Nudging Travel Behavior Changes via Incentives, Information Provision, and Gamification

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Travel Demand Management (TDM)

Gridlock  October 21, 2015
What Pope Francis did for D.C. traffic

“A 2 percent reduction in volume [in peak hours] generally led to a 27 percent decline in highway congestion.”

Would you change your commute for cash?

By Max Smith | @amaxsmith
January 21, 2019 5:09 am

The Washington Post

Morning peak: without and with Pope

Transportation  August 18, 2018
This app wants to reward you for smart commuting choices

The Washington Post
Reduction in Traffic Congestion due to COVID-19

In July 2020, traffic were back at 85-90% of the pre-covid volumes, but the congestion did not come back!

Average travel speeds by month at 8:00 a.m.

2019
- 20 mph
- 30 mph
- 40 mph
- 50 mph
- 60 mph

2020
- Catastrophic Health Emergency declared
- Stay at Home Order issued
- Use of Face Coverings & Physical Distancing Order issued
- Stay at Home Order replaced by Safer at Home Order

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Congestion Mitigation with a Small % of Demand Reduction

- Just a 5% reduction in travel demand could reduce traffic congestion, as measured by trip delay, by 23%.

- If we could reduce travel demand by 15% in the morning peak period, the annual time savings from reduced congestion would be worth $918 million.
Travel Demand Management (TDM)

Congestion is a highly non-linear phenomenon.

We only need to nudge a small percentage of people to change their driving routines in order to achieve a significant mitigation in traffic.
Travel Demand Management (TDM)

- **NEW INFRASTRUCTURE**: Where affordable, to meet desired outcomes
- **BEST USE OF EXISTING NETWORK**: Through optimised levels of service on roads and public transport services
- **DEMAND MANAGEMENT**: Address demand through supply-side measures: active modes, public transport and school or workplace travel plans
- **INTEGRATED PLANNING**: Align development with existing transport infrastructure and services, and plan for urban form which reduces travel demand
Behavior Research: How to Nudge Behavior, Effectively?

**Focus Groups**
- Find the most effective incentives

**Surveys and Lab Experiments**
- Market/technology adoption
- How do travelers make decisions
- How will they adjust decisions with personalized information, monetary & non-monetary incentives

**Naturalistic Driving Tests**
- Focus on driving styles

**Real-World Tests**
- In collaboration with partners
Behavior Research: How to Nudge Behavior, Effectively?

A structured incentive system is found 2~4 times more effective than plain cash (quantified via focus groups and lab experiments).
Monetary incentives are not always needed.

Findings from a survey with 1,250 DC-Maryland-Virginia residents:
- In some scenarios, subjects did not need incentives for making behavioral adjustments
- Travel time/costs information can play a substitution role in the incentivization process
incenTrip Vision and Goal

**Emerging Technologies**
- Big Data
- Artificial Intelligence
- Internet of Things & Computing
- Shared, Automated & Electrified

- Personalized services
- Optimal resource allocation
- Sharing is the key for system benefits

**Goal:** Optimize and personalize traveler incentives to promote multimodal and shared mobility, off-peak travel, and smart routing/driving for reduced congestion, energy use and emissions **in the most cost-effective way.**
incenTrip Deployment Thus Far

IncenTrip Travel Demand Management Pilot Deployment
Fall, 2021

IncenTrip Official Integration into Agency Work Program and Fiscal Budget
July 1, 2019

Baltimore, MD

Washington, DC

Dynamic Incentives For Dynamic Travelers
Personalized and Dynamic Incentives
Gamification, Non-Monetary Incentives

An embedded menu allows users to add personal settings, join incentive programs, and redeem rewards. New background trip logging function allows users to earn incentives simply by carrying their phones with them. **Challenges** enable customized incentives targeting congestion relief for specific corridors, special events, accidents, holidays, and work zones.

Trip planning function allows users to explore mode, departure time, and route options. Users see trip statistics and personalized weekly goals. Users/Stakeholders may suggest challenges and partners for crowd-sourced solutions. Alerts of unusual travel conditions are sent to impacted road users before/during their trips.
Gamification, Non-Monetary Incentives

What are Levels

Levels are rankings you earn as you collect more and more eco-points. You begin every month at the Seed Saver level and have until the end of the month to gain more levels. At the beginning of the next month your level will reset back to Seed Saver.

<table>
<thead>
<tr>
<th>Badge</th>
<th>Level</th>
<th>Required Eco-points</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Seed Saver</td>
<td>0</td>
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<tr>
<td></td>
<td>Leaf Saver</td>
<td>500</td>
</tr>
<tr>
<td></td>
<td>Tree Saver</td>
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<tr>
<td></td>
<td>Forest Saver</td>
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</tr>
<tr>
<td></td>
<td>Planet Saver</td>
<td>3,000</td>
</tr>
</tbody>
</table>

Choose Travel Mode

Commuter Connections

1 available match(es)

- 20 points

Not in Any Rideshare Pool with Others

You are not in any rideshare pool or there is no other member in your rideshare pool.

Setup Rideshare Pool

- 20 points

More rideshare services will be included later.
Maryland Transportation Institute

**CONGESTION REDUCTION**
- Total hours of congestion reduced: 36,829
- Total cost of congestion reduced: $570,725

**EMISSIONS REDUCTION**
- Total tons of emission reduced: 14,528
- Total cost of emission reduced: $290,808

**FUEL USAGE**
- Total gallons of fuel saved: 320,526
- Total cost of fuel saved: $818,734

**TOTAL BENEFITS:** $1,780,267  
**TOTAL INCENTIVES:** $98,652  
**RETURN ON INVESTMENT:** 18:1

**Traveler Behavior Change**
- Original: 44%
- Change Route: 21%
- Change Departure Time: 20%
- Change to Transit and Shared Ride: 15%

**Trips taken by mode:**
- Transit: 2,082
- Drive: 1,584
- Ride Share: 1,076
- Multimodal: 154
- Bike/Walk: 141

**Incentive Distribution by Home Location**
- under 50,000: 18%
- 50,000-74,999: 22%
- 75,000-99,999: 23%
- 100,000-199,999: 37%
- 200,000-299,999: 30%
- 300,000+: 27%

**Incentive Distribution by Household Income**
- under 21: 12%
- 22-29: 12%
- 30-39: 16%
- 40-49: 12%
- 50-59: 27%
- 60 and above: 30%

**Incentive Distribution by Age**
- Total Users: 2,126  
- Total Trips: 512,175
Follow these easy steps to start earning rewards!

1. Download incenTrip from Google Play or Apple App Store
   ![Download on the App Store](image)
   ![Get it on Google Play](image)

2. Create your account
3. Plan your trip
4. Take your trip - incenTrip logs your travel to calculate points
5. Collect Points and Redeem for rewards right through the app!

Learn more at [mdot.Maryland.gov/incenTrip](https://mdot.Maryland.gov/incenTrip)
incenTrip Progress Snapshot

- 476 Downloads (Apple & Google Play)
- 1,503 Total persons miles travelled
- 26% (400) of total persons miles travelled was Walking/Biking Miles Traveled
- Reached thousands of Marylanders with Promotions on Social Media

Earn points by regularly or occasionally commuting with the following modes:

- **Walking**
  - Save $1.40 and burn 56 calories for each mile you walk.

- **Biking**
  - Save $1.40 and burn 31 calories for each mile you bike.

- **Transit**
  - Save $1.10 and reduce 40 grams of carbon emissions for each mile of transit you take.

- **Ridesharing/Carpooling**
  - Save around $1 and reduce 205 grams of carbon emissions for each mile you rideshare.

- **Multimodal**
  - Save around $1 and reduce 205 grams of carbon emissions for each multimodal mile you take.


Earn Cash Rewards!
Questions?

Please type your questions in the question window
Thank You!

Contact Details:
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