GREATER PHILADELPHIA

FUTURES GROUP

*ENGAGE, COLLABORATE, ENVISION*

# TNC Infrastructure Implications

09.14.16

CONNECTIONS 2045

DELAWARE VALLEY dvrpc REGIONAL PLANNING COMMISSION

# The Futures Group

A multidisciplinary group of stakeholders in Greater Philadelphia focused on understanding:

- How long-term change is occurring in the region.
- What its likely implications are.
- Make recommendations to more strategically position ourselves.

# Greater Philadelphia Future Forces





# Transportation Networking Companies

1. Equity issues
2. Cost: TNC vs. vehicle ownership
3. Public revenue impacts
4. Governmental role
    a) Infrastructure implications: parking, curbside, etc.
    b) Regulations
    c) Institutional needs
5. Expand Parking & Amtrak Connection at PHL?

# What-If Scenario

## TRANSPORTATION ON DEMAND

dvrpc

Smartphones, apps, and real-time information help people get around.

# Platforms and Networks

A **platform** is a the physical and/or digital infrastructure that serves as a base upon which others can build, play, and/or iterate new applications, processes or technologies.

A **network** is a group of interconnected people and things.

*- Source: Oxford Dictionary*

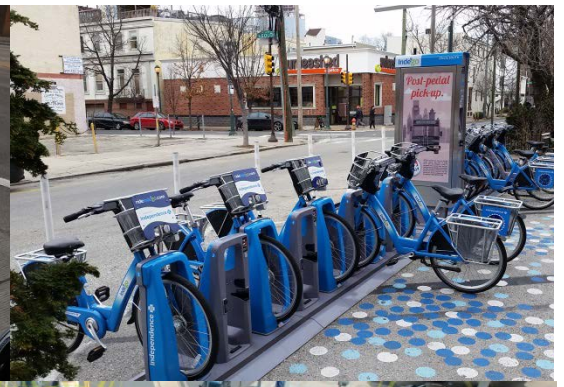
# Urban Areas are Physical Platforms

# “Digitization” of the Physical World

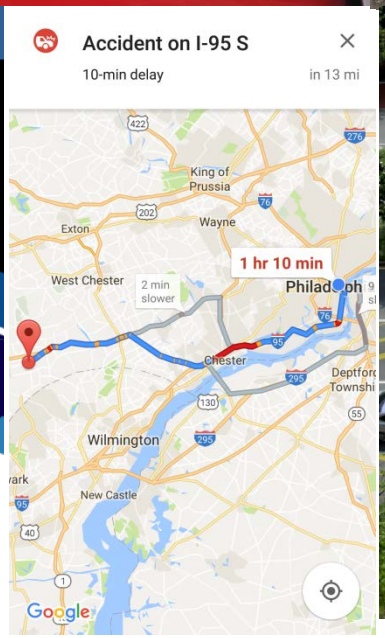

Empowering
+ Smart Cities
+ Platform Cities
+ Digital Cities
+ Connected Cities
+ Intelligent Cities
+ Shared Mobility

# “Digitization” of Transportation





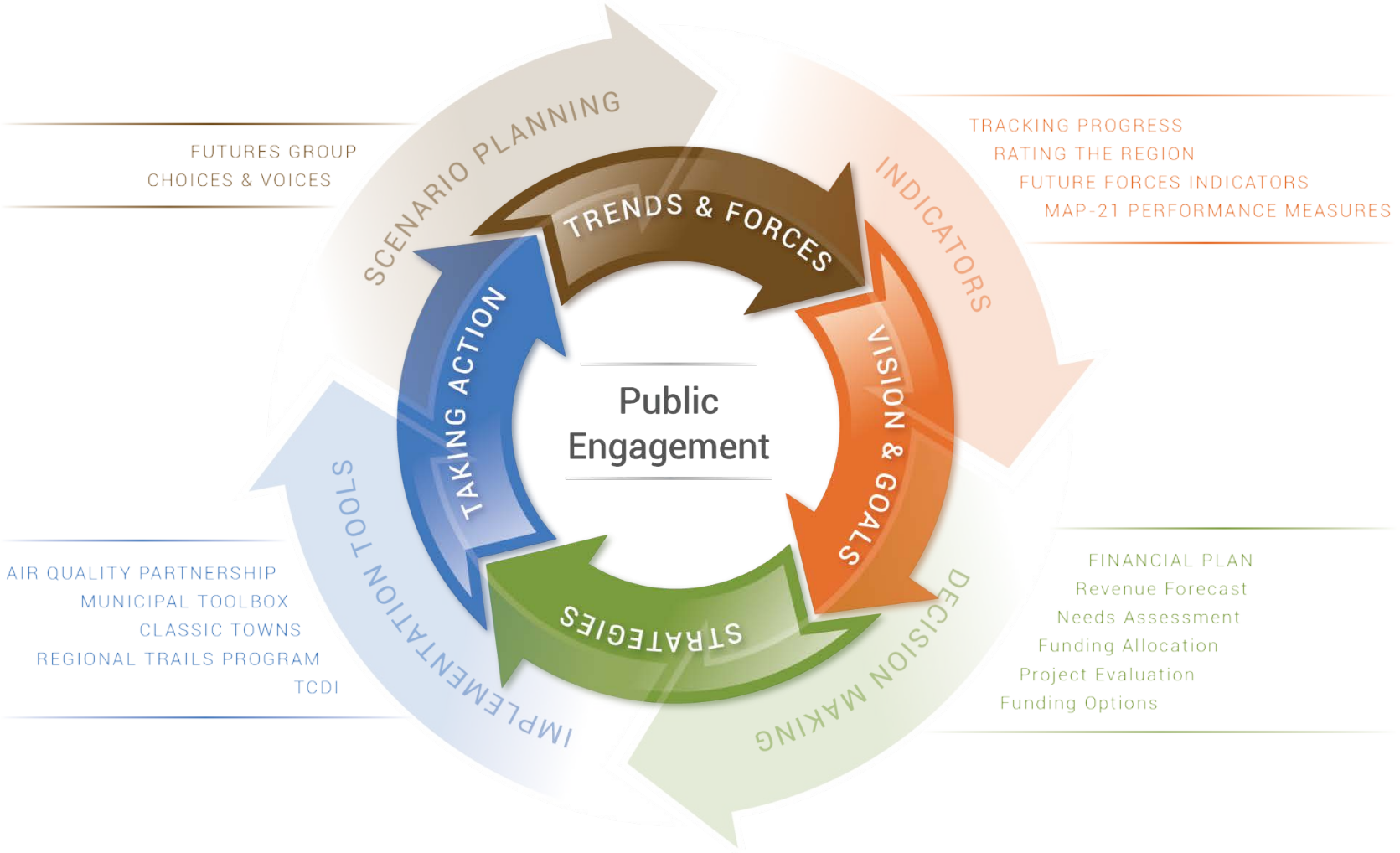







dvrpc

# DVRPC Long-Range Planning



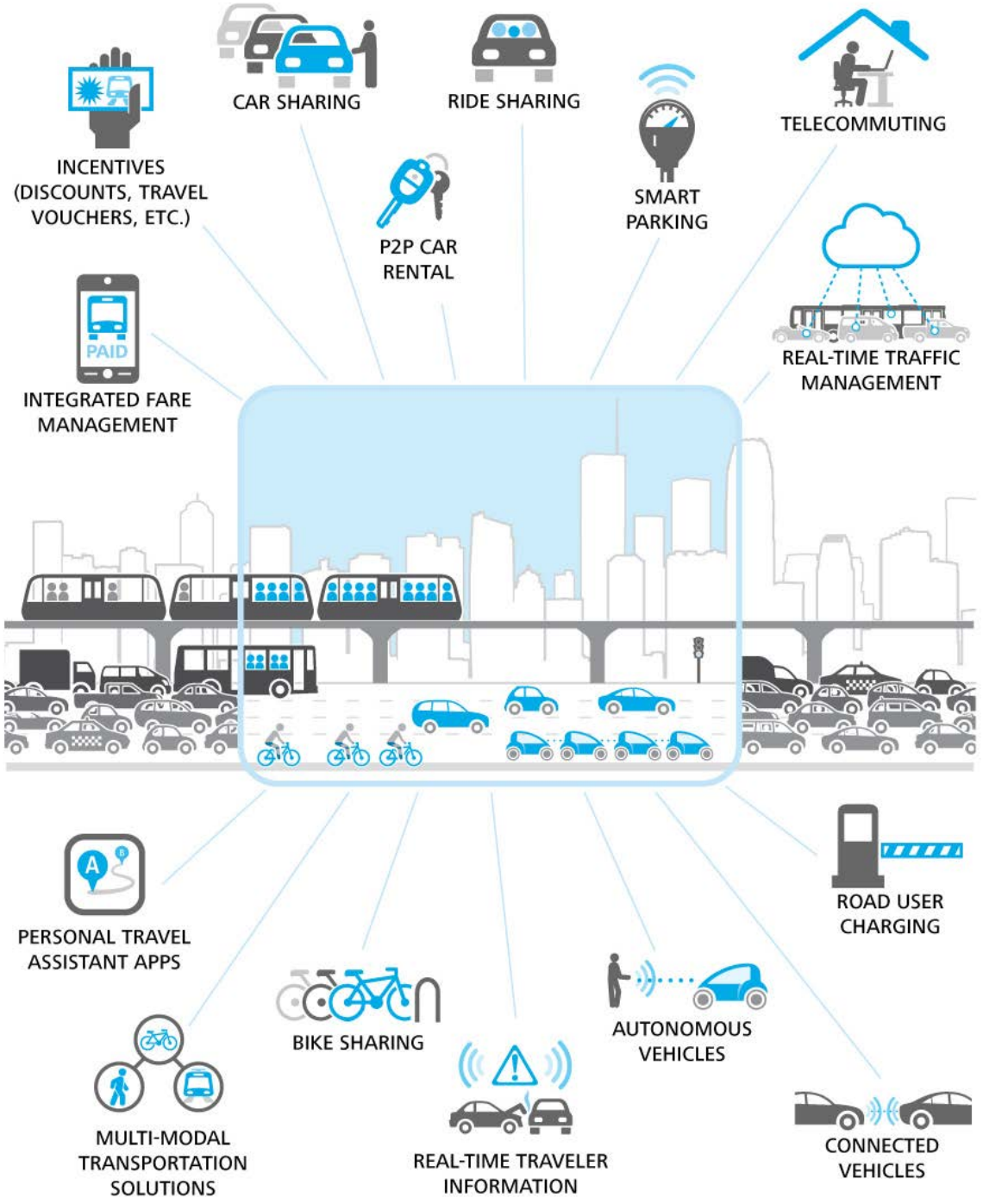
# Crafting a Vision


***Most Common Theme:***

***Build an Integrated, Multimodal Transportation Network***

## *New Vision is Digital:*

## *Integrated, Multimodal Transportation Network*



# MOBILE APPLICATIONS IN URBAN SETTINGS: WAZE

Asta Zelenkauskaite, PhD
Drexel University

Challenging the notion of efficiency


# Asta Zelenkauskaite

## Assistant Professor, Department of Culture and Communication

College of Arts and Sciences

Expertise:

COMMUNICATIONS | CULTURE | SOCIAL MEDIA

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Zelenkauskaite received her doctorate in Mass Communication from Indiana University, Bloomington, with two minor specializations in information science and linguistics. Her research focuses on the ways in which communication occurs through computer network environments as well as mobile telephony. She is interested in the changes that social media bring to mass media landscape by studying these phenomena from a multi-method approach to analyze changing understanding of content, audiences, and media companies. Most of her work bridges disciplinary boundaries methodologically and conceptually through her collaborative work with computer scientists and information science scholars.

More information about Zelenkauskaite

*For news media inquiries, contact Emily Storz at els332@drexel.edu, 215.895.2705 (office) or 609.351.3592 (cell).*

## In the News

Jeff Gelles: Internet users want privacy, study finds

**Dr. Asta Zelenkauskite**, an assistant professor in the College of Arts and Sciences, was quoted in a *Philadelphia Inquirer* story on September 5 about Internet privacy.

## Related Articles

No matching articles

# Big Data Through Cross-Platform Interest-Based Interactivity

Asta Zelenkauskaite
Drexel University
Philadelphia, Pennsylvania, USA
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Bruno Simões
Fondazione Graphitech
Trento, Trentino, Italy
Email: bruno.simoes@graphitech.it

***Abstract*—Given the ubiquity of social media, we capitalized on interest-based relevance as a key component to enhance user experience. Interest-based relevance modeling was extracted from user interaction in a cross-platform social media Big Data repository. The goal of this study was twofold: first we addressed theoretical dilemmas of a cross-platform user experience; second, we implemented an android-based mobile application and designed a cloud architecture to account for theoretical parameters of Big Data User-centric approach and interactivity. To address cross-platform Big Data challenges, we relied on cloud computing to perform computationally intensive operations such as searching, data mining, and data processing at large scale.**

**Our use case was based on a cross-platform interest-based navigation and content filtering across multiple radio content streams. The streams consisted of tags from radio stations' programming and social media content through a discovery process. User interaction was geared to enable preferred topic filtering, flexibly shifting participation roles, notifications, and navigation**

underexposed. Single-platform SNSs, even historical ones, varied technologically and scope-wise, ranging from user demographics, geographical attributes, or mere maintenance of pre-existing relationships. Since 2003 specialized social networking sites became mainstream, focusing on specific interests such as traveling, activism, religion, photosharing, music listening, and video sharing to mention a few [2]. evolved and broadened their scope over time. For exa access to Facebook is open to everyone, even if initia was restricted to college student networks.

Some of these limitations were addressed to over limited content access, platform interoperability issues lack of relevant content segmentation across multiple forms. Attempts to facilitate interest-based content acces started to be modeled within a single platform. Son the techniques included "like" feature on Facebook; T

2012 Fourth International Conference on Intelligent Networking and Collaborative Systems




# Remediation, convergence, and big data

## Conceptual limits of cross-platform social media

Asta Zelenkauskaite

Drexel University, USA

Asta Zelenkauskaite, Drexel University, 3141 Chestnut St, PSA 322, Philadelphia, PA 19104, USA. Email: astaze@gmail.com

**Abstract**

The era of multiplatform media and big data provide new opportunities to reconsider data access by media companies. Outlined here is the discussion surrounding data access from media institutional logic and user-centric perspectives in the contexts of digitalization and big data. The discussion includes technological affordances that can be geared toward users or that merely reinforce media companies' prominence. However, limitations of information architecture lie in its structure and the inability to facilitate navigation by users across multiple content streams. Media companies concentrate access around their own cross-platform content. Despite technological feasibility, media companies continue to choose cross-platform architecture that is structurally limiting to users. Cross-platform conceptual limits are discussed within the context of the broader socioeconomic landscape of mass media digitalization and big data.

Audience autonomy | big data | convergence | data architecture | digitalization | media logic | remediation | social media | social responsibility



# Interconnectedness of Complex Systems of Internet of Things through Social Network Analysis for Disaster Management

Asta Zelenkauskaite[1], Nik Bessis[2,3], Stelios Sotiriadis[2], Eleana Asimakopoulou[2]
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[2] Distributed and Intelligent Systems Research Group, University of Derby, Derby, United Kingdom
[3] Department of Computer Science and Technology, University of Bedfordshire, Luton, United Kingdom
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***Abstract* — This visionary paper presents the Internet of Things paradigm in terms of interdependent dynamic dimensions of objects and their properties. Given that in its current state Internet of Things (IoT) has been viewed as a paradigm based on hierarchical distribution of objects, evaluation of the dynamic nature of the hierarchical structures faces challenges in its evaluation and analysis. Within this in mind, our focus is on the area of complex social networks and the dynamic social network construction within the context of IoT. This is by highlighting and addressing the tagging issues of the objects to the real-world domain such as in disaster management; these are in relation to their hierarchies and interrelation within the context of social network analysis. Specifically, we suggest to investigate and deepen the**

understood better by reacting to and with their environment in a more advanced and meaningful manner. It is also our vision that inter-connected smart objects could help the basis for an improved understanding of the environment as well as for an improved decision making in critical scenarios such as those evident in disaster management.

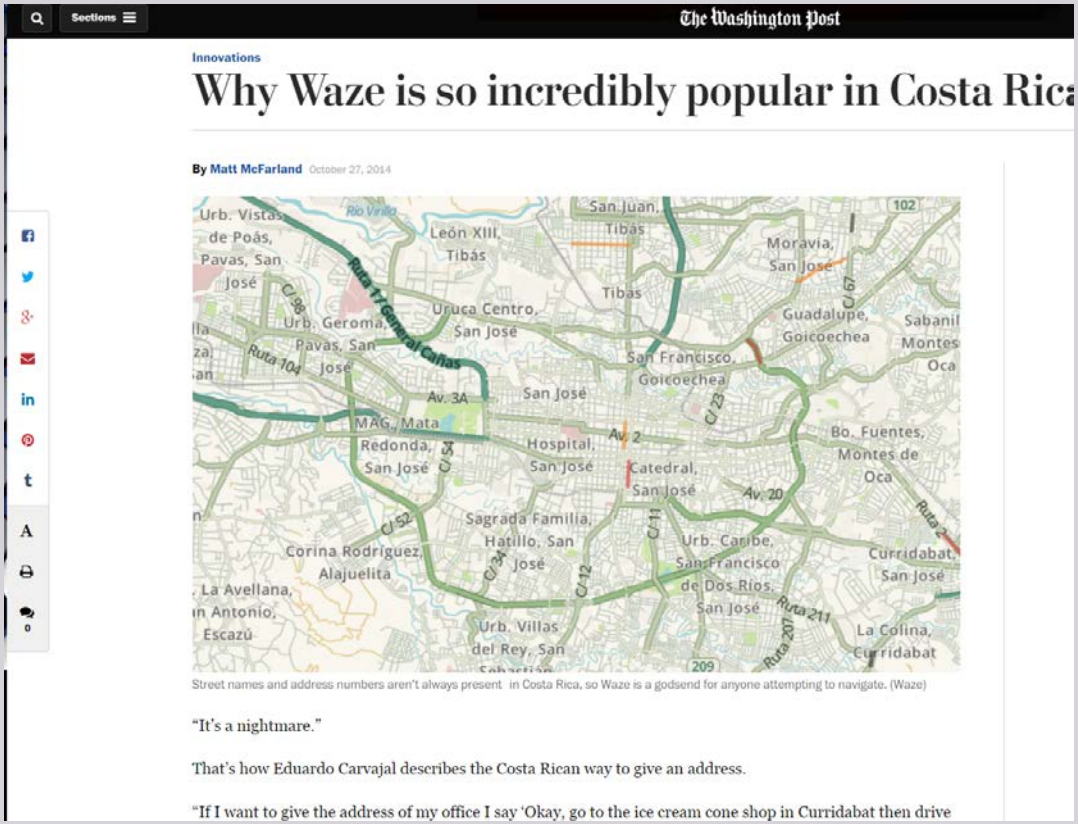
IoT has also been described as a paradigm that mainly integrates and enables several technologies and communication solutions including but not limited to tracking technologies, wired, wireless sensors, their networks, exchanged networked communication which in turn, lead to a shared next generation Internet (see more in [2]), what is also known as Future Internet. IoT has also been defined as "a world-wide network of interconnected objects

# WAZE AS A SOCIOTECHNICAL SYSTEM

**Convenience, efficiency, saving money**

**Community-driven**

# SUCCESS STORIES



Sections

The Washington Post

Innovations

## Why Waze is so incredibly popular in Costa Rica

By Matt McFarland October 27, 2014



Street names and address numbers aren't always present in Costa Rica, so Waze is a godsend for anyone attempting to navigate. (Waze)

"It's a nightmare."

That's how Eduardo Carvajal describes the Costa Rican way to give an address.

"If I want to give the address of my office I say 'Okay, go to the ice cream cone shop in Curridabat then drive

# 3 RECONFIGURED CONTEXTS

**Point 1:**

**Alternative routes shift traffic from the main roads to the neighborhood roads.**

**Point 2:**

**“When everyone is special, nobody is special” principle [If everyone is diverted, then new traffic zones get created]**

**However, what are contexts that are relevant for the futures group?**

**Point 3:**

**Emergency situations and special events**

# DISCUSSION: UNPREDICTABILITY OF THE PLANNING

a. Mobile apps reconfigure density of the traffic use of what was initially planned:

i. To what extent?

ii. Which neighborhoods and how much and why?

iii. Which other Geospatial apps are the ones that may be part of the discussion?

b. Mobile apps like Waze may influence the future of the planning:

i. 'Dialog' with planning institutions?

ii. Emergency planning together

iii. Algorithmic power and data exchange

# THANK YOU

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Asta Zelenkauskaite


BRIDJ
CONNECTING THE CITY.

# Pop-up Urban Mass Transit

- Direct, comfortable, right when you need it
- Track your vehicle's progress
- Data-driven, flexible service to meet dynamic demands of a city

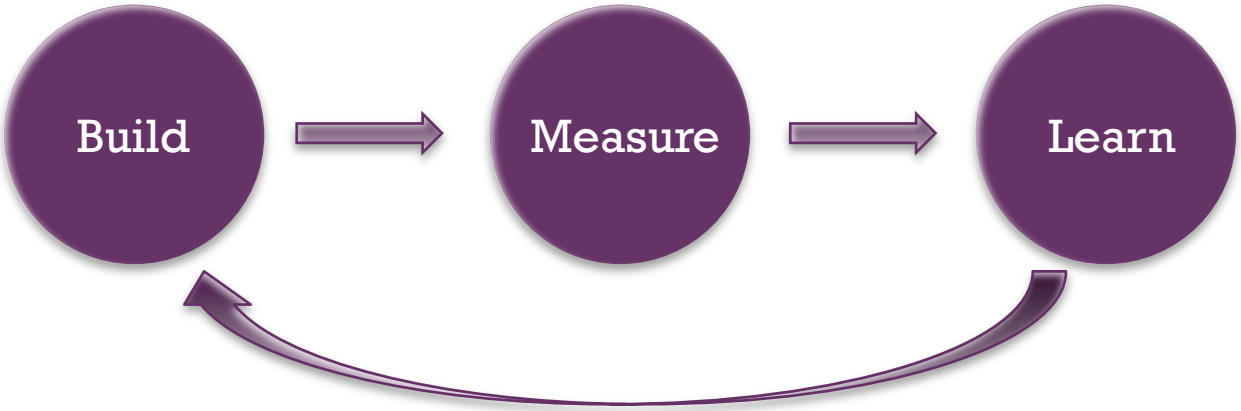


# Why?

- Massive growth of cities around the world
- Imperative that we get good at moving groups of people around in fewer vehicles
- People are becoming more discerning when they choose transportation modes due to the growing number of options
- Need to make mass transit efficient and comfortable

# Urban Logistics Learner

- Understand how to move large groups of people and things around rapidly growing cities
- Iteratively learn movement patterns and transit needs of a city
- Explore different partnership models to make platform that can work in any situation



# Infrastructure Needs

- Physical / Technical infrastructure that facilitates on-demand mobility
  - Now
    - Safe curb space for pick ups / drop offs
    - Free wifi
    - Kiosks for those without smartphones
  - Future – autonomous technology
    - Curb-car communication
    - Location for vehicles not in use
  - Lots of possibility for new forms of Public-Private Partnerships

Wi-Fi NOW: Amsterdam

Mary Rose Fissinger
maryrose@bridj.com


# BUILDING THE FUTURE

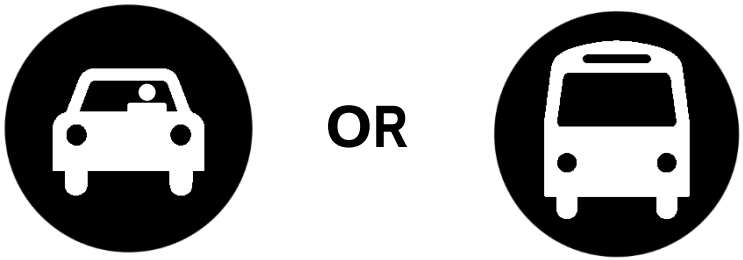
**DVRPC FUTURES FORCES**

**SEPTEMBER 14, 2016**

# FUTURE FORCES OF THE REGION


# A CHANGING TRANSPORTATION LANDSCAPE

**From Binary transportation modes (car or transit)**



Private Car OR Public Transit

**To Multi-modal (transit and rideshare and bike and car share and…)**


**Frequent ride-hailing users less likely to own or drive a car, more likely to use a range of other transit options**

Source: Survey conducted Nov. 24-Dec. 21, 2015.
"Shared, Collaborative and On Demand: The New Digital Economy"

PEW RESEARCH CENTER

# FUTURE FORCES OF THE REGION

# ENDURING URBANISM

**2ND Ddensest downtown in U.S.**

## IN CENTER CITY BETWEEN 2010 & 2015:

- New Development **Eliminated 2,426** Public Parking Spaces
- Employment in Core Center City Grew from 231,873 to 243,450 **(+5.0%)**
- Population in Core Center City Grew from 58,882 to 63,521 **(+7.9%)**
- Public Parking Occupancy Rates Actually **Declined** from 75.6% to 73.9% **(-1.7%)**
- **Not Possible Without Transit**

**COMCAST INNOVATION & TECHNOLOGY CENTER**

- REPLACED **360-SPACE PUBLIC** PARKING LOT WITH **70-SPACE PRIVATE** GARAGE
- **DIRECT-CONNECT TO SUBURBAN STATION**
- 1,121-FT SKYSCRAPER (9TH TALLEST IN U.S.)
- $1.2 BILLION COMMERCIAL INVESTMENT

# ENDURING URBANISM

**62% OF ALL CENTER CITY/ UNIVERSITY CITY WORK TRIPS**

**WITH SEPTA:**

**2ND DENSEST DOWNTOWN IN UNITED STATES**

# ENDURING URBANISM

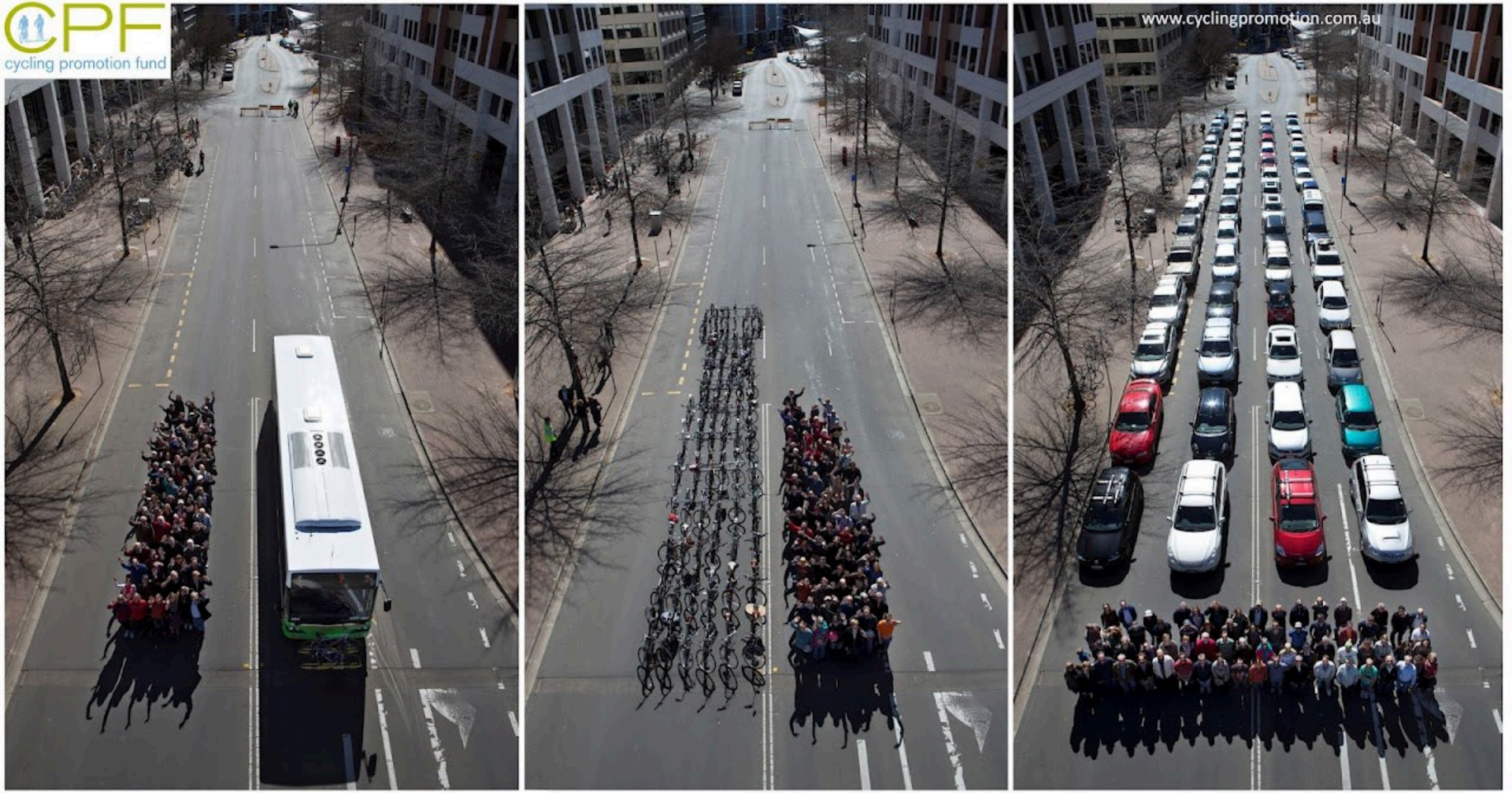
**62% OF ALL CENTER CITY/ UNIVERSITY CITY WORK TRIPS**

Innovation Integration SEPTA Renewal

## WITHOUT SEPTA, 923 ACRES OF ADDITIONAL PARKING NEEDED – 28 COMCAST CENTERS OF SQUARE FOOTAGE JUST FOR CARS

# ENDURING URBANISM

## SPACIAL EFFICIENCY OF MODES



# ENDURING URBANISM

## SPACIAL EFFICIENCY OF MODES

# FUTURE FORCES OF THE REGION




# TRANSPORTATION ON DEMAND

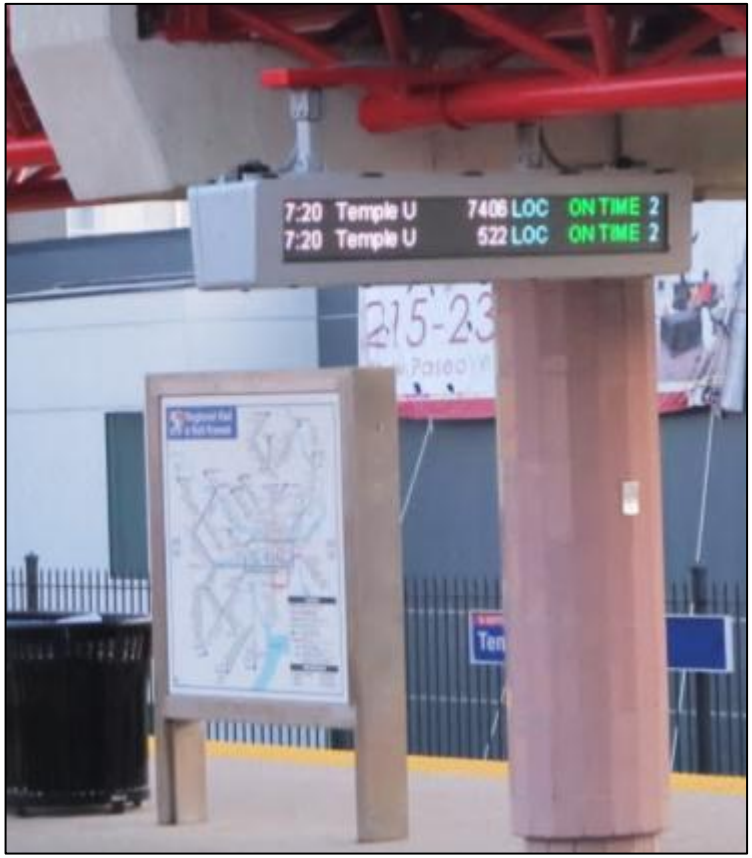
## INFORMATION-DRIVEN TRANSIT EXPERIENCE

Innovation Integration SEPTA Renewal

## SEPTA KEY
EARLY ADOPTERS – JUNE 13, 2016




## REAL TIME INFORMATION
MODEM INSTALL UNDERWAY



# TRANSPORTATION ON DEMAND

## INFORMATION-DRIVEN TRANSIT EXPERIENCE

## Pricing

- **Enhanced transit passes**
  - Integration with TNCs and other travel providers
- **Different passes for different commutes**
  - A selection of pass-types to suit different travel frequencies and habits

## Ease of Use

- **Real-time information to consumers**
  - Vehicle location and arrival time
  - Multi-modal information for trip planning
- **Payment options**
  - Integrated SEPTA Key and mobile payments
- **Integrated transportation services**
  - First and last mile
  - Mixed mode daily commutes

## Leveraging Data

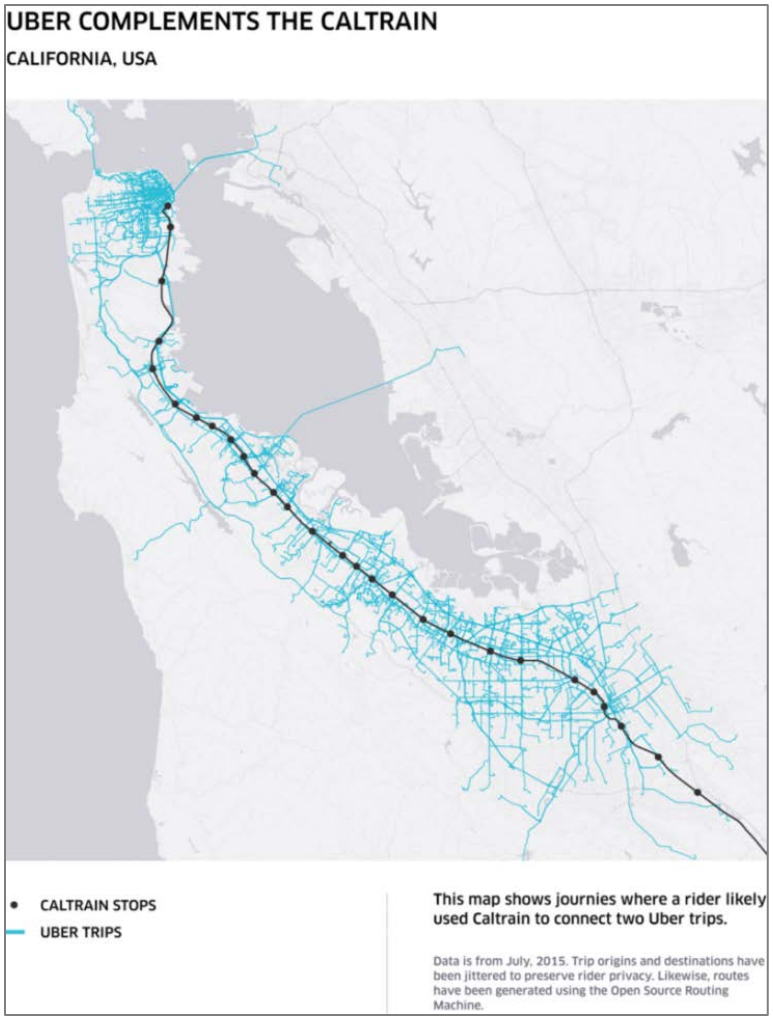
- Optimize SEPTA service through analysis of trips searched and taken
- Customized information, communication, and pricing models to consumers
- Data sharing?

# TRANSPORTATION ON DEMAND

## INTEGRATED SERVICES

### SEPTA & TNCs

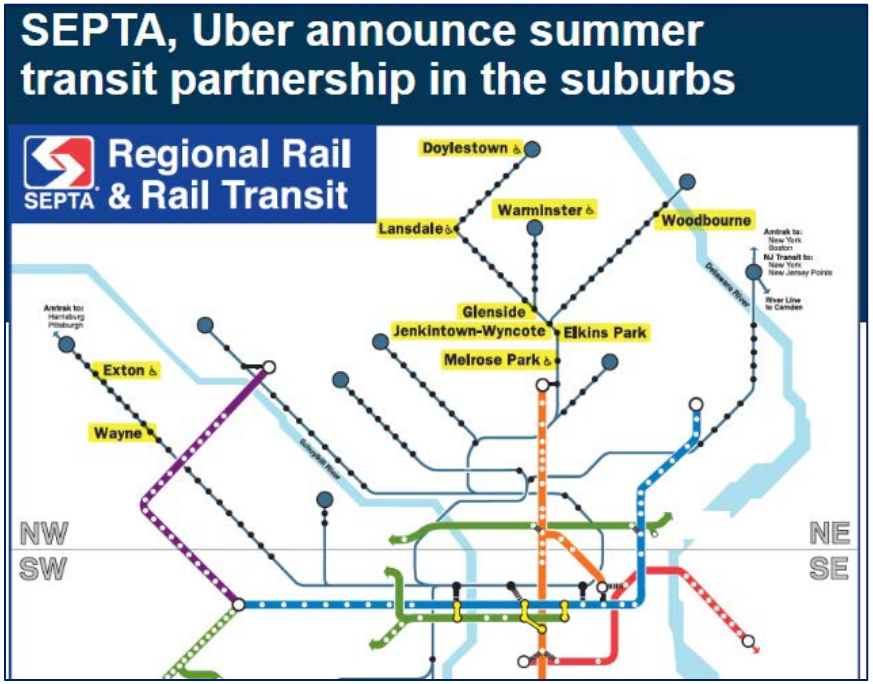
- **First mile, last mile**
  - Supplement transit
  - Improve transit's efficiency or extend reach
- **Integrated services and payments**
  - Dallas integrates Uber into its transit app
- **Mixed mode route trips**
  - Payment integration for new types of commutes
- **Loyalty program integration**
  - Rewarding customers for using transit and TNCs in tandem



# TRANSPORTATION ON DEMAND

## SEPTA/UBER PILOT PARTNERSHIP

- 40% discount for rides to and from 11 Regional Rail Stations
- Summer 2016 (Memorial Day - Labor Day)




## How did it do?

¯_(ツ)_/¯

## Framework for Pilots

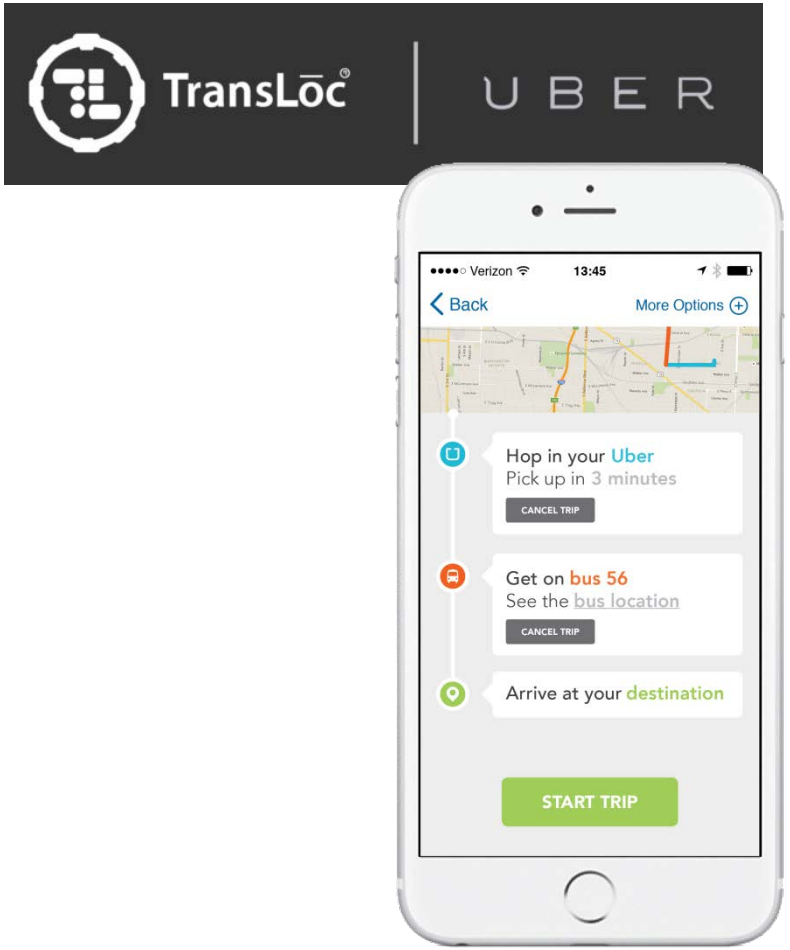
- Proof of Concept
- Scalability
- Data-sharing for tracking/evaluation

# TRANSPORTATION ON DEMAND

## INTEGRATED INFORMATION

### SEPTA & TNCs

- **Integrated real-time info**
  - Plan trips based on vehicles, not schedules
  - See transportation choices as a continuum
- **Integrated mobile payment**
  - Your device as your transportation hub
- **Data-driven transit experience**
  - Service improvements and optimization
  - Customized information and suggestions to save customers time and money
- **Data-sharing improves transit and TNCs**



# FUTURE FORCES OF THE REGION

## BUILDING AN INTEGRATED MULTIMODAL NETWORK

- **Information-driven integration**
  - Payment methods and pricing models
  - Real-time service information
  - Leveraging resulting data

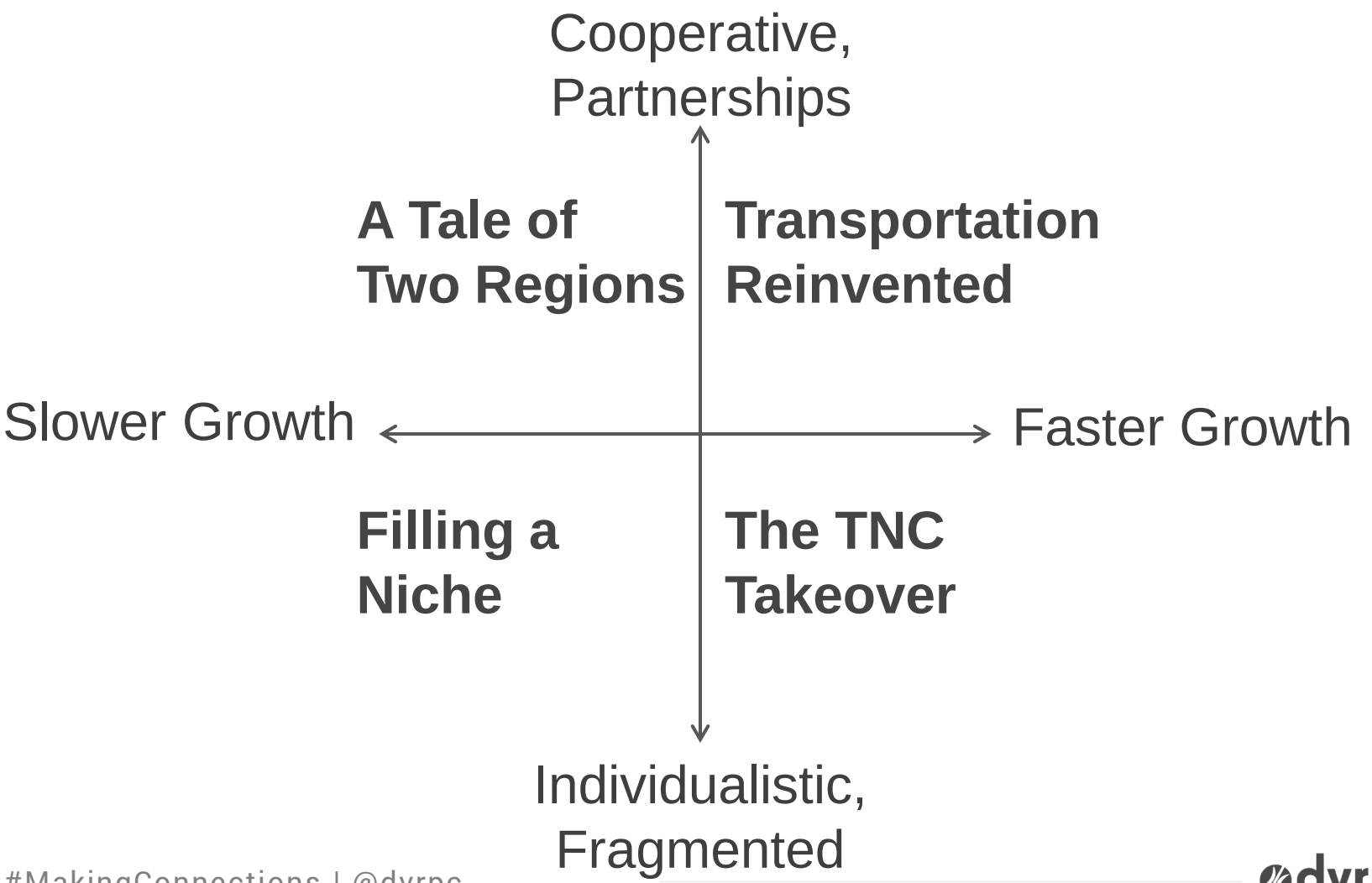

- **Data as infrastructure**
  - Multimodality will increasingly rely on
    - Information availability to customers
    - Information integration with providers
  - Privacy concerns
  - Travel data will help optimize
    - Transportation and city planning
    - Investments in physical infrastructure

# “Competing” Transportation Theories

| | Auto-Oriented | Active Transportation | Digital Transportation |
|---|---|---|---|
| Overall Goal | Increase mobility | Increase accessibility | Increase information |
| Land Use | Separation of uses | Mixed use, high density | Live / work where you want with recognition that density is more efficient |
| Trip priorities | High speed | Shorten trips, get exercise | Customization, cost, reliability, use time other than for driving |
| Safety | Safe mobility | Vision Zero | Connected technologies, warning systems, feedback loops, and data enhance safety |
| Key Metrics | Level-of-service, vehicle hours of delay, travel time index / savings | Bike/Ped level of service, trip length, total travel time, vehicle miles traveled, greenhouse gas emissions, transit trips | Real-time data, person throughput, wait time, personal ratings, Big Data and analytics |
| Investment Priorities | New and wider roads | Connections between modes; Walking, biking, and transit facilities | Multimodal Smart Roads that increase safety and efficiency |
| Rationale for Investment | Fight congestion; reduce delay | Build livable communities; sustainability; improve health | Create an integrated, multimodal network, profit (private market) |

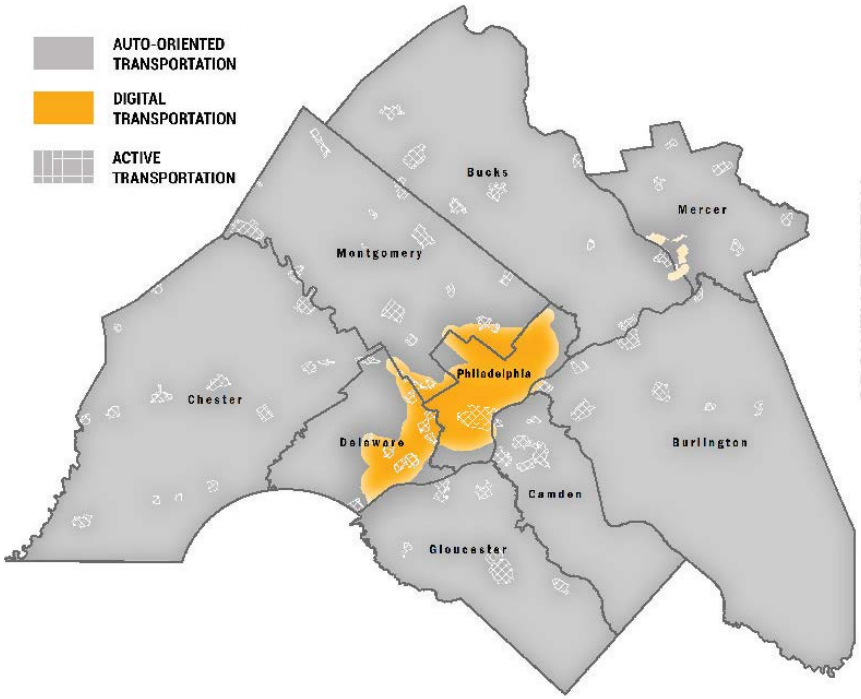
*Source: DVRPC 2016, adapted from Lockwood, Ian. “Livable Traffic Engineering.” CNU Orlando. Video published November 17, 2012. https://www.youtube.com/watch?v=o7lXblXNOPk*

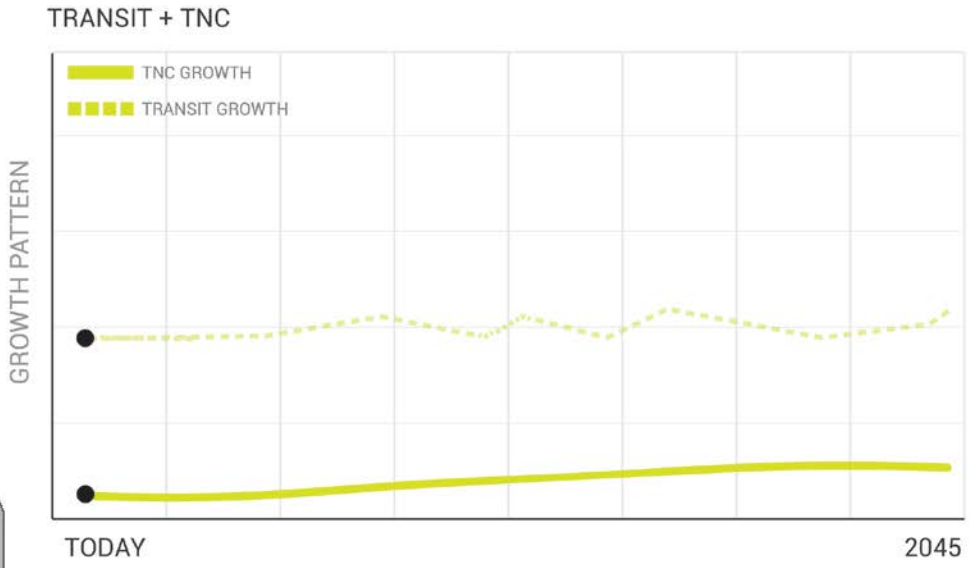
# TNC Future Scenarios



# Filling a Niche

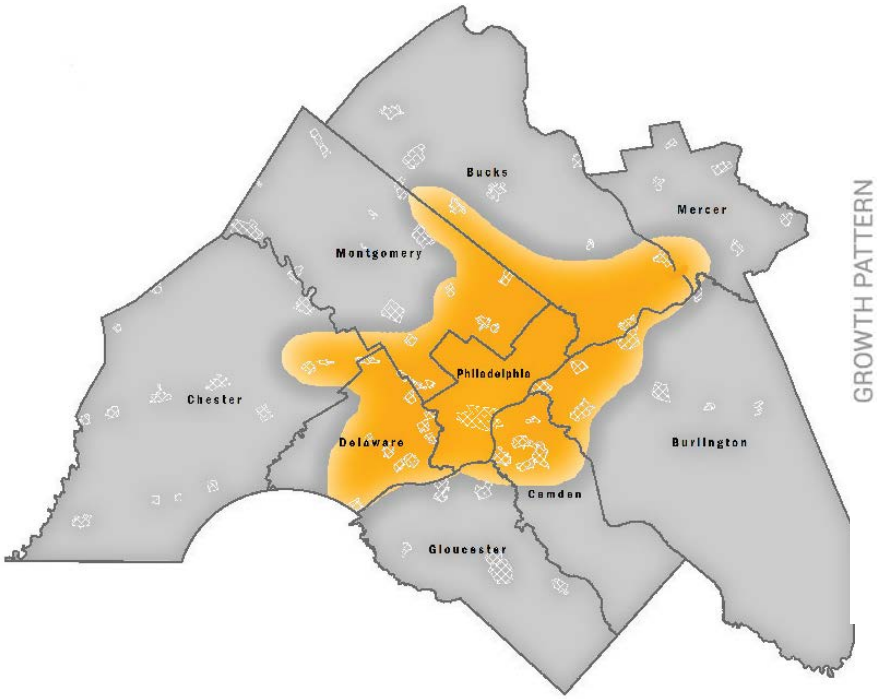
Despite bursting onto the scene, TNC operators never manage to grow beyond specialized trips. Transit service is little affected by TNCs, with no substantial change in ridership.

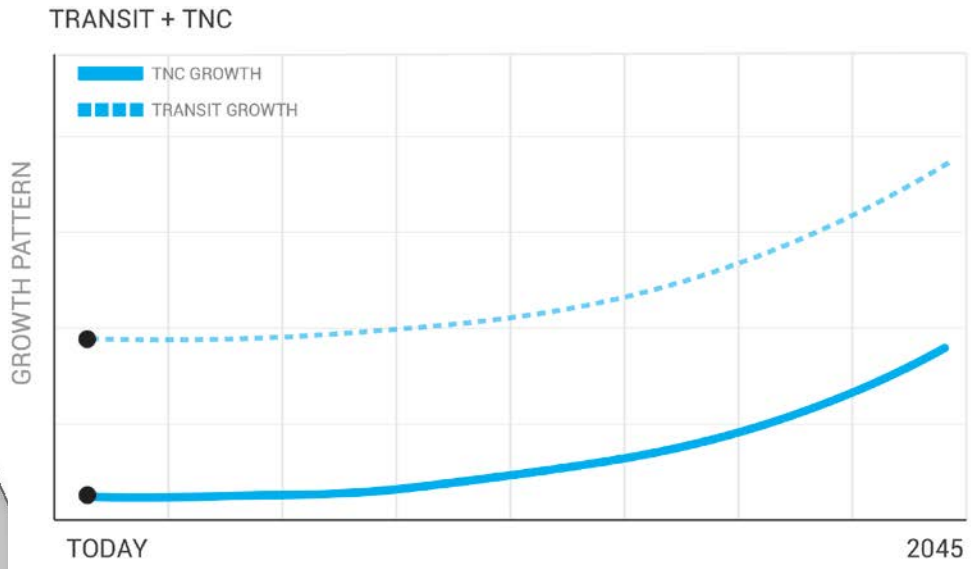


# A Tale of Two Regions

TNCs and transit agencies build partnerships in the region's denser developed areas, building an integrated, multimodal transportation network. Outside these areas the traditional auto-oriented transportation system remains in place.



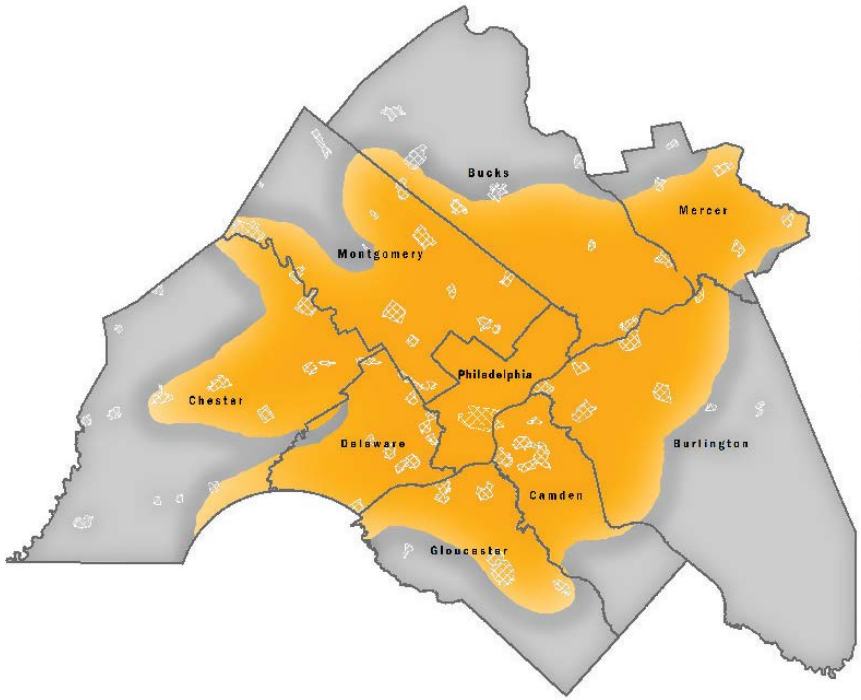



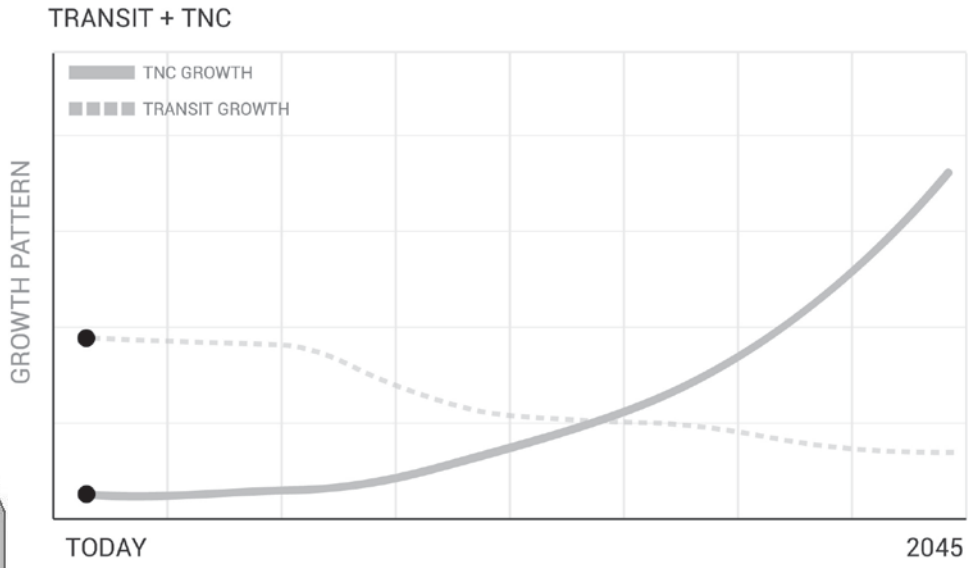



dvrpc

# The TNC Takeover

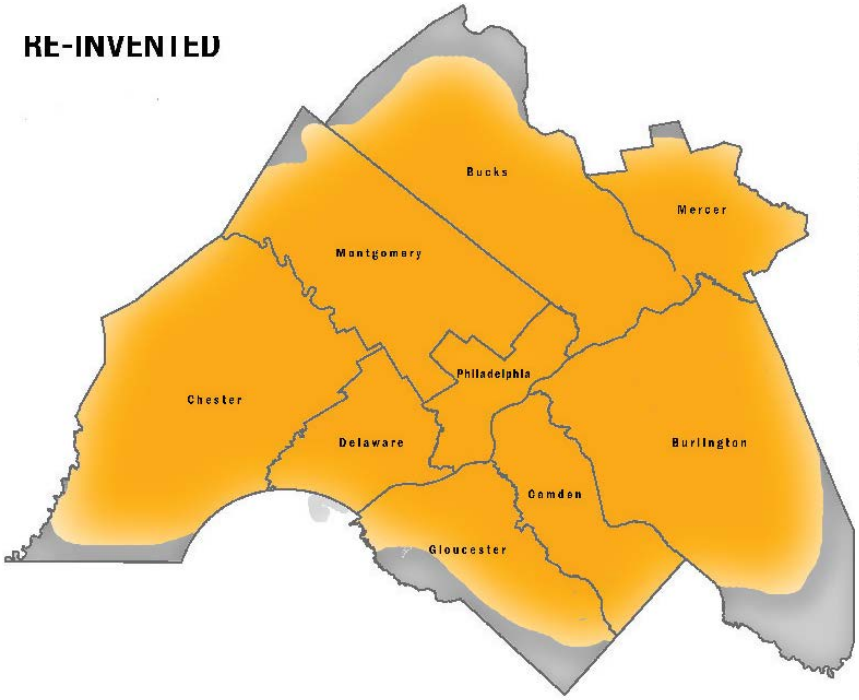
TNCs operate independently and are better able to quickly respond to changing market conditions. This has led to a significant scaling down of transit operations, which now consist primarily of rail operations and limited bus service.

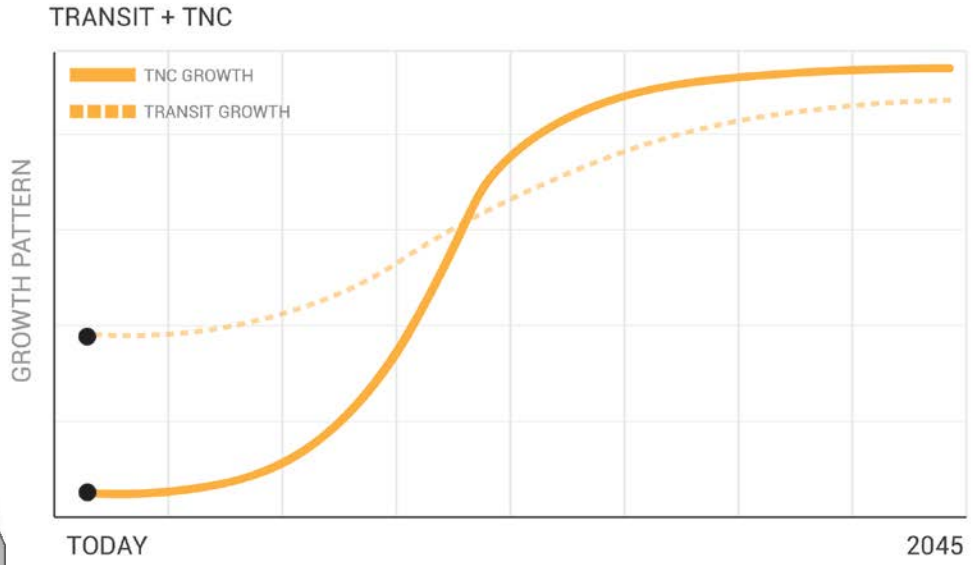


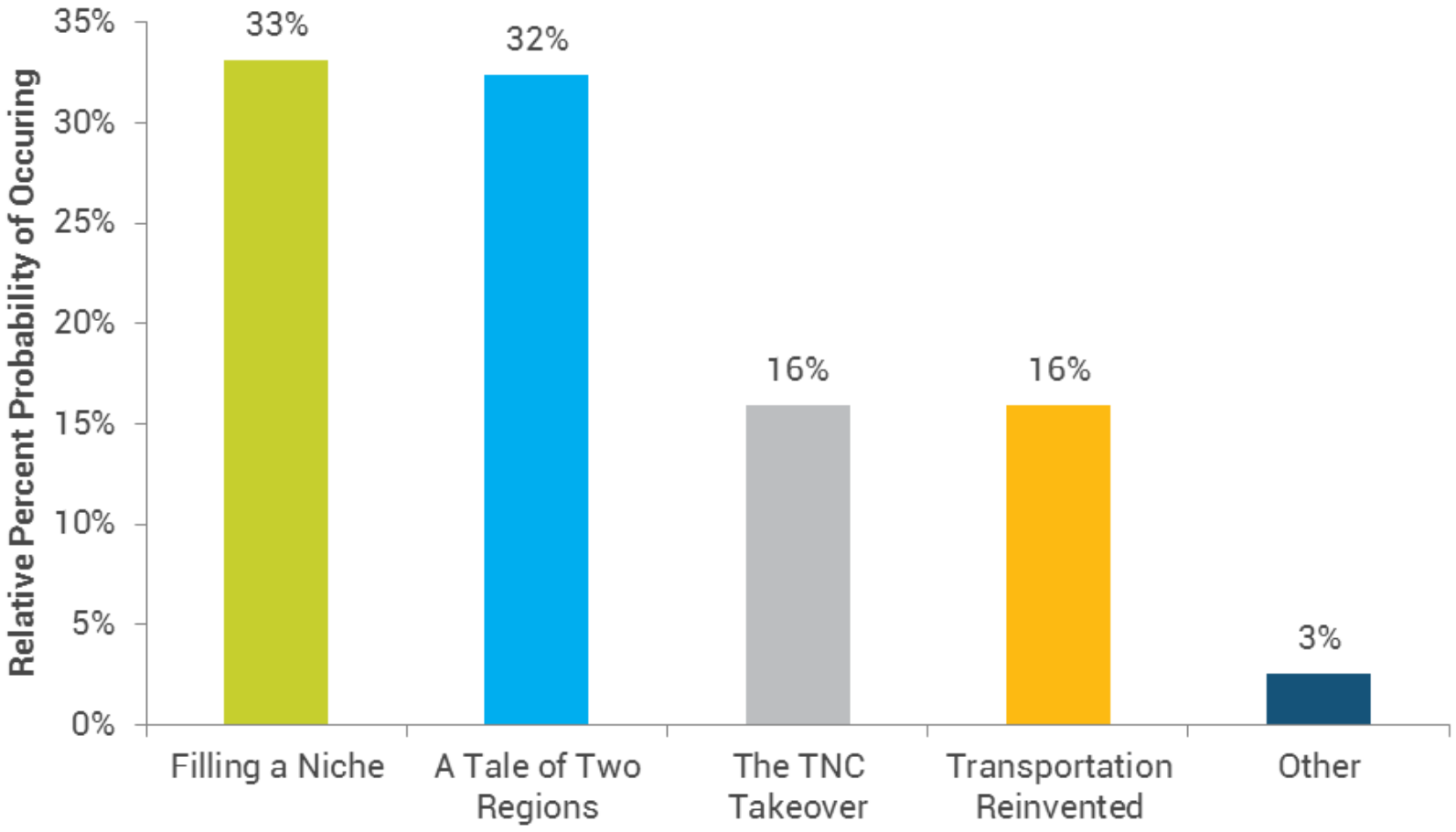
# Transportation Reinvented

Transit redefines its operations, creates cooperative partnerships with new private market TNC services, and becomes the backbone of an integrated transportation network. Aggressive service expansion and big venture capital investments fuel long-term, rapid TNC growth.



# TNC Survey Results



# The Scenario We Aren't Getting Into…Yet

# Thank You!


www.dvrpc.org/connections2045