Transportation Demand Management: A Contemporary Approach

COMPASS Workshop
December 8, 2021
Eric Schreffler, Transportation Consultant
Father Guido Sarducci’s 5-Minute University

Final Exam:

1. Como está usted?  Muy bien

2. Where is God?  God is everywhere

3. Economics:  Supply and Demand
V/C Ratio

**VOLUME**

**CAPACITY**

Shift from predict and provide (volume constant) to managing demand (capacity constant)
Poll: So, How Can We Manage Demand
## Agenda

<table>
<thead>
<tr>
<th>Time</th>
<th>Session</th>
</tr>
</thead>
<tbody>
<tr>
<td>9:30 - 9:35 am</td>
<td>WELCOME</td>
</tr>
<tr>
<td>9:35 - 10:00 am</td>
<td>INTRODUCTION AND CONCEPTUAL FRAMEWORK</td>
</tr>
<tr>
<td>10:00 - 10:20 am</td>
<td>TDM AND TRAFFIC MANAGEMENT</td>
</tr>
<tr>
<td>10:20 - 10:30 am</td>
<td>DISCUSSION: TDM as an Operational Strategy</td>
</tr>
<tr>
<td>10:30 - 10:50 am</td>
<td>CASE STUDY: PORTLAND, OR - Caleb Winters, Oregon Metro</td>
</tr>
<tr>
<td>10:50 - 11:10 am</td>
<td>THE USE OF INFORMATION TECHNOLOGY AND INCENTIVES</td>
</tr>
<tr>
<td>11:10 - 11:20 am</td>
<td>DISCUSSION: Application to Treasure Valley</td>
</tr>
<tr>
<td>11:20 - 11:30 am</td>
<td>COMMUNICATING THE BENEFITS OF TDM</td>
</tr>
</tbody>
</table>
DEFINITIONS

TRANSPORTATION DEMAND MANAGEMENT

TRAVEL DEMAND MANAGEMENT

A COMPONENT OF TRANSPORTATION SYSTEMS MANAGEMENT AND OPERATIONS (TSMO)

A COMPONENT OF ACTIVE (DEMAND) MANAGEMENT (ADM)
FHWA DEFINITIONS

1993 - Travel Demand Management

TDM maximizes the people-moving capability of the transportation system by increasing the number of persons in a vehicle or by influencing the time of, or need to, travel.

*FHWA Report DOT-T-94-02*

2019 - Active Demand Management

1. A suite of solutions intended to **reduce** or **redistribute** travel demand to alternate modes or routes that **incentivizes** drivers by providing rewards for traveling during off-peak hours with less traffic congestion.
2. **Dynamically** manages demand, which could include redistributing travel to less congested times or routes or by influencing mode choice.

*FHWA Report FHWA-HOP-19-10*
It all comes down to enhanced choices…

TDM is a set of strategies aimed at maximizing traveler choices
Beyond Commuter Ridesharing

- Used for all trip types
- Used before and during trips
- An influencer on system reliability and performance
- Integrated into system management and operations
- Used to manage demand shifts (planned and unplanned)
CHOICES ARE THE KEY

- Pre route and En-route trip choices:
  - Mode and Destination
  - Route and Time
  - Lane

- Choices enabled by:
  - Information exchange
  - Operational collaboration
  - Roadside and in-vehicle technology
    - ITS, Connected Vehicles
  - Financial mechanisms
  - Smartphones
  - Shared Mobility
## Integrating TDM into the Transportation Planning Process

<table>
<thead>
<tr>
<th></th>
<th>State Level Planning</th>
<th>Metropolitan/ Regional Planning</th>
<th>Corridor Planning</th>
<th>Local/Municipal Planning</th>
</tr>
</thead>
<tbody>
<tr>
<td>Regional Mobility/ Accessibility</td>
<td>Good</td>
<td>Excellent</td>
<td>Good</td>
<td>Fair</td>
</tr>
<tr>
<td>Congestion Reduction/ System Reliability</td>
<td>Fair</td>
<td>Excellent</td>
<td>Excellent</td>
<td>Good</td>
</tr>
<tr>
<td>Air Quality/ Environment *</td>
<td>Good</td>
<td>Excellent</td>
<td>Fair</td>
<td>Good</td>
</tr>
<tr>
<td>Economic Development*</td>
<td>Fair</td>
<td>Good</td>
<td>Fair</td>
<td>Good</td>
</tr>
<tr>
<td>Land Use/ Transportation</td>
<td>Good</td>
<td>Excellent</td>
<td>Good</td>
<td>Excellent</td>
</tr>
<tr>
<td>Goods Movement/ Freight</td>
<td>Fair</td>
<td>Good</td>
<td>Good</td>
<td>Good</td>
</tr>
<tr>
<td>Livability*</td>
<td>Fair</td>
<td>Good</td>
<td>Fair</td>
<td>Excellent</td>
</tr>
</tbody>
</table>

*FHWA Report FHWA-HOP-12-035*
ROLE OF TDM IN REGIONAL GOALS

<table>
<thead>
<tr>
<th>CIM 2050 GOALS</th>
<th>CAN TDM ADDRESS?</th>
</tr>
</thead>
<tbody>
<tr>
<td>ECONOMIC VITALITY</td>
<td>☺☺☺</td>
</tr>
<tr>
<td>SAFETY</td>
<td>☺</td>
</tr>
<tr>
<td>CONVENIENCE</td>
<td>☺☺</td>
</tr>
<tr>
<td>QUALITY OF LIFE</td>
<td>☺☺☺</td>
</tr>
</tbody>
</table>
A Diverse Array of Strategies
STRATEGIES TO MANAGE DEMAND

Beyond traditional commuter ridesharing
Integrating TDM and Traffic Management
Using technology and incentives
Great examples from Portland
Communicating the Benefits
FHWA Demand Management Resources
Transportation Demand Management:
A Contemporary Approach

INTEGRATING TRAFFIC MANAGEMENT
AND DEMAND MANAGEMENT
Traditional TDM

- Born of gas crises of 1970s
- Focused on mode shift
- Work with employer and commuters
- Ridesharing (carpooling and vanpooling) key strategy
- Aimed at reducing VMT to address air quality goals
- Congestion mitigation a longer-term objective
## TDM vs. Traffic Management

Traffic Managers and TDM Professionals often speak a different language

<table>
<thead>
<tr>
<th>Traffic Management</th>
<th>TDM</th>
</tr>
</thead>
<tbody>
<tr>
<td>Engineering</td>
<td>Planning/CMAQ</td>
</tr>
<tr>
<td>Incident Management</td>
<td>Choices</td>
</tr>
<tr>
<td>Reliability</td>
<td>Sustainability</td>
</tr>
<tr>
<td>Corridors</td>
<td>Gamification</td>
</tr>
<tr>
<td>Connected Vehicles</td>
<td>Shared-Use</td>
</tr>
<tr>
<td></td>
<td>Active Transportation</td>
</tr>
</tbody>
</table>

How can they better relate to each other?
Integrating TDM and Traffic Management

Travel today...
- Transportation is multi-modal
- All trips are considered
- Travelers expect a seamless trip

By working together, TDM professionals and traffic managers...
- Create more traveler choices
- More effectively manage travel
Leveraging Each Other’s Capabilities

Traffic Management

• Real-time conditions
  ▶ Data
  ▶ Cameras
• Traffic Control and Restrictions
• Traveler Information

TDM

• Direct connections to travelers
• Marketing and awareness
• Innovations in understanding travel behavior
• New models of partnership
Collaboration Opportunities

- **Day to Day Operations**
  - Better incident management
  - Customized traveler information
  - Integrated corridor management

- **Emergency Management**
  - Evacuation/Emergencies
  - Continuity of Service

- **Active Demand Management**
Trip Chain Model
Mode and Destination Choice

**MODE CHOICE**
- In-route mode shift
- New forms of transit (BRT)
- Use of ridehailing services
- Bike/scooter/walking

**DESTINATION CHOICE**
- Pandemic has shown bright light on work/commute habits
- 20-25% of workforce could do remote work
- Virtual meeting are “normal”
In-route mode shift

- Real time message signs to divert car users onto transit (US101)
Route and Time Choice

Route Choice

- Real-time, comparative travel times
- Proactive traffic alerts

Time Choice

- Staggered/Flex hours
- Rush hour avoidance
- Parking pricing
**Incident Management**

**New Jersey Transit Train Crash**

NJ Transit service is suspended in and out of Hoboken due to a train accident at Hoboken Station. Travel information will be updated throughout the day, with the most recent information loaded in red.

**New York Times**

NEVER- Hoboken // NJ Transit crash – 43 of your commute or trip has been impacted by this incident, visit our page for alternate travel information: https://nytimes.com/.../nj-transit-train-crash

**Event-specific P&R lot Map**

Due to the recent NJ Transit train crash at the Hoboken station, NJ Transit is suspending service in and out of Hoboken Station. We have compiled the most up-to-date travel information to help you get to and from work, including real-time updates on the situation. For more information, please visit our website: [Alternate Commute Information for Hoboken / NJ Transit Train Crash](https://alternate-commute-information.com/).
SF PARK: Managing Parking Demand via Pricing (San Francisco, CA)
- Pilot program as part of a USDOT UPA to “achieve a minimum level of availability so that it was easy to find a parking space most of the time on every block and that garages always have some open spaces available.”
- Demand responsive pricing, not fully dynamic in real-time

| Project Evaluation Findings | Parking availability improved - target parking occupancy (60-80%) was achieved 30% more often<br>Parking was easier to find - parking search time decreased by 43%.<br>Double parking reduced by 22%.<br>Drivers generated 30% less GHG emissions.<br>As a result of reduced parking search activity, VMT reduced by 30%.<br>Bus speeds improved by 2.3% in areas that reduced double parking. |
Lane Choice

- HOV/HOT lanes
- Bus signal priority
- Bus only lanes
- Use of hard shoulder
- Bus on shoulder
Day-to-Day Operations
Bus on Shoulder Example - I-55 in Chicago, IL

Bus on Shoulder - I-55

- Expressway travel times were highly unreliable due to recurring congestion
  - Commuter Bus travel times varied by over 15 minutes in instances
- Partnership between Pace (public transit and vanpool provider) and Illinois DOT and planned by the Regional Transportation Authority
- Buses can travel on inside shoulder when travel speeds in main lanes dropped below 35 mph
- Cost < $1M
  - Cheaper and more cost effective to constructing a new bus-only lane or rail line
What is needed to realize integration?

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Trustworthy travel information</td>
<td></td>
</tr>
<tr>
<td>New partnerships</td>
<td></td>
</tr>
<tr>
<td>Planning for Operations (TSMO)</td>
<td></td>
</tr>
<tr>
<td>Better communication</td>
<td></td>
</tr>
</tbody>
</table>
Can TDM help manage traffic in the Treasure Valley?
Transportation Demand Management: A Contemporary Approach

USING INFORMATION TECHNOLOGY FOR INCENTIVES
Behavioral Economics

- Blending insights from psychology and economics to reveal how hidden forces shape decision making
- Incentivizing travelers to overcome perceived barriers
- Incentives have been shown to be very cost effective
- Technology is enabling the wider use of incentives
What are different strategies to promote travel choices?

- Tailored Messaging
- The Right Incentives
- Specific Information
### What are the messaging strategies?

<table>
<thead>
<tr>
<th>Try it again</th>
<th>Make it a Habit</th>
<th>Use it Well (&amp; Often)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nudge people at opportune moments</td>
<td>Leverage default choices</td>
<td>Make the ride social</td>
</tr>
<tr>
<td>Reframe and promote the opportunity</td>
<td>Evoke personal values and identity in messaging</td>
<td>Encourage user to rethink and own the commute</td>
</tr>
<tr>
<td>Re-frame “try before you buy” incentive messaging</td>
<td>Increase salience of messaging</td>
<td></td>
</tr>
<tr>
<td>Target messaging at the negative perceptions of public transportation</td>
<td>Help people commit to a plan</td>
<td></td>
</tr>
<tr>
<td>Simplify the payment process instructions</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Source: [https://hackernoon.com/is-your-social-impact-organizations-marketing-strategy-failing-you-ef986ac5eb1](https://hackernoon.com/is-your-social-impact-organizations-marketing-strategy-failing-you-ef986ac5eb1)
What are the incentives strategies?

Gamification
- Leaderboards
- Points & Prizes

Raffle opportunities

“Try before you buy”

“Use it or lose it”

Rewards

Subsidies

Source: https://healthprize.com/platform/how-behavioral-economics-can-improve-patient-adherence/
Incentives

- Financial incentive for each non-SOV trip (often gift card)
- Mode shift incentives (e.g., 90-day trial)
- Financial incentive for time and destination choices
- Gamification (e.g., F5T4)
- Toll incentives (e.g., LA Metro)
What are the information strategies?

- Cover all modes
- Highlight non-motorized and electric options
- Real-time information
- Multi-modal comparison information
- Payment instructions
- Commuteride, CityGo and BSU all have info on choices
Enabling Technology

Cell phone (GPS enabled)
Cell phone
Cell phone
Apps are coming from entrepreneurs
Waze, Uber, Lyft have carpool programs
Proximity tracking; mode determination by speed
**Incentives**

**Rush Hour Avoidance - The Hague**
- $4 per day to not travel on freeway from 7:30-9:30 am
- Over half avoided this period
- Dutch have expanded to many facilities

**Atlanta CAC Cash for Commuters**
- $3 per day up to 90 days
- 1,800 commuters
- 1,300 fewer car trips
- 30,000 fewer car miles
- 70% continued after 90 days
- 50% continued after a year

Source: FHWA-PL-11-011

Source: FHWA-HOP-12-035
Example program

- **Access Program for MIT in Cambridge, MA**
  - 5-pronged approach to reduce parking demand on campus

- **Preliminary findings:**
  Parking demand reduced by 15%

- Free unlimited transit access via employee ID cards
- Shift from annual parking contracts to daily parking pricing
- Increased commuter rail subsidy from 50% to 60%
- Subsidized parking at transit stations
- Online commute dashboard to compare travel modes and record trips for rewards
Parking Incentives

CAPRI (Congestion and Parking Relief Incentive) at Stanford University (April 2012 - September 2014)

- Commuter behavior monitored using RFID sensors for automobiles and a smartphone app for walkers and bikers
- Earn points for “good trips” (off-peak) & redeem points for monetary and in-kind rewards - used gamification
- Nudged commuters through personalized offers, social influence, and status
- Study found some users shifted from driving to walking or biking
Portland Transportation Wallet

2021 TRANSPORTATION WALLET
Adult & Honored Citizen transit fare
Pay only $99 and get:
- TriMet Hop Card
  - $200 Central Eastside
  - $100 Northwest
- Annual Portland Streetcar Pass
- $99 BIKETOWN credit
- $30 scooter credit
- $30 Free2Move car-share credit

GOLDEN TRANSPORTATION WALLET
Low Income transit fare
FREE

The Golden Transportation Wallet comes with this package.
Includes additional discounts with these companies!

Eligibility based on TriMet's Fare Assistance Program
(less than double the federal poverty level)

for people in the Northwest & Central Eastside Parking Districts
What Information and Incentives might work here?
Transportation Demand Management:
A Contemporary Approach

COMMUNICATING THE BENEFITS
First a word about planning

- Regional transportation plans include sustainability and TDM in goals
- “Stove-piping” limits integration into operations
- TDM is about thinking about travel and choices: people not cars
- TSMO, CMP and RTP all need to sync

FHWA Report FHWA HOP-12-035
Communicating the Benefits

- TDM “checks” a lot of boxes
- TDM is low cost as compared to supply solutions
- TDM is cost effective
- People want choices
- Shared economy is widely accepted
- Private sector is involved
- Benefit-Cost Ratios can be calculated (TRIMMS)
Worksites offering financial incentives realized a Vehicle Trip Reduction of 2-12% percentage points higher than without (overall 21% VTR vs. 15%) (source: TCRP 2010)

TDM is cost effective: study of emission reduction programs showed ridesharing, vanpool, TDM and employer programs be among lowest cost per pound emissions reduced (source: FHWA-HOP-12-035)

TDM can help with travel flow: increasing Person Throughput, reducing VMT, reducing delay; smoothing peak shoulders
Benefits of TDM

Transportation System Benefits
• Reduced congestion and resulting time savings
• Multiple options for getting around

Social Benefits
• Reduced dependence on fossil fuels
• Enhanced quality of life in walkable, bikeable communities with many transportation options
• Reduced community fragmentation caused by wide, high-speed roads

Environmental Benefits
• Improved air quality
• Reduced greenhouse gas emissions
• Improved water quality
  • reduced polluting emissions and fluid leaks
  • reduced need for paved surfaces

Health and Safety Benefits
• Fitness benefits of active transportation (biking and walking)
• Health benefits of improved air quality
• Stress reduction

Financial Benefits
• Reduced costs of car ownership and maintenance
• Reduced cost of parking

Source: commuterpage.com
Benefits to Business

- Enhance worker home life (via choices)
- Enhanced recruitment and retention
- Reduced employee stress
- Reduced parking demand and costs
- Schedule reliability
- Serve environmental and sustainability goals (e.g., LEED)
CONTACT INFO

Eric N. Schreffler
Transportation Consultant
858-354-3839
estc@san.rr.com

FHWA Resources
www.ops.fhwa.dot.gov/publications/publications.htm
Transportation System and Demand Management Integration

COMPASS
December 8, 2021

Caleb Winter
Senior Transportation Planner
Why and how do we choose TDM?

Why?
- Land use and transportation
- Air quality
- Congestion, quality of life, multimodal investments

How?
- Implement regional policy adopted in the Regional Transportation Plan (RTP)
- Involve stakeholders in strategy
- Fund program pieces
- Evaluation
2018 RTP Community Policies

- Vibrant Communities
- Shared Prosperity
- Transportation Choices
- Reliability and Efficiency
- Safety and Security
- Healthy Environment
- Healthy People

- Climate Protection
- Equitable Transportation
- Fiscal Stewardship
- Transparency and Accountability
The strategy planning process

- Vision
- Goal
- Objective
- Target
- Performance Measure
- Action
Stakeholders

Regional
State DOT, DEQ, MPO, transit

Local
cities, counties, community based organizations, transportation management associations, parks & recreation, chambers of commerce, K-12 schools, higher ed schools

Global
Academic researchers and consultants
Program funding

Grant Making
• Inspiring applicants
• Developing criteria
• Scoring
• Negotiation

Grant Management
• Grant Agreements (contracting)
• Technical support and partnership
• Invoice review
• Evaluation
Inspiring grant applications

TDM Inventory

- Employer & University Outreach
- Shared Mobility
- Planning & Infrastructure
- Community Programs
- Safe Routes to School
TDM activities

- Get There Oregon – ODOT provides statewide carpool matching, trip-tracking service, annual challenge with achievements and incentives (RideAmigos)
- Vanpool – C-Tran, Enterprise
- Cities/Counties/Parks – individualized marketing, open streets, wayfinding, trail counters, visitor TDM
- Community-based organizations – wayfinding, bike maintenance, skills
- TMAs/non-profits – e-bike commuter pilot, protected bike lane pilot
- Transit/College/University – Employee Commute Options (ECO), marketing of a shuttle service and real-time arrivals, staffing bike rentals
- K-12 schools – walking school bus, safety education, maps (not capital)
Evaluations get results

Target Mode Share
(Regional Average)

- Drive Alone: 40%
- Telecommute: 2.8%
- Bike/Walk: 6.6%
- Carpool: 6.9%
- Transit: 13.3%

- 3,943,484 auto trips reduced or prevented
- 10,102,026 new walking and biking trips
- 17,882 metric tons of CO2 reduced or prevented
- 36,847,660 vehicle miles reduced or prevented
- $134,793,893 dollars saved
2010 TSMO Integration of TDM

- Multimodal Traffic Management
  - Traveler Information

- Traffic Incident Management

- Transportation Demand Management
Residential outreach boosts transit ridership beyond the control group

Interstate MAX Individualized Marketing (IM) 2004
Relative increases in transit trips

- No IM: 24%
- With IM: 44%
What would it take to restore reliability with TDM?
Combining modes to complete one trip
Thank you!

Caleb Winter

Email: Caleb.Winter@oregonmetro.gov

[Links]
https://www.oregonmetro.gov/tsmo