of environmental statements.

This research was developed through a field study consisting of two phases.

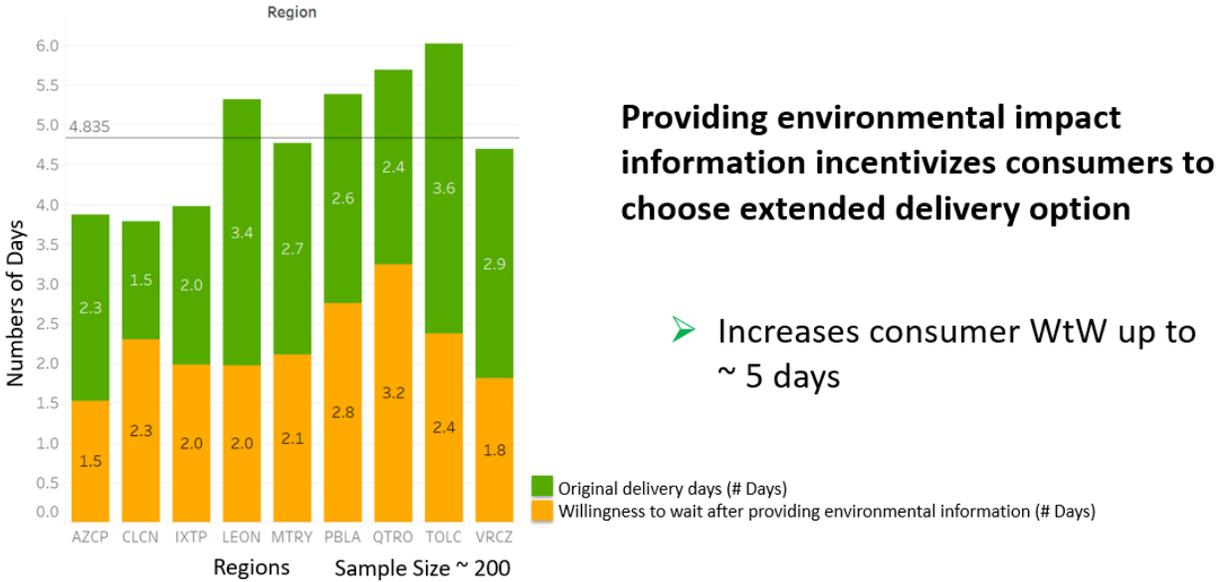


On Phase 1, we tested customer intentions to WtW. We studied the results of a stratified survey to 360 customers of one of the largest retail company in Mexico.

The survey was conducted at the moment of the delivery, at the customer’s home, across nine regions of Mexico.

We evaluated the effectiveness of explaining carbon footprint in equivalent terms of trash, and trees to the customers. The field study shows that 30% of consumers who are not willing to wait when given economic incentives are willing to wait longer for home deliveries when given environmental incentives.

Consumers Care about Green Delivery



Providing environmental impact information incentivizes consumers to choose extended delivery option

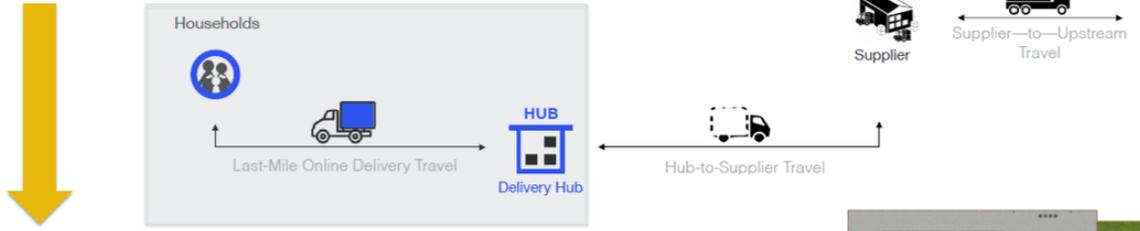
➤ Increases consumer WtW up to ~ 5 days

Additionally, equivalent information using trees is the most effective at incentivizing consumers to wait longer and it shows the potential for firms to reduce by 25% their last mile delivery carbon footprint. It might also improve customer satisfaction by providing understandable “environmental information” to incentive consumers of pro-environmental choices.

The following figure presents the methodology we followed to estimate the savings of CO2 emissions.

How much CO₂ can be saved by delaying the delivery?

1. Analyze the Historical delivery information (6 months period)



2. Fuel-based approach (NTM):

$$TE = CE * D * [FC_{empty} + (FC_{full} - FC_{empty}) * LF]$$

	A	B	C	D
Elevation	High	Low	Low	High
Topology	Hilly	Flat	Flat	Flat
Average Speed	Low	Medium	High	Low
Segment Lengths	Short	Medium	Long	Short



3. Simulate last mile delivery operations (Extended time)

Gamez, K. Velazquez, M. and Barkah, A. "Route Clustering in Transportation with Geospatial Analysis and Machine Learning to Reduce CO₂ Emissions." (2018). Working Paper

On Phase 2, we evaluated customer's decision of WtW. The experiment results include the choice of 317 customers at the moment of the purchase (at the store) in two regions of Mexico.