



# **Symposium on Smart Cities NAS Arab American frontiers in Engineering**

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**WHILE CITIES ARE NOW HOME TO **HALF** OF THE WORLD'S 7 BILLION HUMANS (1.8B are in Facebook, 6.8B have a mobile phone and 3.17B have access to the internet)**





On-Demand  
Mobility  
chariot



# THE SMART MOBILITY ECOSYSTEM

Traffic Flow



Mobile Ticketing



Curated by:

TRANSIT SCREEN

Sensors



Autonomous Vehicle Tech



Mobility Apps



Street Level Information/Ads



Beacons/Proximity



Self-driving Cars



Faraday Future

Mapping



# The Challenge

## FACTS:

20+ M



5+ M



10+ M



1 month

From Data to Information

From Information to Action:

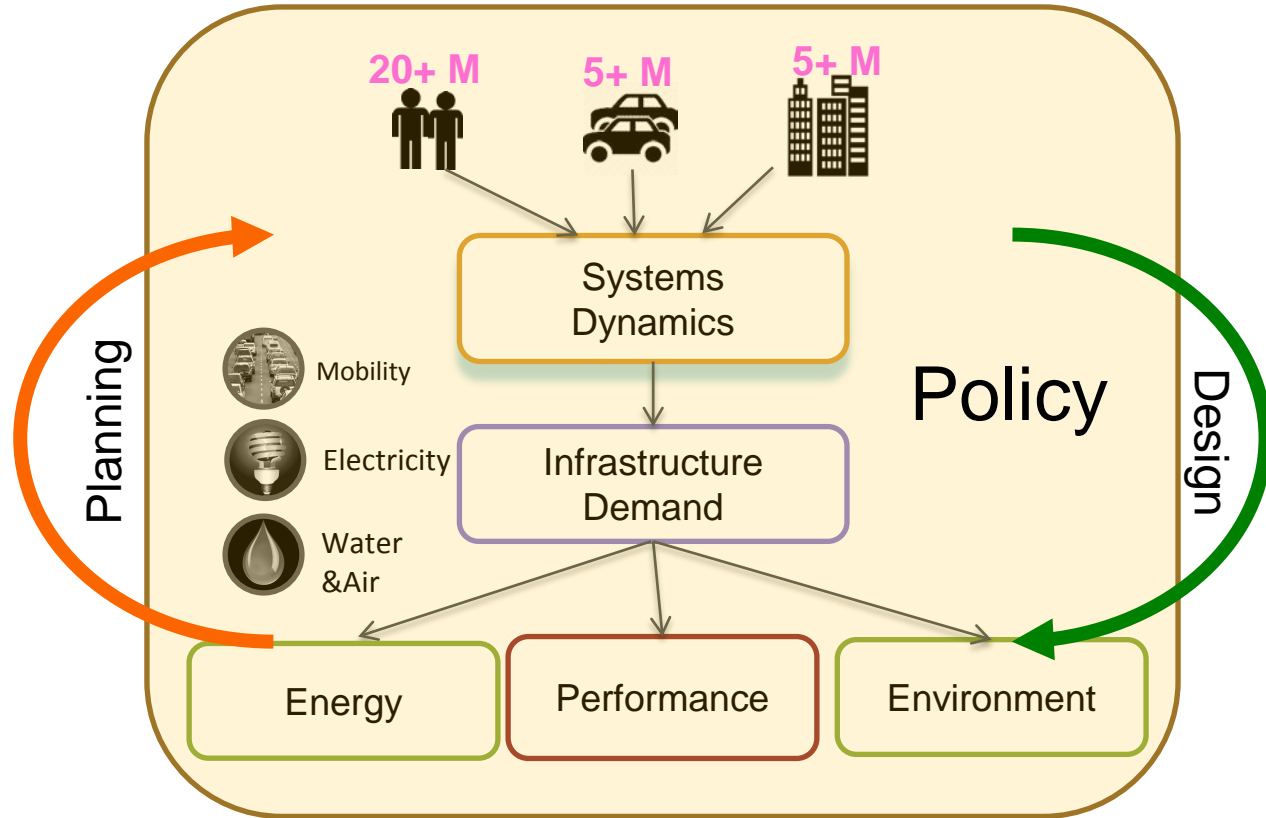
Better informed policies for  
the environment, public health  
and inclusive well being



# Smart Infrastructure Planning of Urban Systems

Urban environments are changing:

- Rural-urban migration
- Quality of life
- Quality of service
- Sustainable Consumption



**NAE's Engineering Grand Challenge: Restore and Improve Urban Infrastructure**

Source: <http://www.engineeringchallenges.org/challenges/infrastructure.aspx>

# The Opportunity

(ICT data or our digital bread crumbs)

## Data from Companies

- Mobile Phone Data
- Waze
- Credit Card Transactions



## On-line

- Airbnb Supply
- POIs and hours of Operation
- Online Maps
- Social Media



## Other sources

- Camera and GPS Data
- Transit feeds



# 2017 *This Is What Happens In An Internet Minute*



## The Scale

5 billion mobile phone users  
10,000 credit card transactions every second  
16 million text messages and 452k Tweets





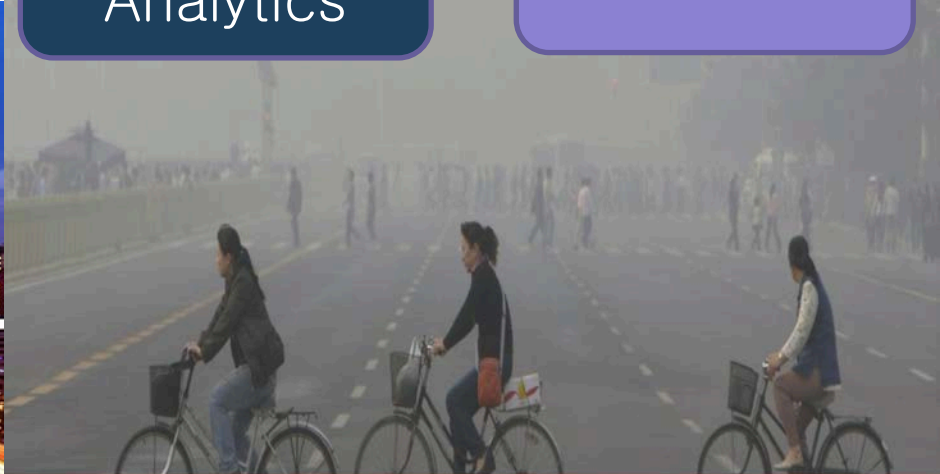
City-wide  
Data

Simulation  
Model

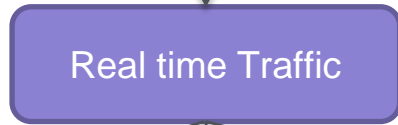
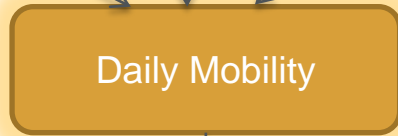
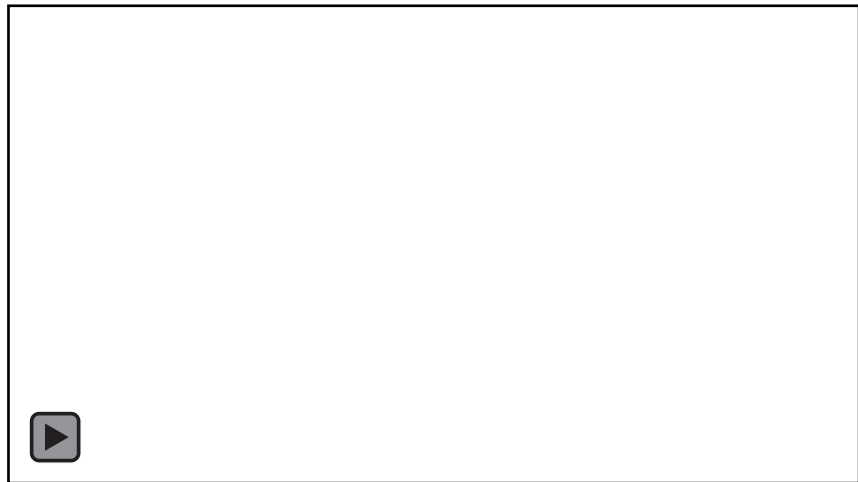


Data  
Analytics

Interventions



# Big data Platforms for Traffic Management

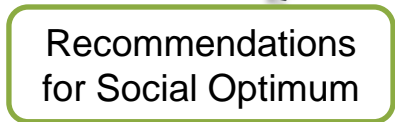


## Existing approaches

- Activity models based on travel diaries

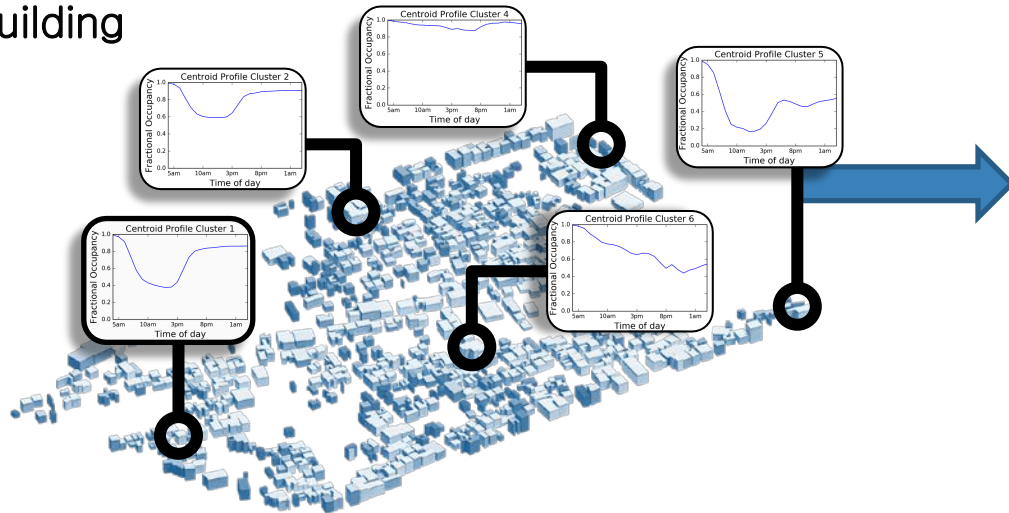
## New approach

- Passively Extracted Data expedite the Generation of Information



# Big data Platforms for Energy Management

## Building Occupancy, Weather and Physics of Building



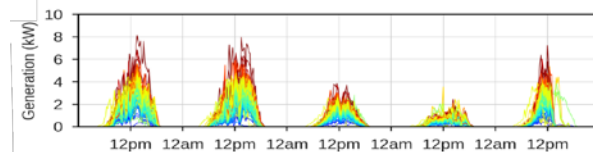
### Existing approaches

Energy Models based on Building Technologies and occupant behavior

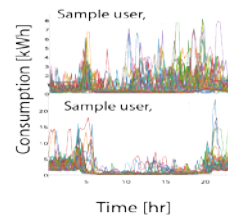
### New approach

Real times sensing of consumption allows to prioritize savings intervention and the adoption of new technologies

## Photovoltaic Production



## Electric Daily Consumption







Jane Jacobs

***“Cities are understood as ‘problems of organized complexity’, dealing simultaneously with a sizeable number of factors which are interrelated into an organic whole” (1961)***

***working from particulars to the general in a “web way of thinking”***

**In a data rich reality we have the unprecedented opportunity to seek for see similarities, patterns and universals, to then see differences, variation and specifics.**





*Methods  
for Data  
Management  
and Visualization*



*Platform for  
Data  
Technology and  
Policy*



*Methods for  
Sensing and  
managing Urban  
Energy  
Network*