



Planning for pedestrians in an automated & connected future

Kelly J. Clifton

Distinguished Transportation Lecture Series 2018

University of Hong Kong

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Story Plot: Man in Hole

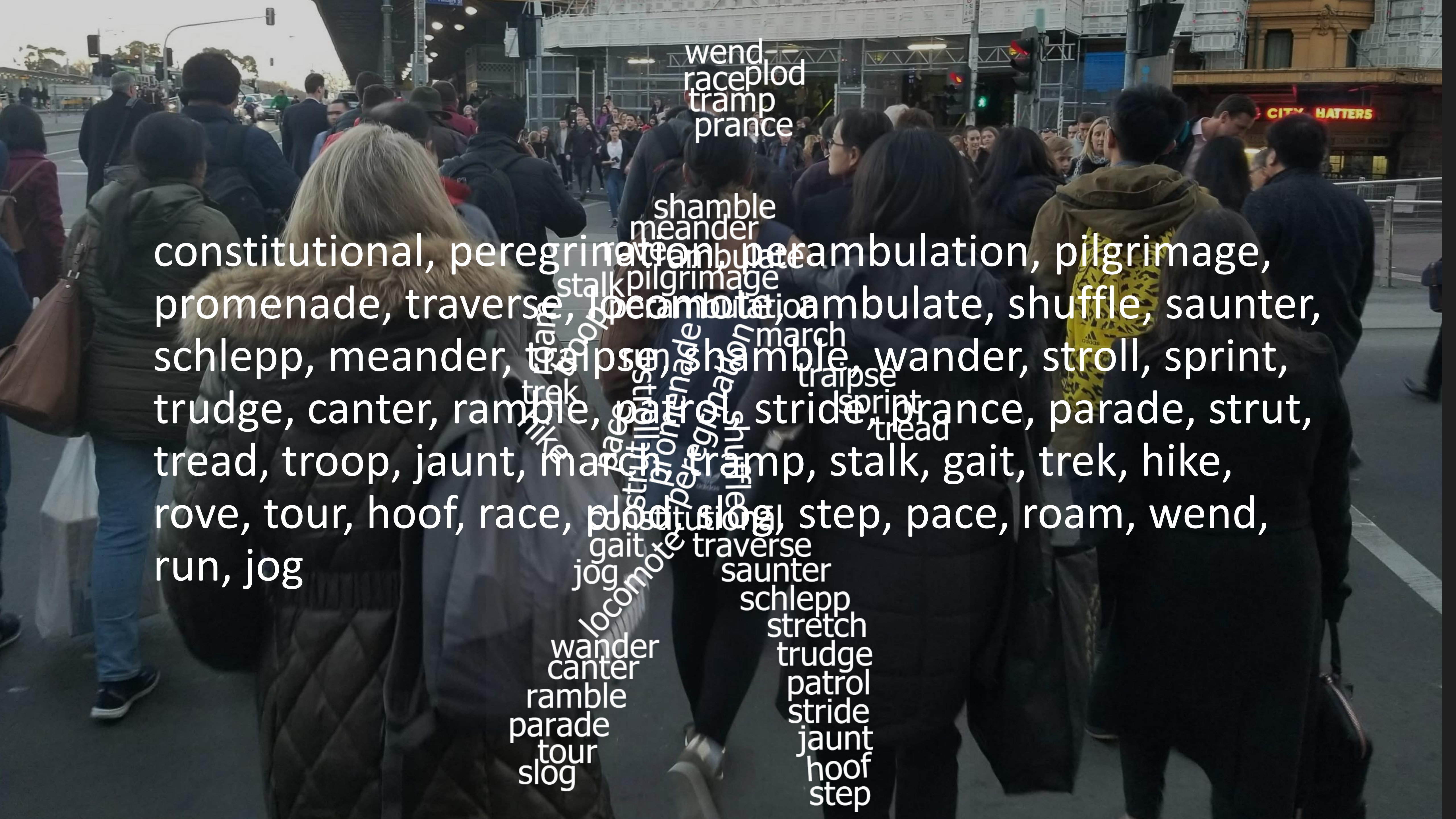


Vonnegut, K. *Man without a Country*.
Seven Stories Press, 2005.
Infographic design by Maya Eilam:
<http://www.mayaeilam.com>

1



The Main Character



wend
raceplod
tramp
prance

shamble
meander

constitutional, peregrination, perambulation, pilgrimage,
promenade, traverse, locomotion, ambulate, shuffle, saunter,
schlepp, meander, trapse, wander, stroll, sprint,
trudge, canter, ramble, parade, stride, prance, parade, strut,
tread, troop, jaunt, march, tramp, stalk, gait, trek, hike,
rove, tour, hoof, race, plod, slog, step, pace, roam, wend,
run, jog

wander
canter
ramble
parade
tour
slog

trudge
patrol
stride
jaunt
hoof
step

locomote
saunter
schlepp
stretch

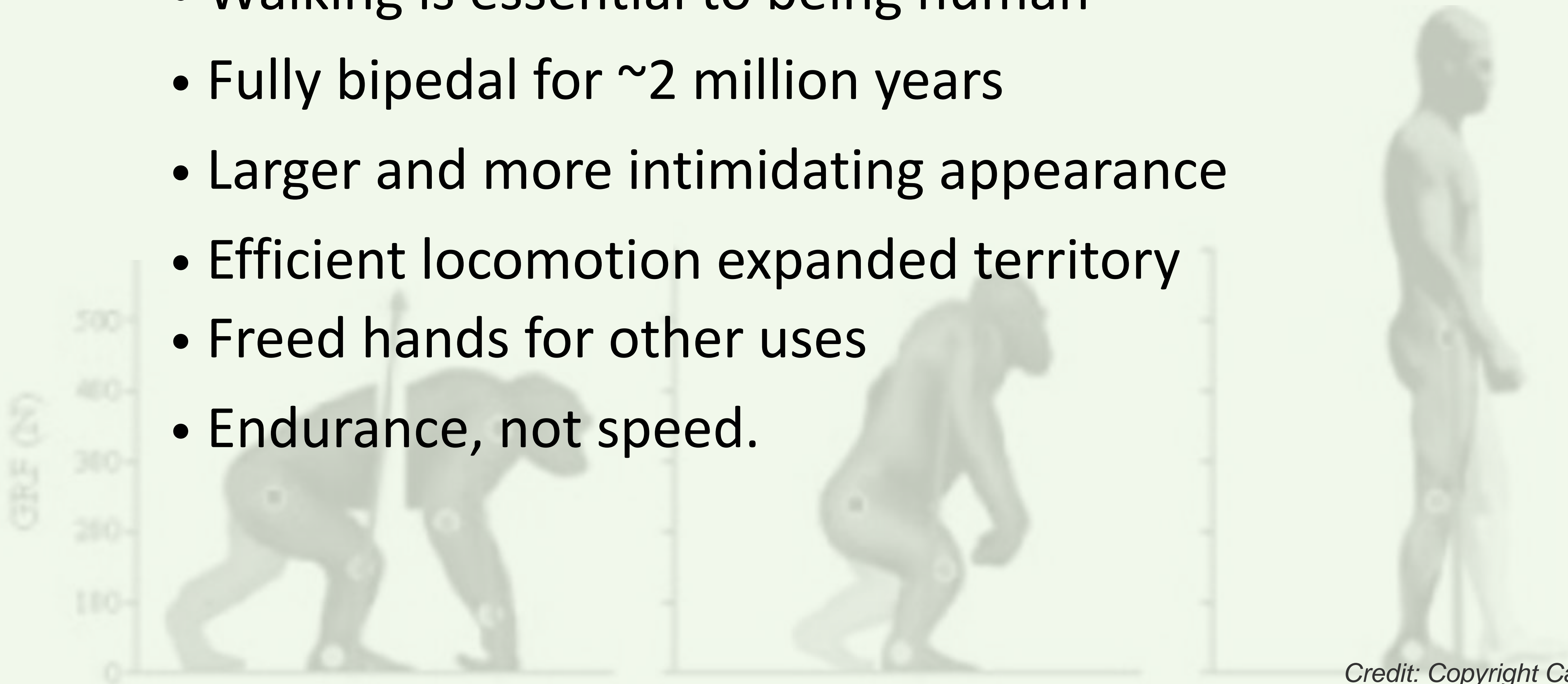
trapse
sprint
tread

trapse
march
trapse
sprint
tread

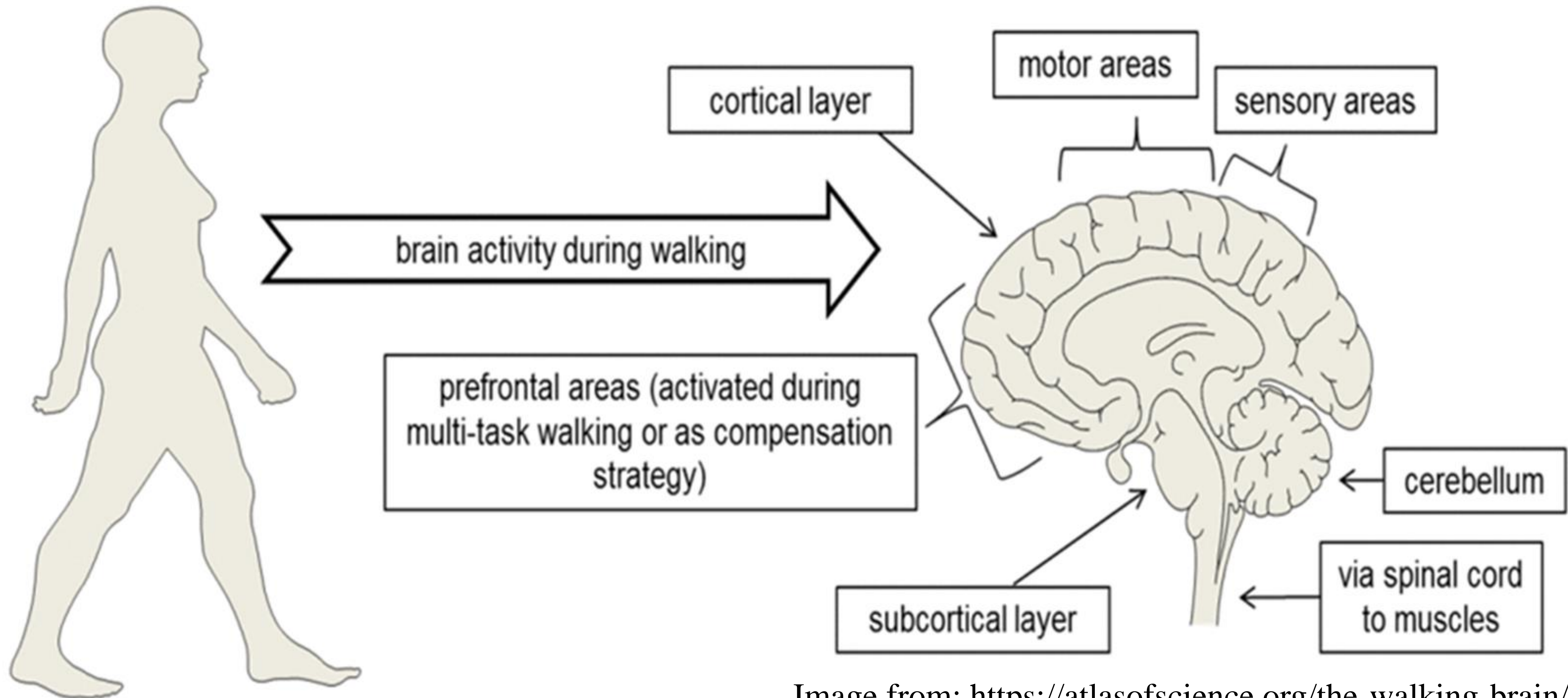
stalk pilgrimage

Walking & Human Evolution

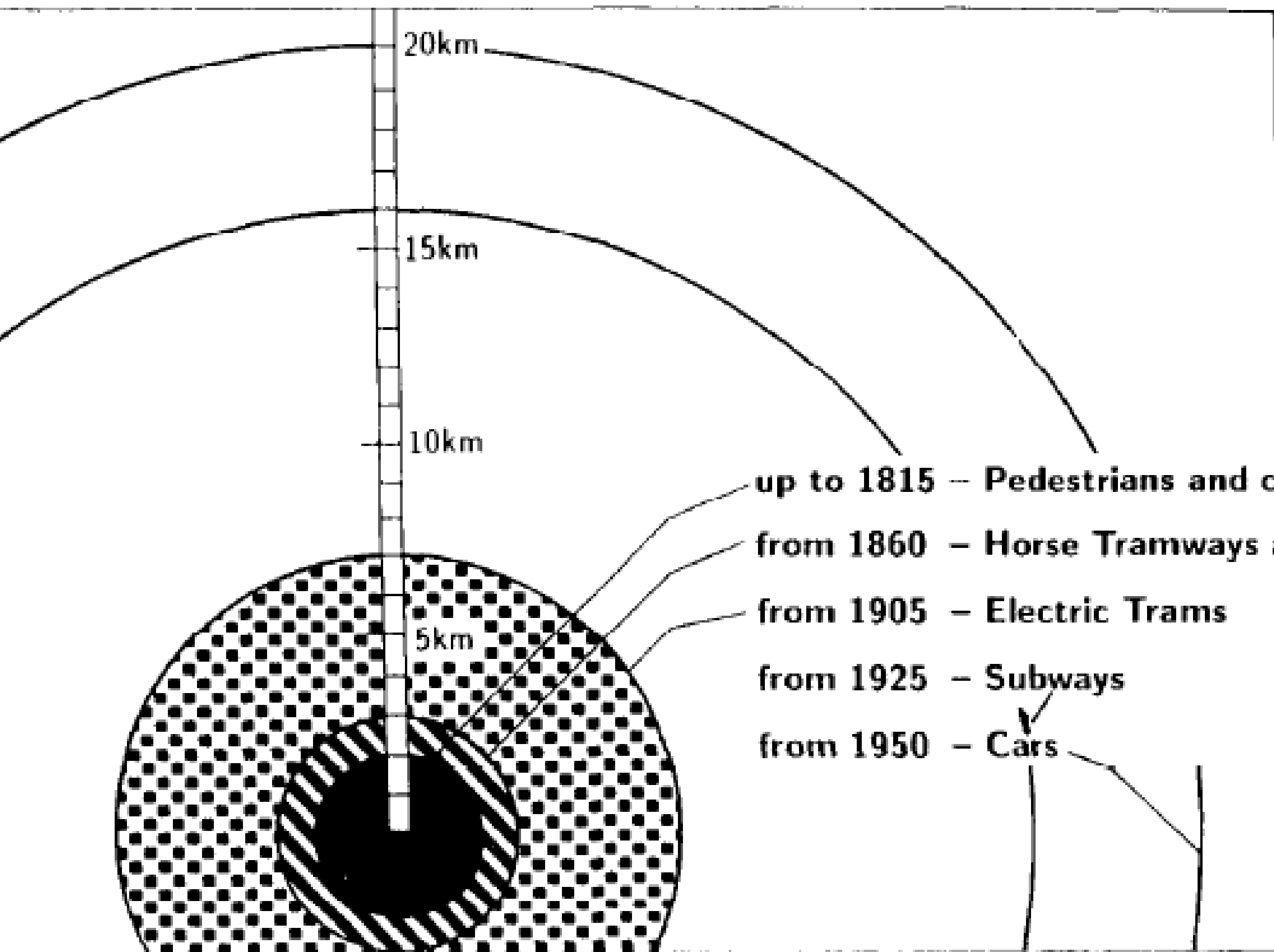
- Walking is essential to being human
- Fully bipedal for ~2 million years
- Larger and more intimidating appearance
- Efficient locomotion expanded territory
- Freed hands for other uses
- Endurance, not speed.



Complex cognitive, sensory, & motor activity



Walking & Cities



Marchetti, "Anthropological Invariants
in Travel Behavior", *Technological
Forecasting & Social Change* 47:75-
88, 1994



THINKSTOCK

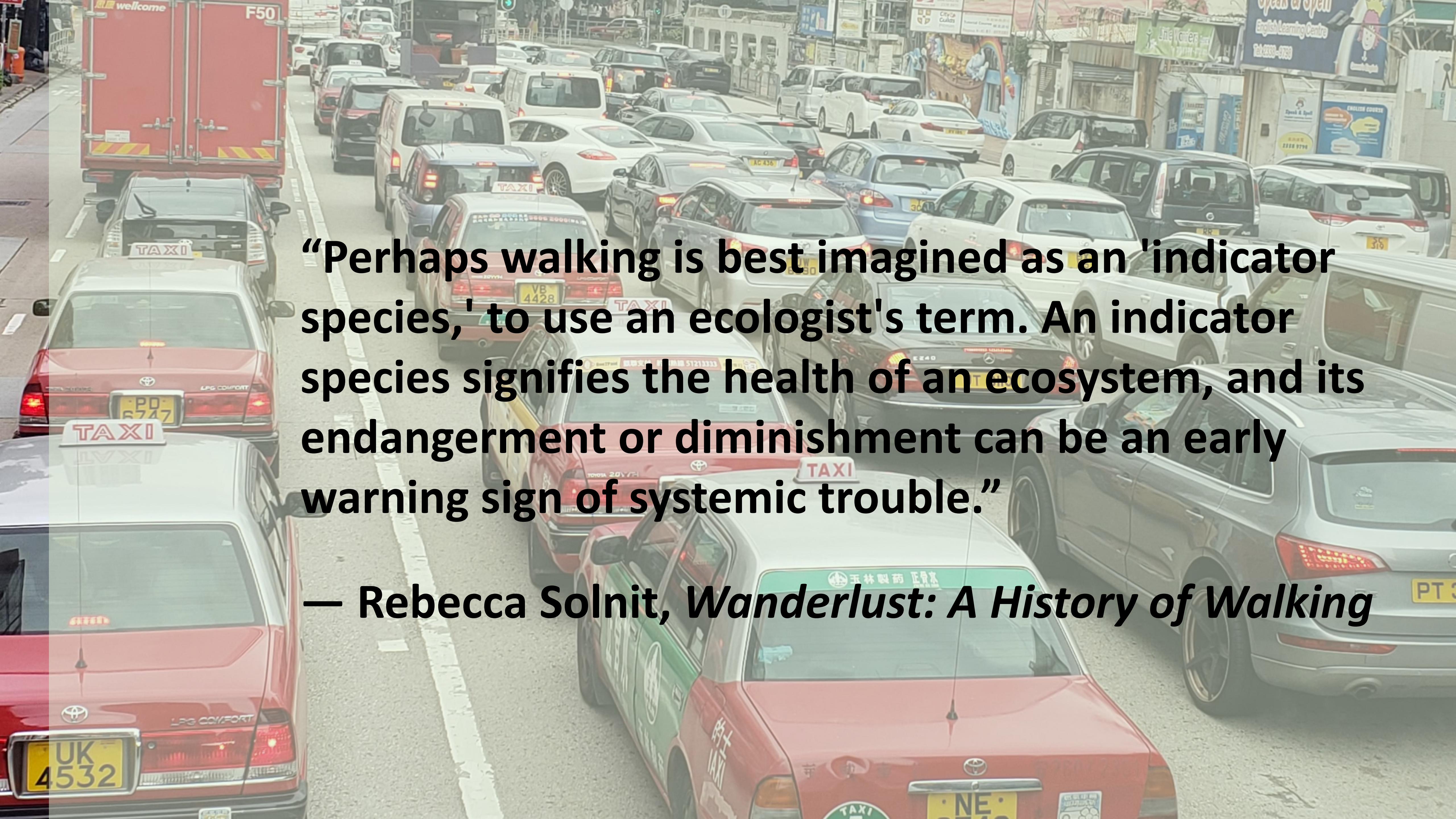


Paul Gavami, *L Flâneur*, 1842

2



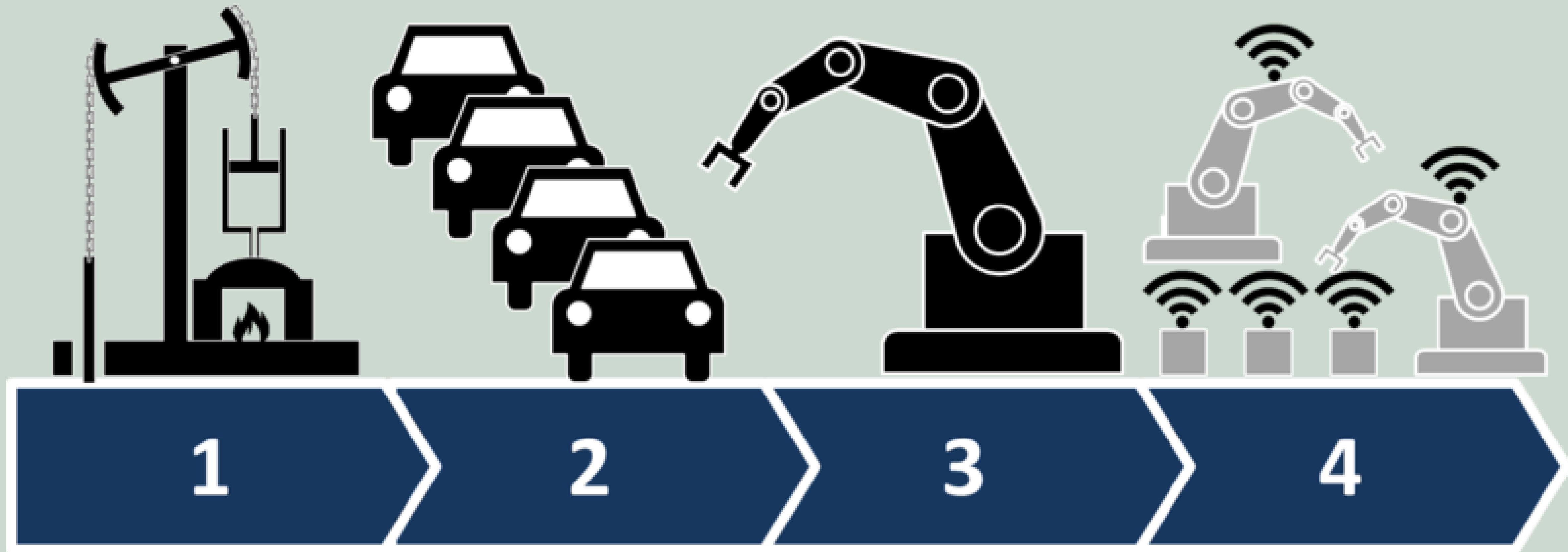
The Trouble



“Perhaps walking is best imagined as an 'indicator species,' to use an ecologist's term. An indicator species signifies the health of an ecosystem, and its endangerment or diminishment can be an early warning sign of systemic trouble.”

— Rebecca Solnit, *Wanderlust: A History of Walking*

Disruptive technologies

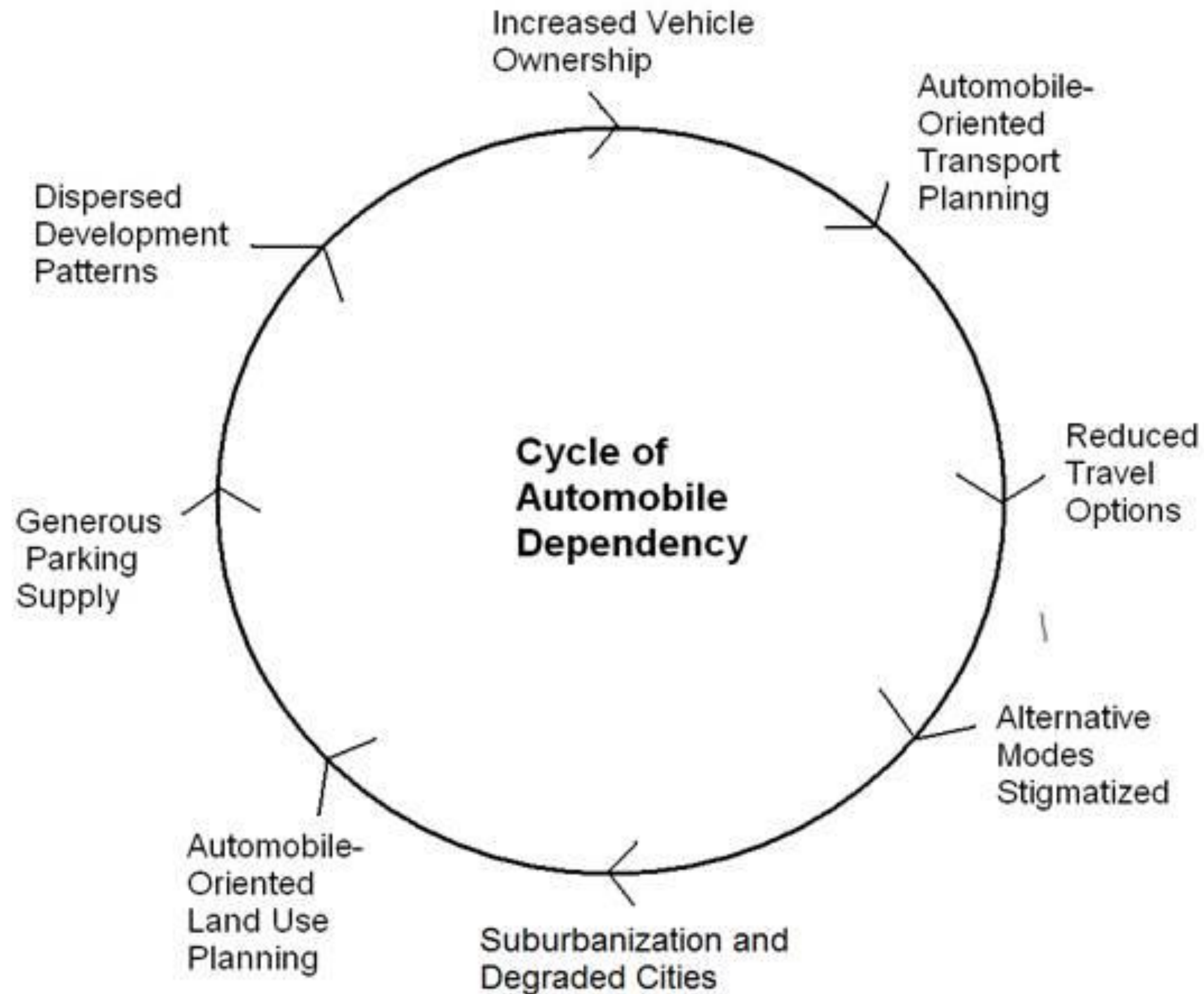


Automobile as a disruptive technology



- Altered the physical form of cities to match the spatial and temporal scale of the automobile
- Transformed our daily lives
- Pedestrians treated as an impediment to flow
- Planning and engineering emphasized movement over accessibility
- Health, safety, environmental consequences

Capacity & Mobility Planning Paradigm





Chip Litherland for the *New York Times*



Stage 3: Livable cities activities & quality of life outlook

But the story isn't over....



... There are changes afoot

Bringing new threats...



....& opportunities

Automated & Connected Technologies

Bikeshare &
Car share



Ride hailing



Automated
vehicles



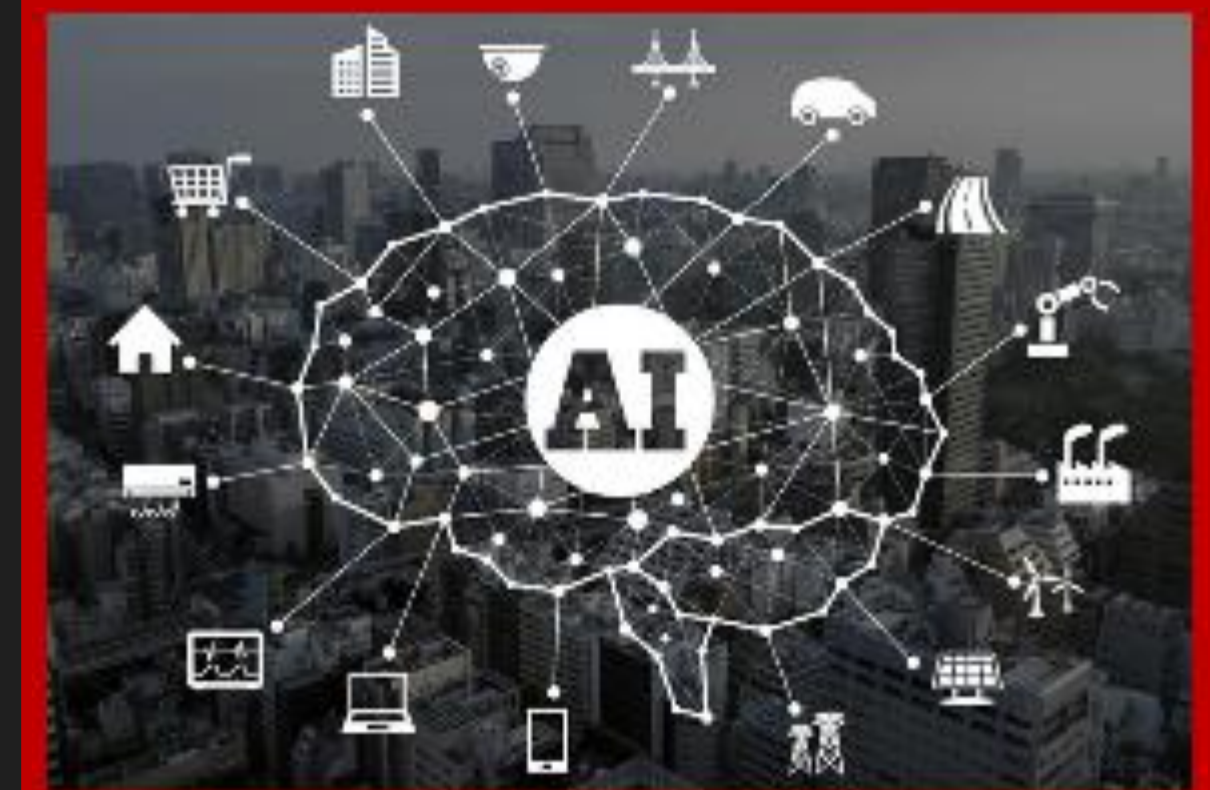
Connected
vehicles



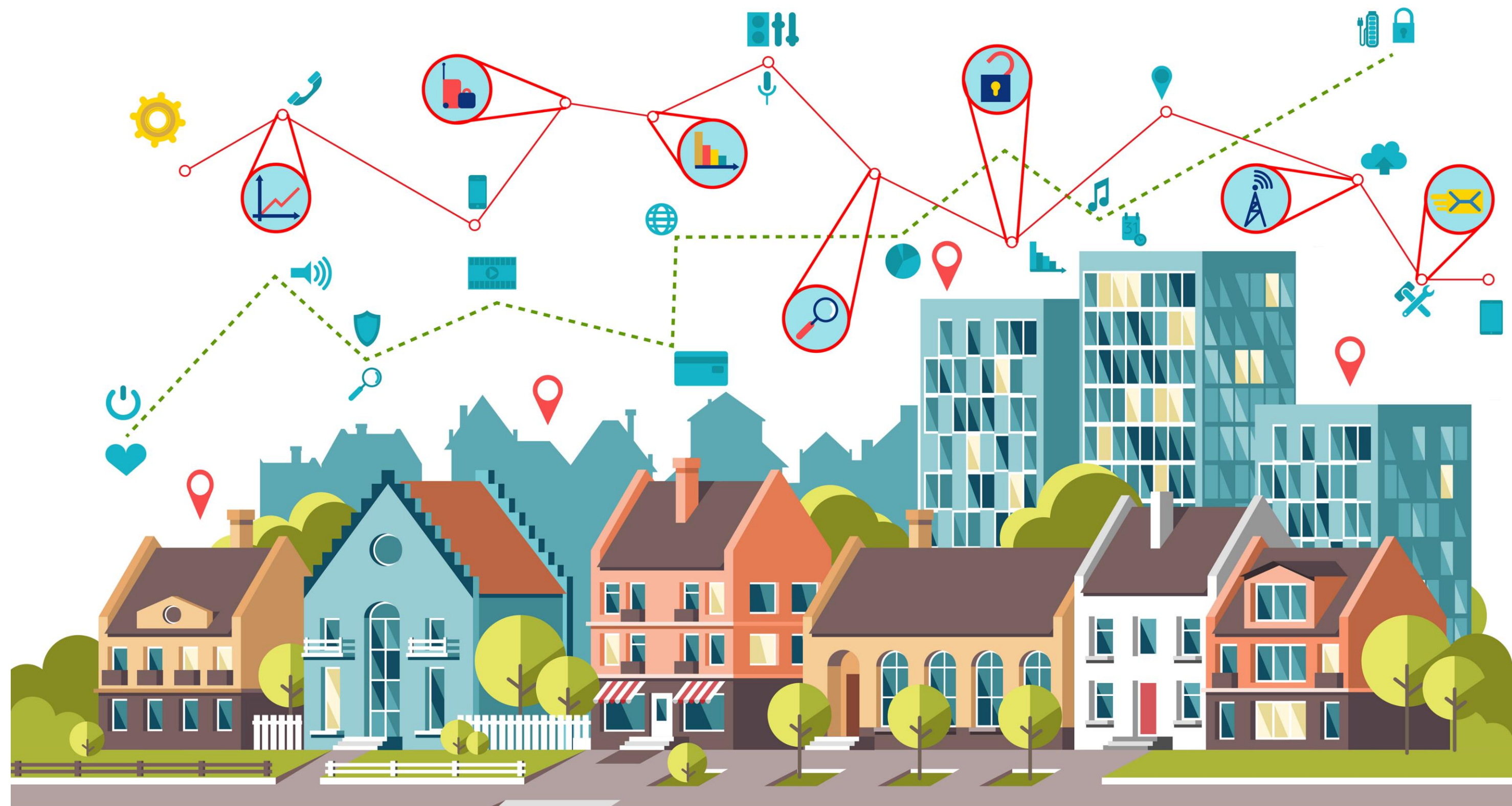
Automated
transit



Artificial
Intelligence
/Deep
Learning



Connecting vehicles, things, & people



Pedestrians are currently facing challenges...

...how do we use these new technologies to alleviate current problems but make us better than before.

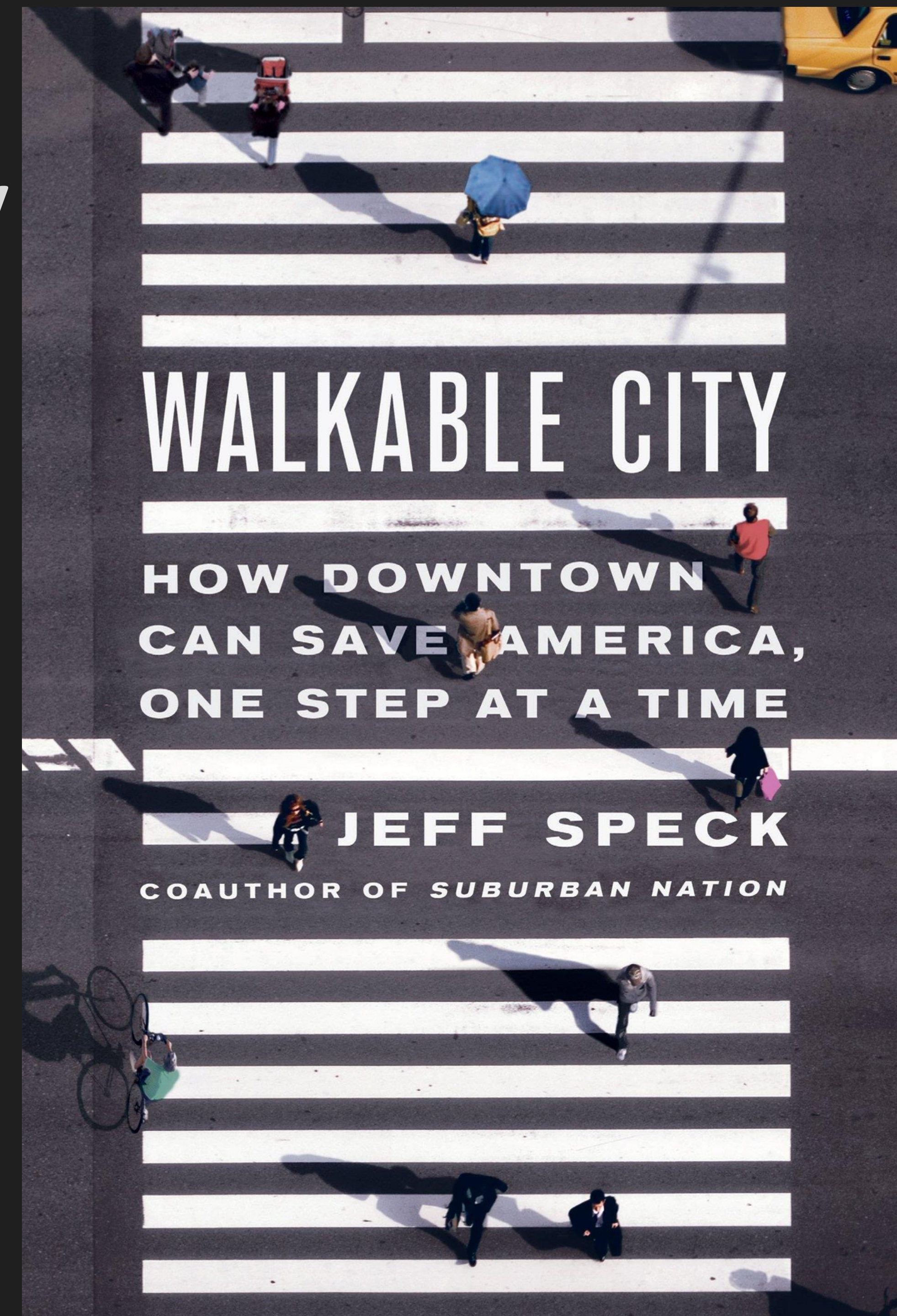
3



Climbing out

General Theory of Walkability

1. Destinations
2. Safe, Secure, & Healthy
3. Comfortable
4. Interesting



1. Destinations

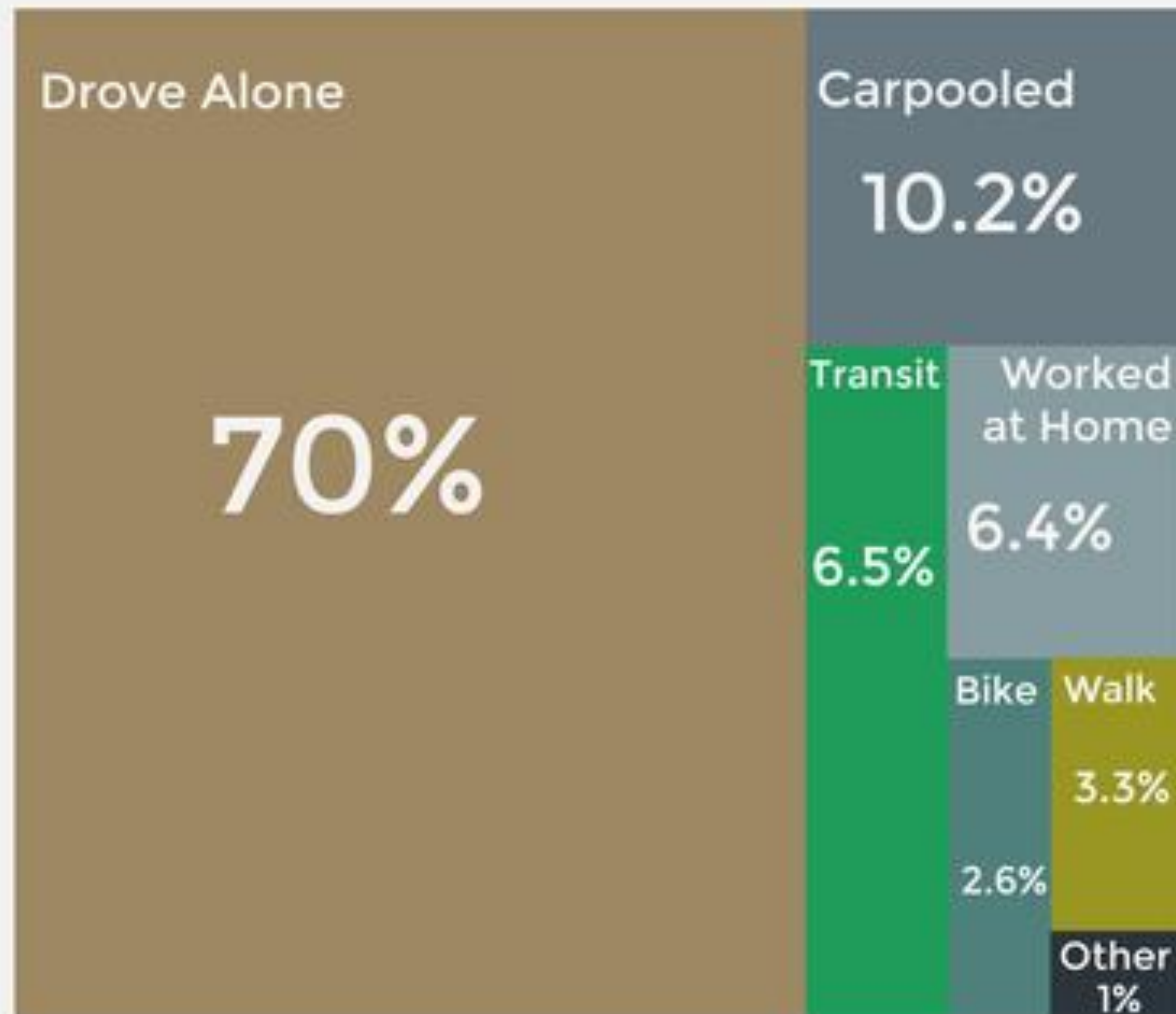
- Telecommunications
- E-commerce
- Delivery



Mode share comparison

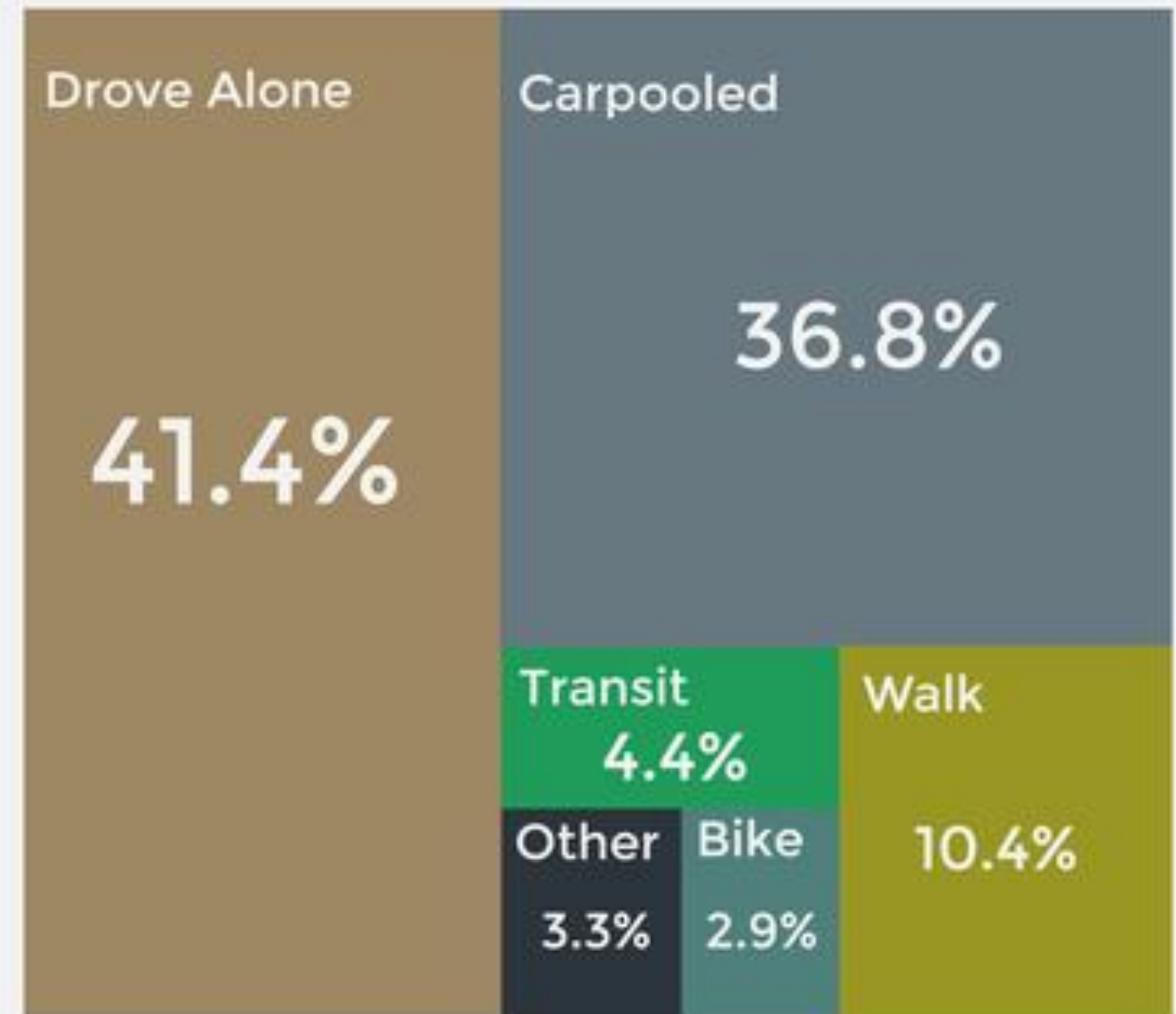
for the Portland region

Commuting trips only



vs.

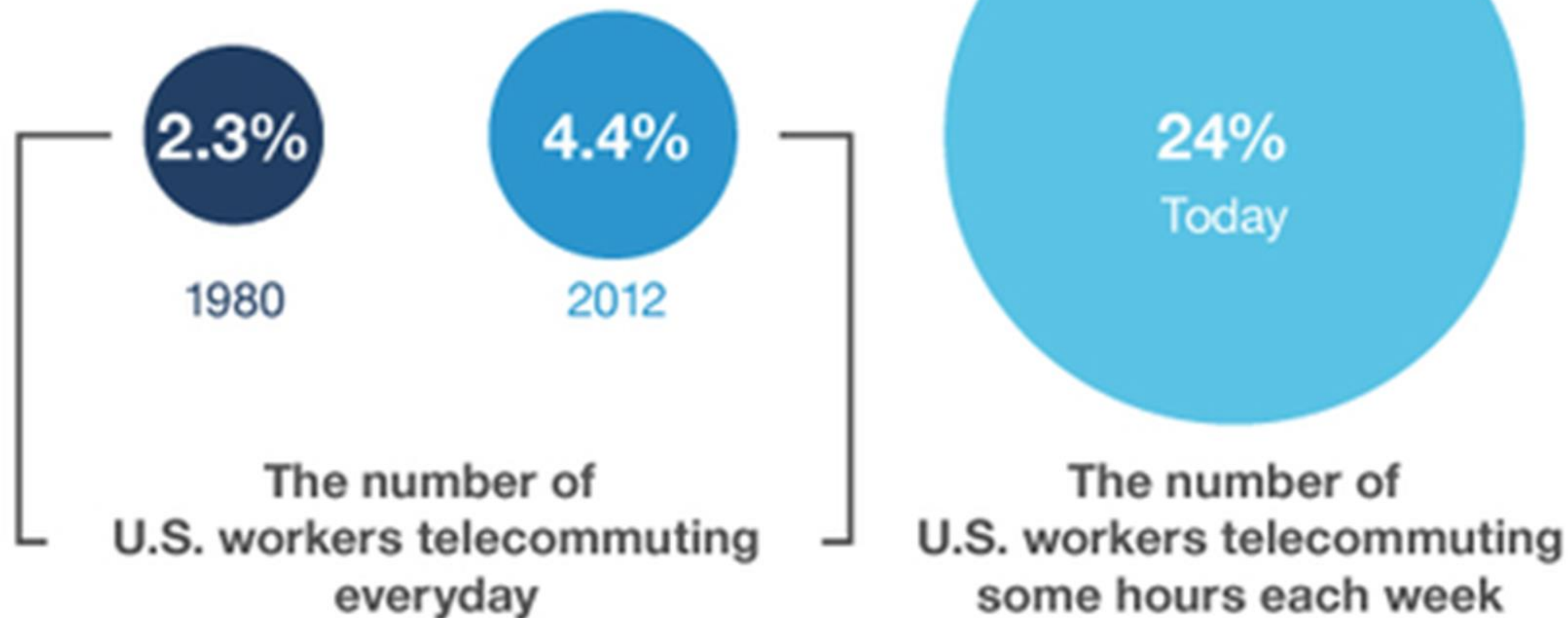
All trips



RISE OF THE TELECOMMUTER

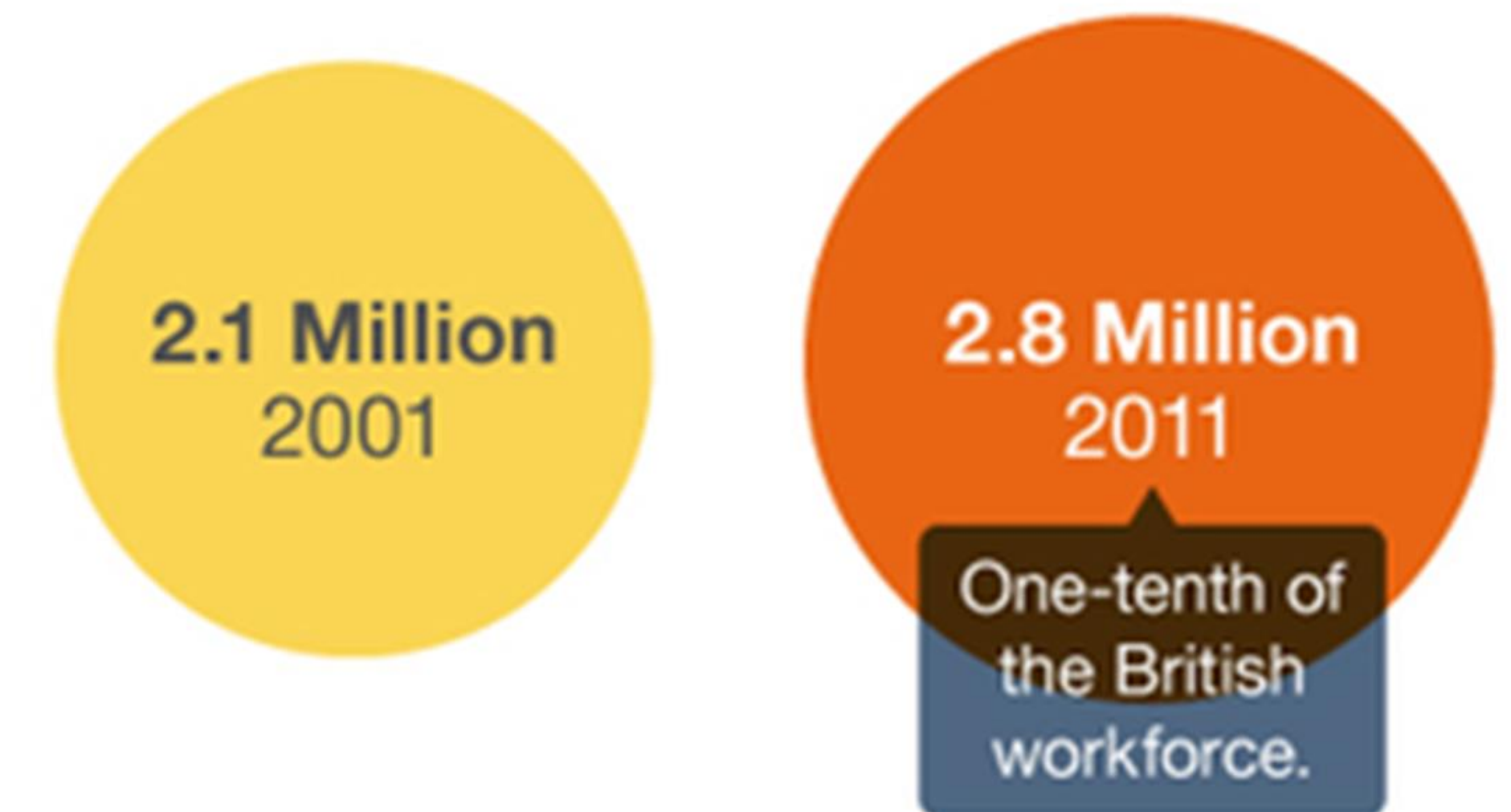
Since technology has made remote work a reality, telecommuting has consistently been on the increase.

Percentage of American workforce working from home:



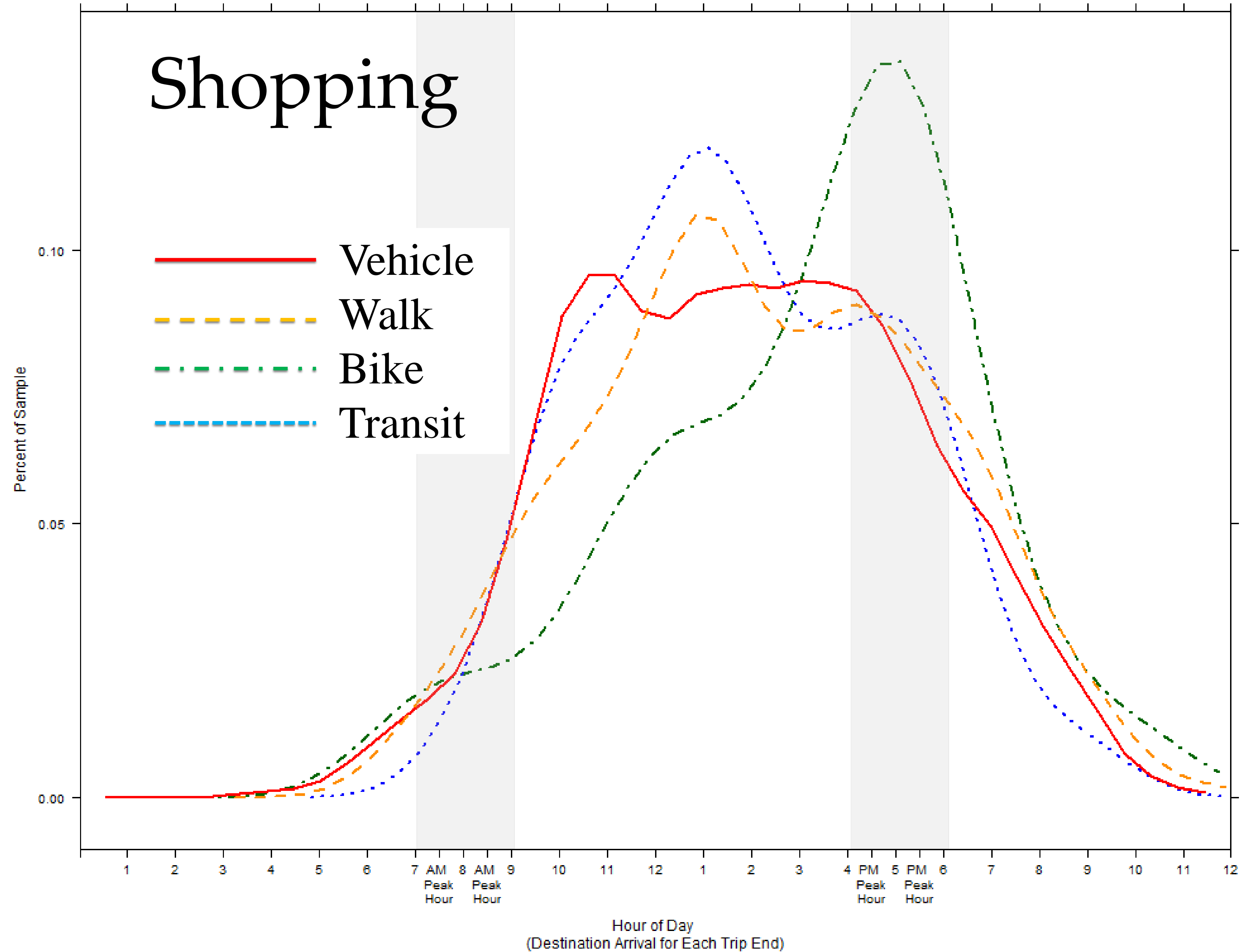
The same trend can be seen in other countries.

Number of UK workers telecommuting at least some of the time:

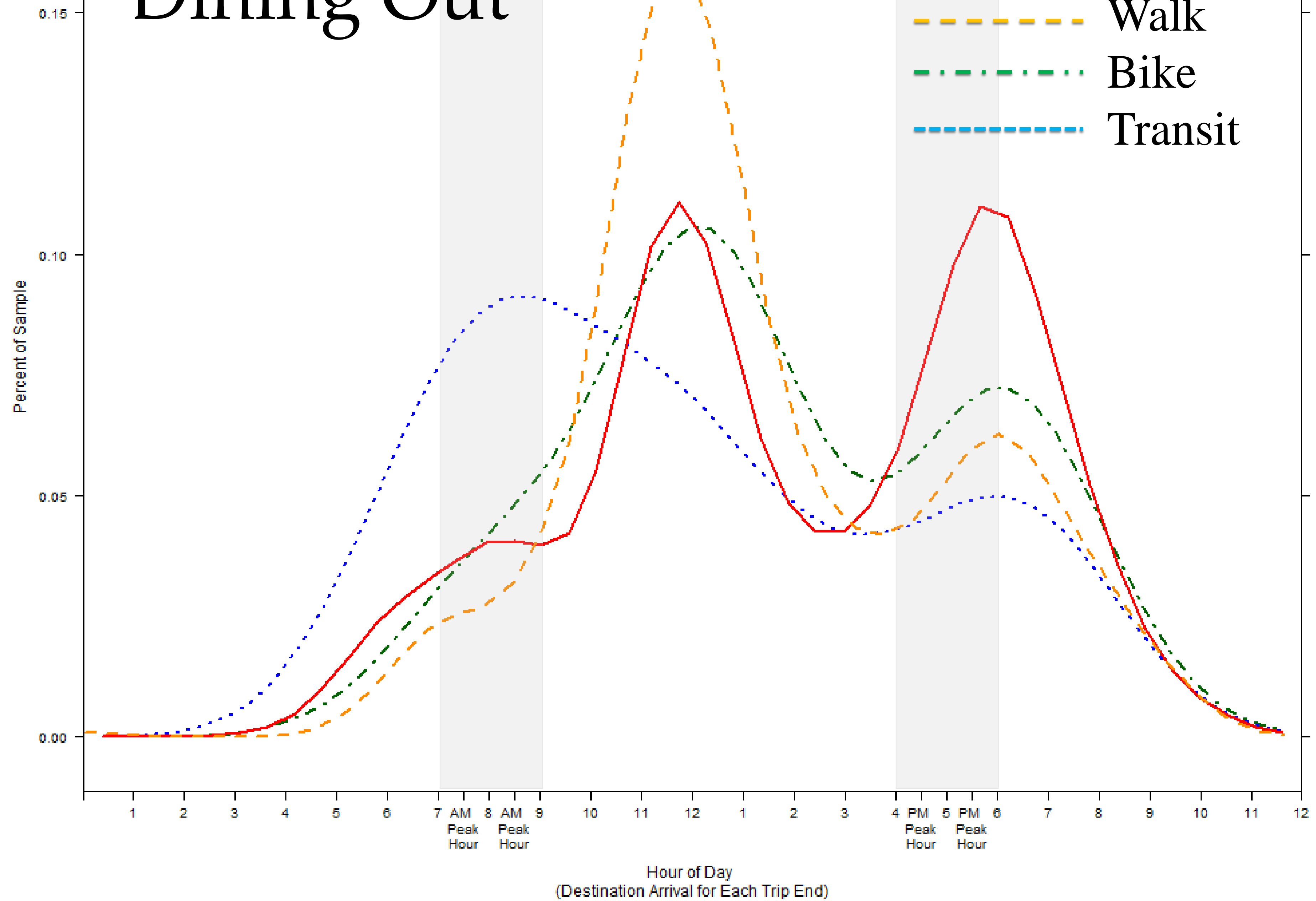


Source: "Death of the Office," by Darren Kingman for Intuit

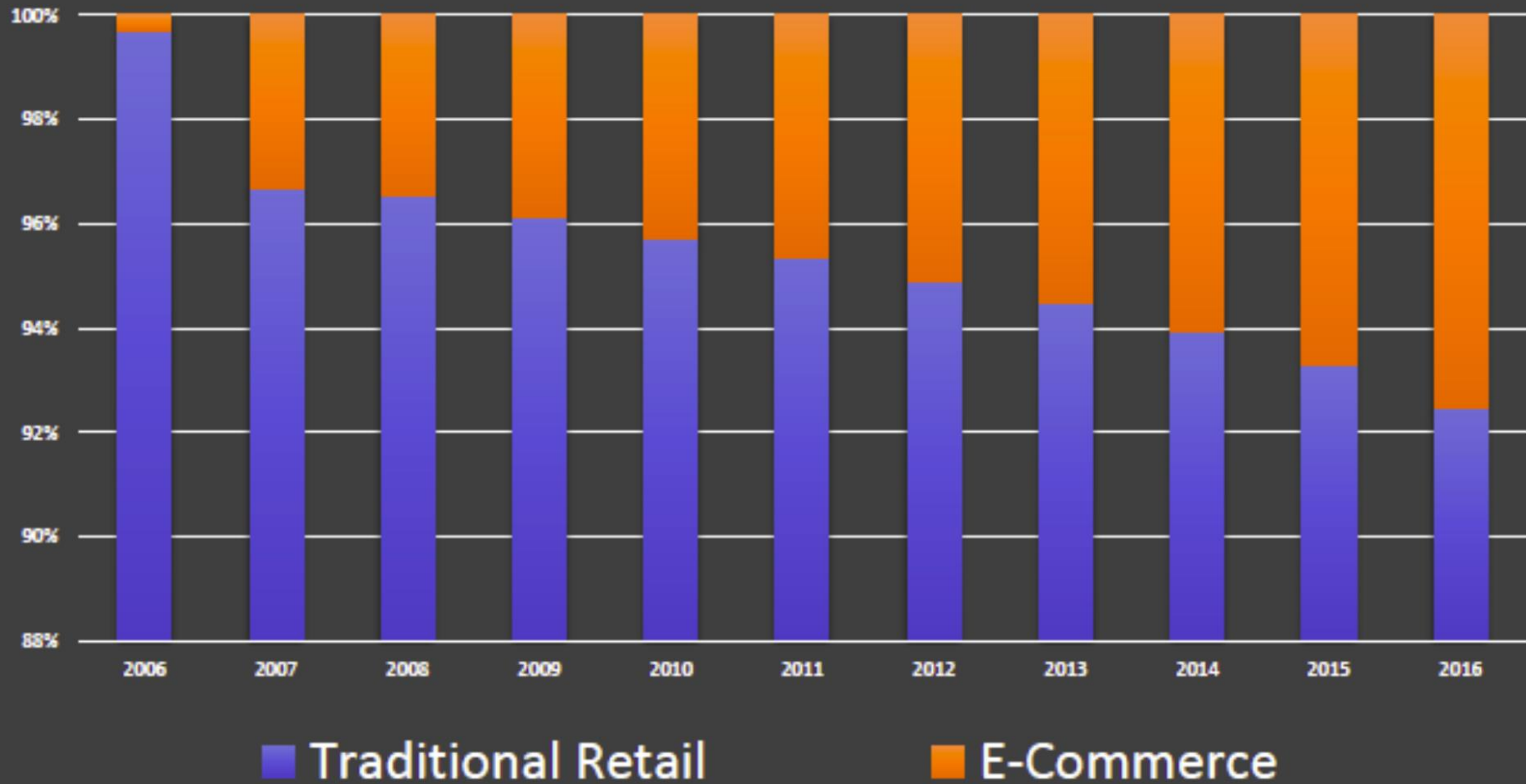
Shopping



Dining Out

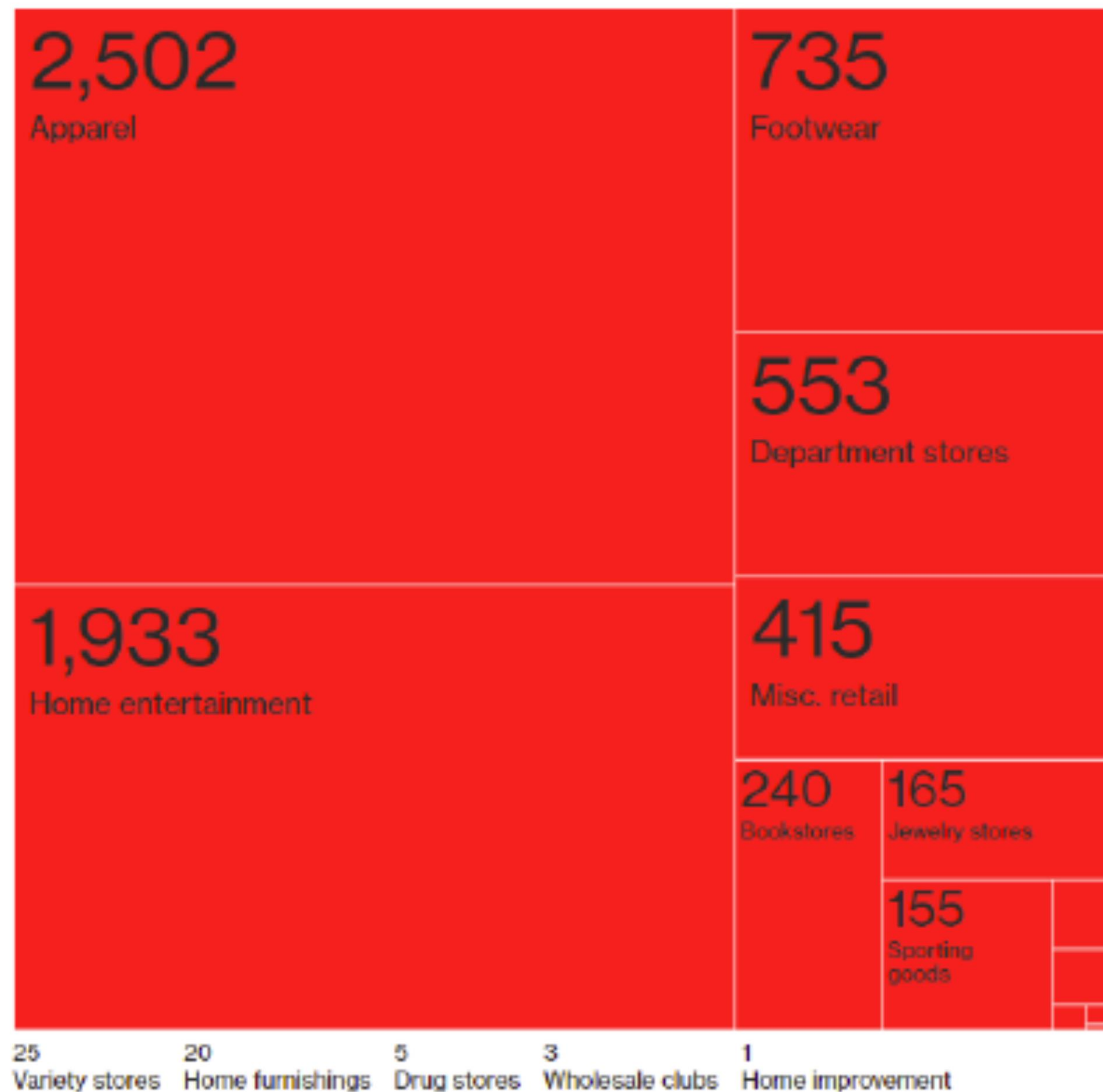


Total U.S. Retail Sales

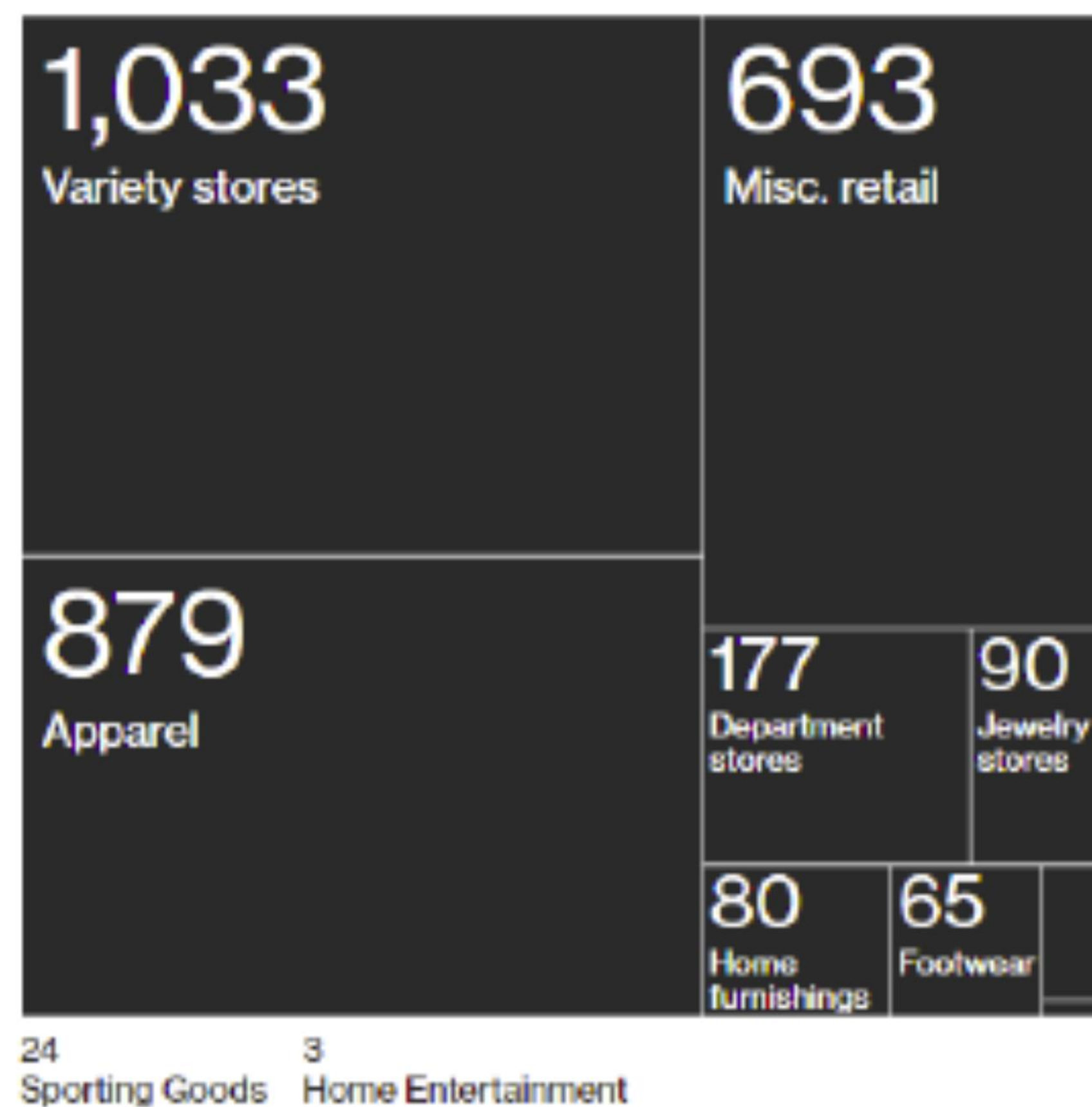


Source: <https://www.census.gov/retail/index.html>

6,752 announced store closings



3,044 announced store openings



AT-HOME
EATING:
THE RACE TO
CONVENIENCE

WHOLE
FOODS
MARKET

ASDA

TESCO

Walmart

Waitrose

GROCERY
STORES

freshdirect.

good
eats

HUBBUB

ocado

Instacart

GROCERY
DELIVERY

Blue Apron

din

PREPARED
GROCERIES

DELIVEROO

DOORDASH

MUNCHERY

JUSTEAT

sprig

MEAL
DELIVERIES

If telecommuting and
e-commerce lead to
productivity gains...

What will we do with our
time?

And to what destinations
will we walk?



Yagi Studio/Getty Images



2. Safe, Secure, & Healthy

- Automated vehicles
- Shared mobility
- New modes
- Connected people, vehicles, & environments

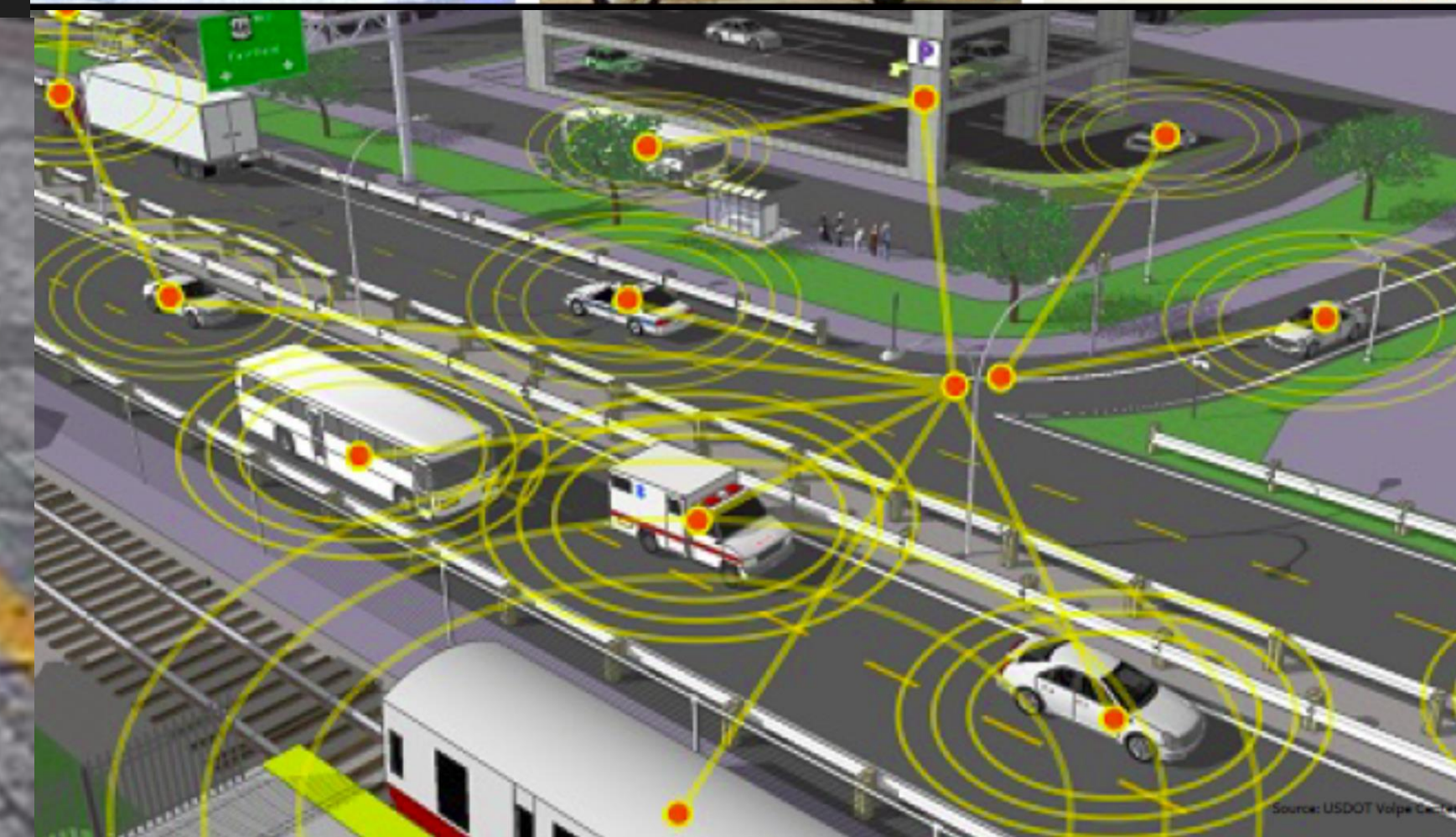
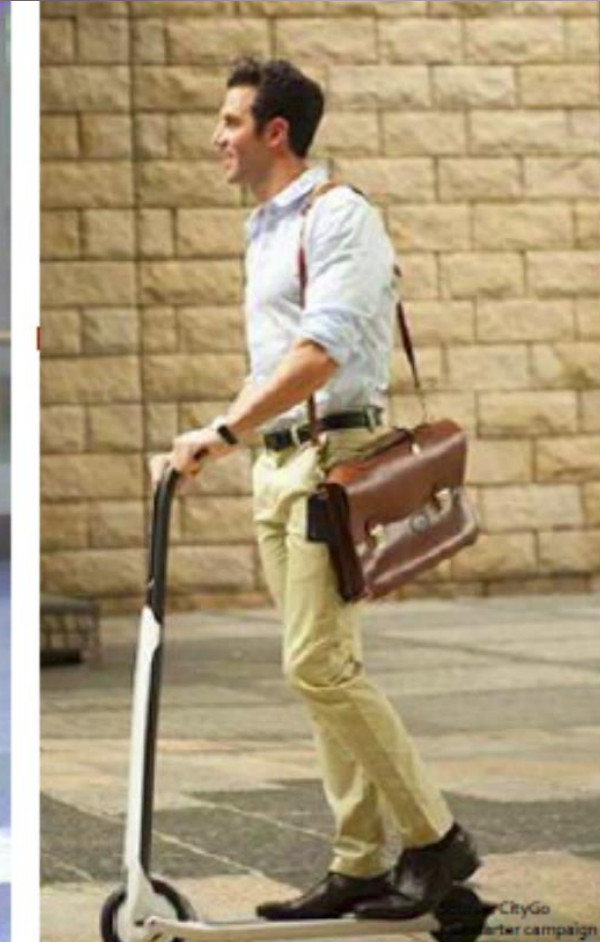
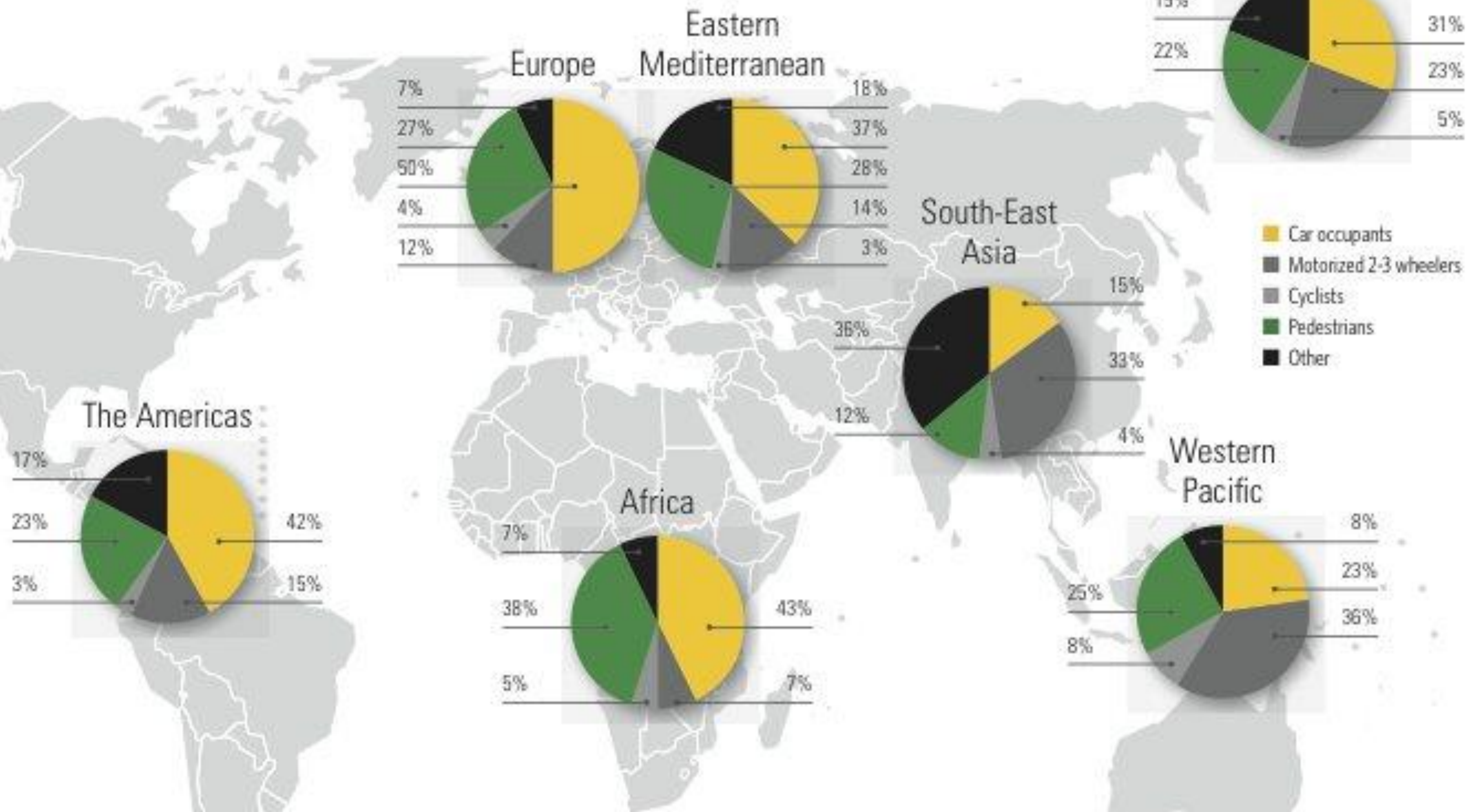


Figure 7

Road traffic deaths by type of road user, by WHO region



Self-Driving Cars Could Save 300,000 Lives Per Decade in America

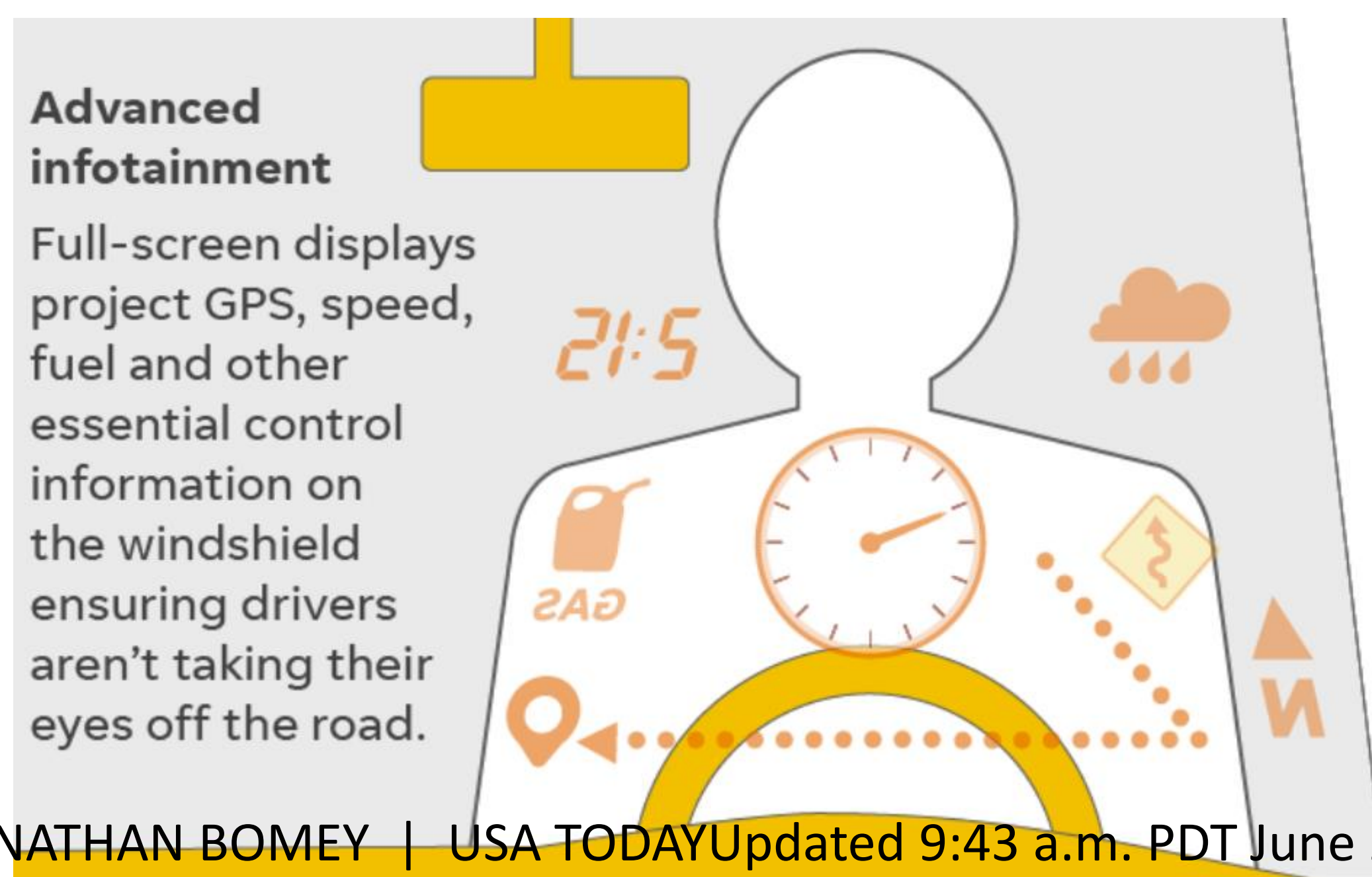
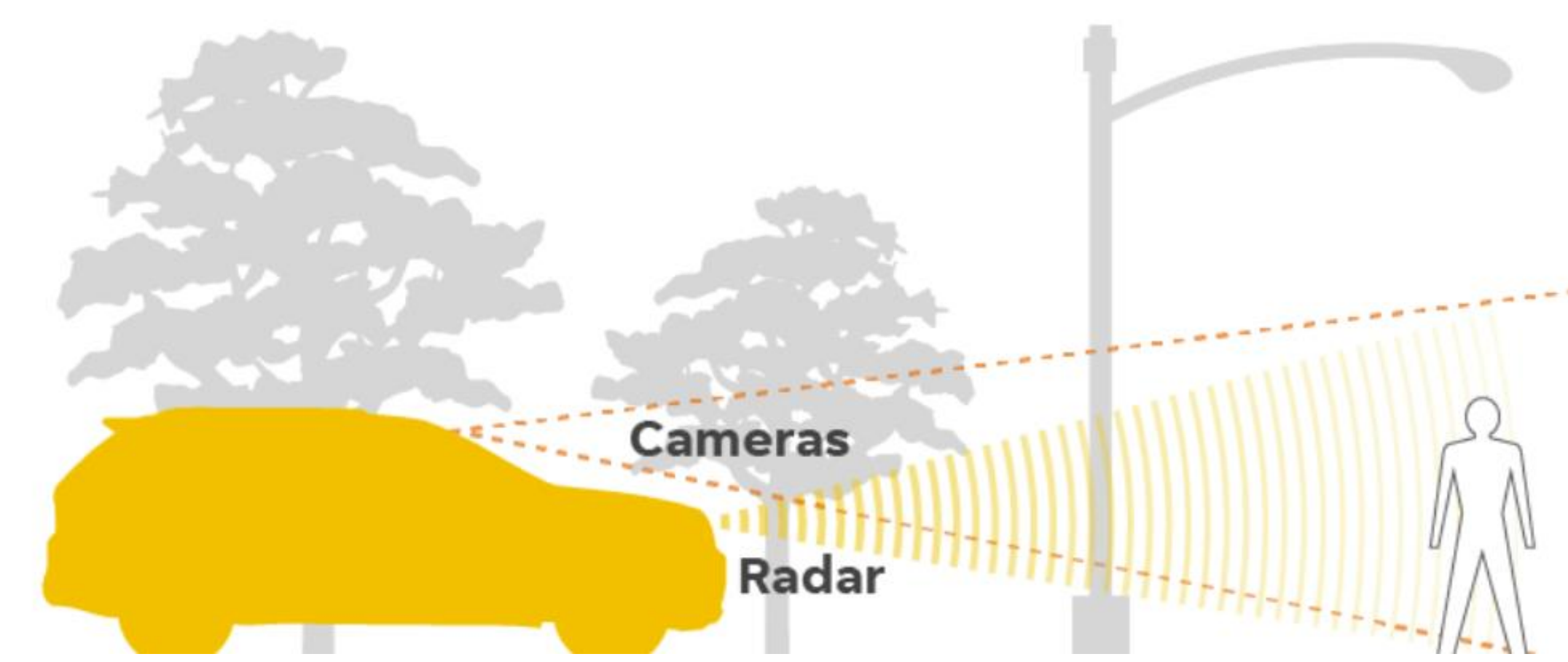
Automation on the roads could be the great public-health achievement of the 21st century.

ADRIENNE LAFRANCE SEP 29, 2015



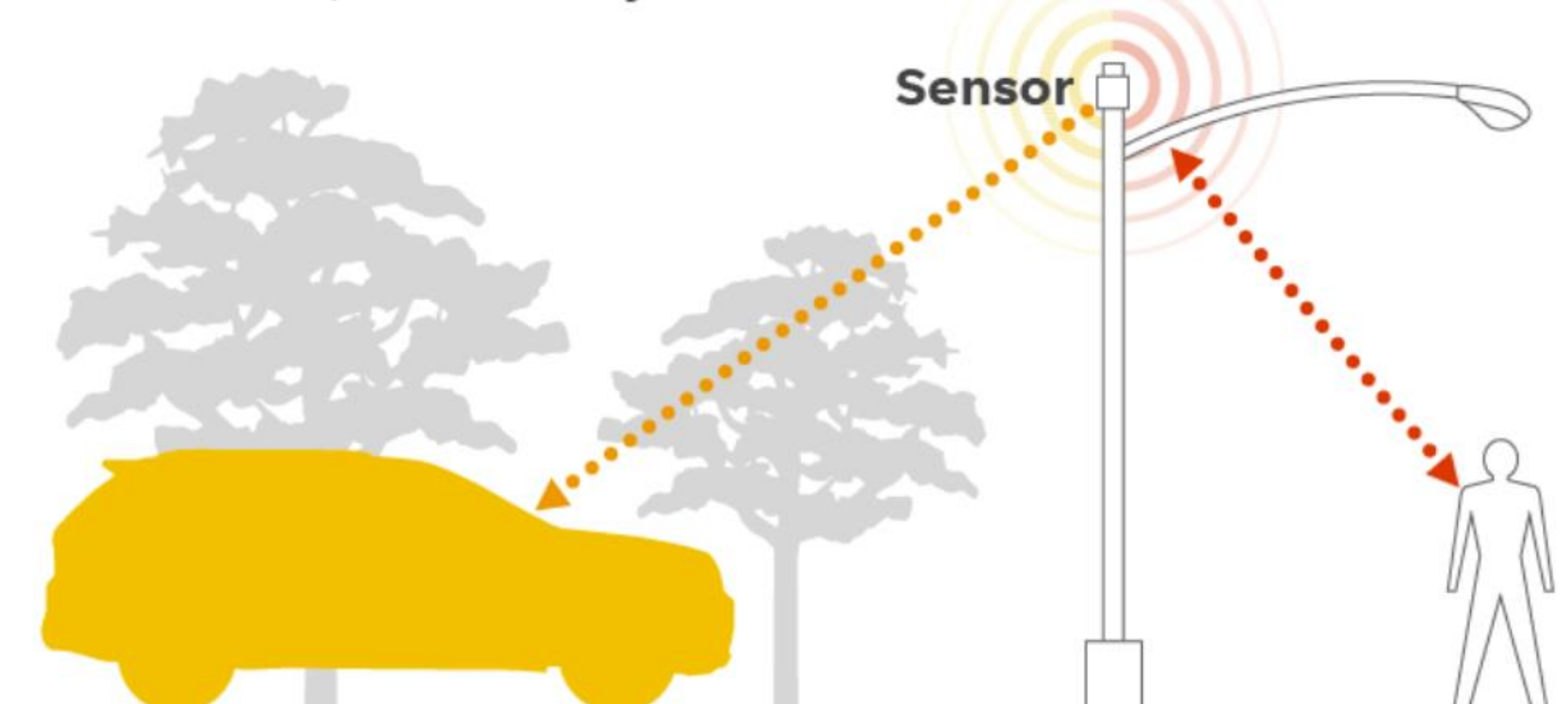
Advanced automatic emergency braking

Radar and cameras detect pedestrians within a 20-meter radius and deploy automatic emergency braking in less time than it takes to blink twice.



Vehicle-to-infrastructure communications

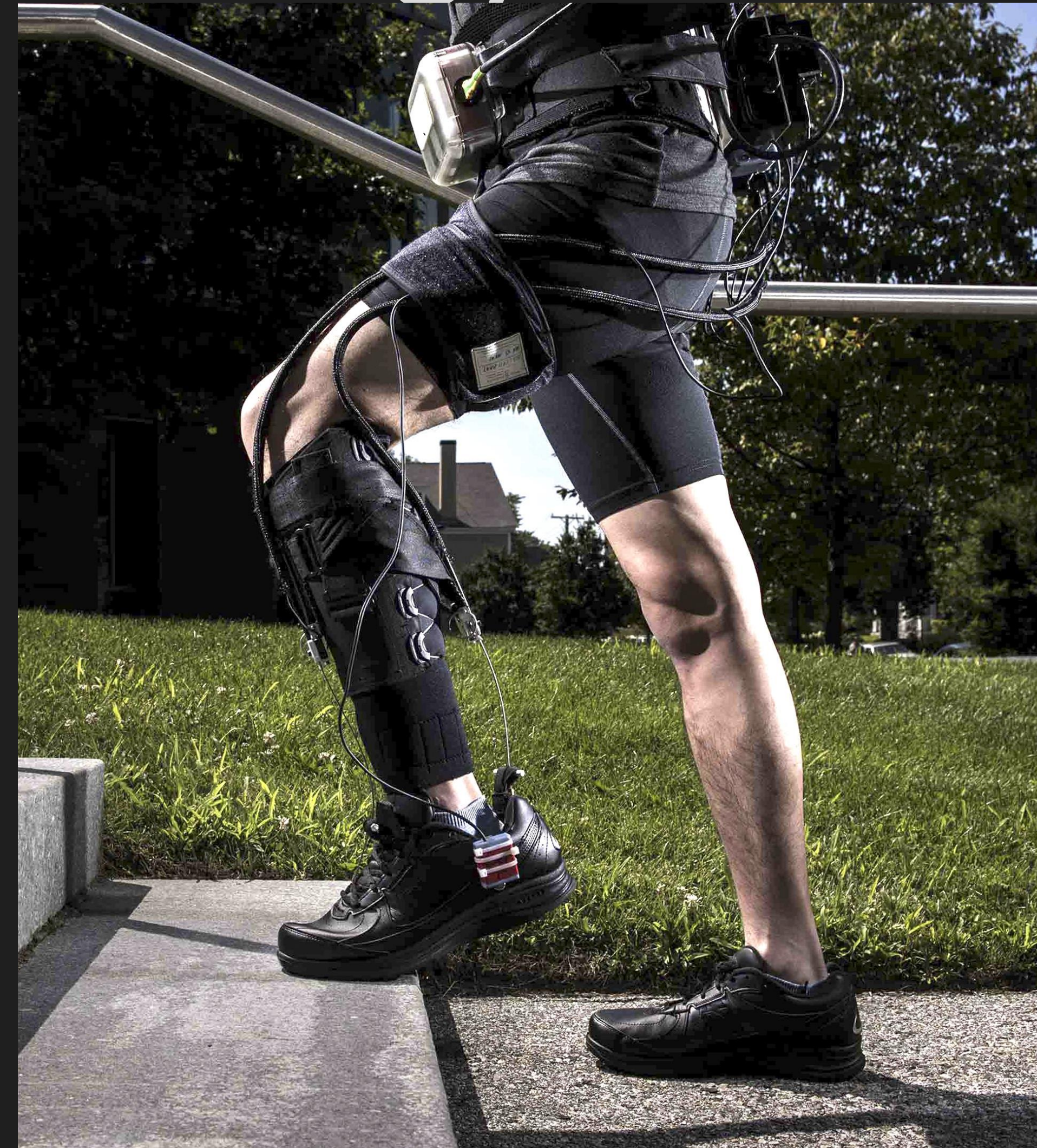
Short-range wireless sensors, mounted on poles or boom arms along the road, signal drivers if pedestrians are in the road ahead, even if they are around a corner and out of view.





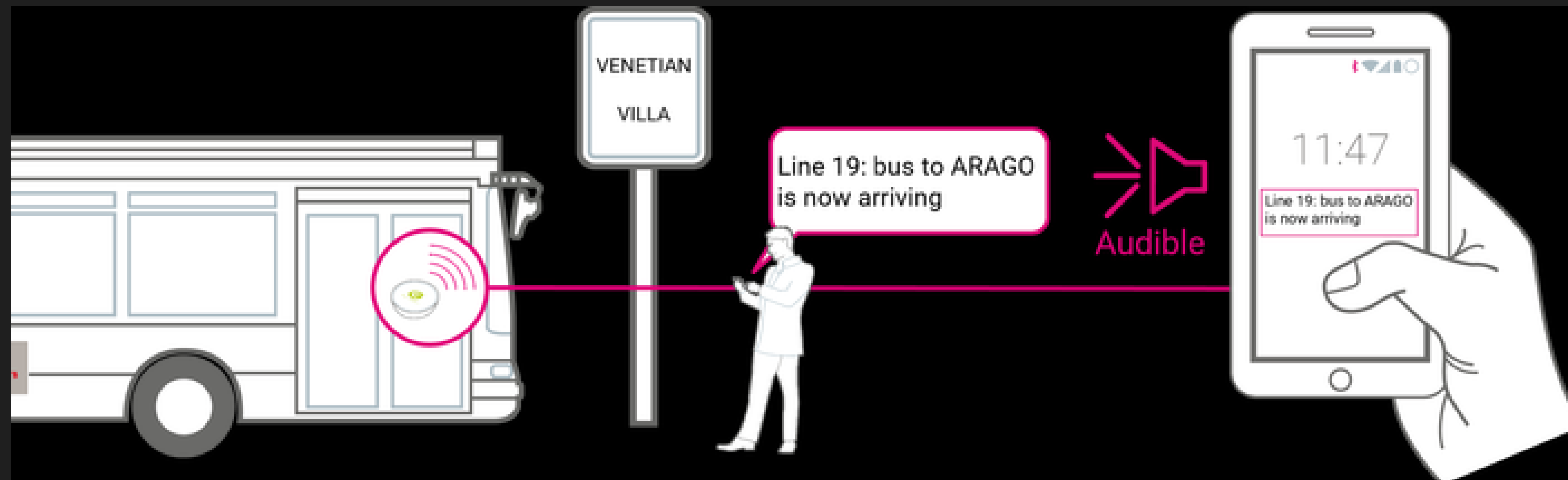
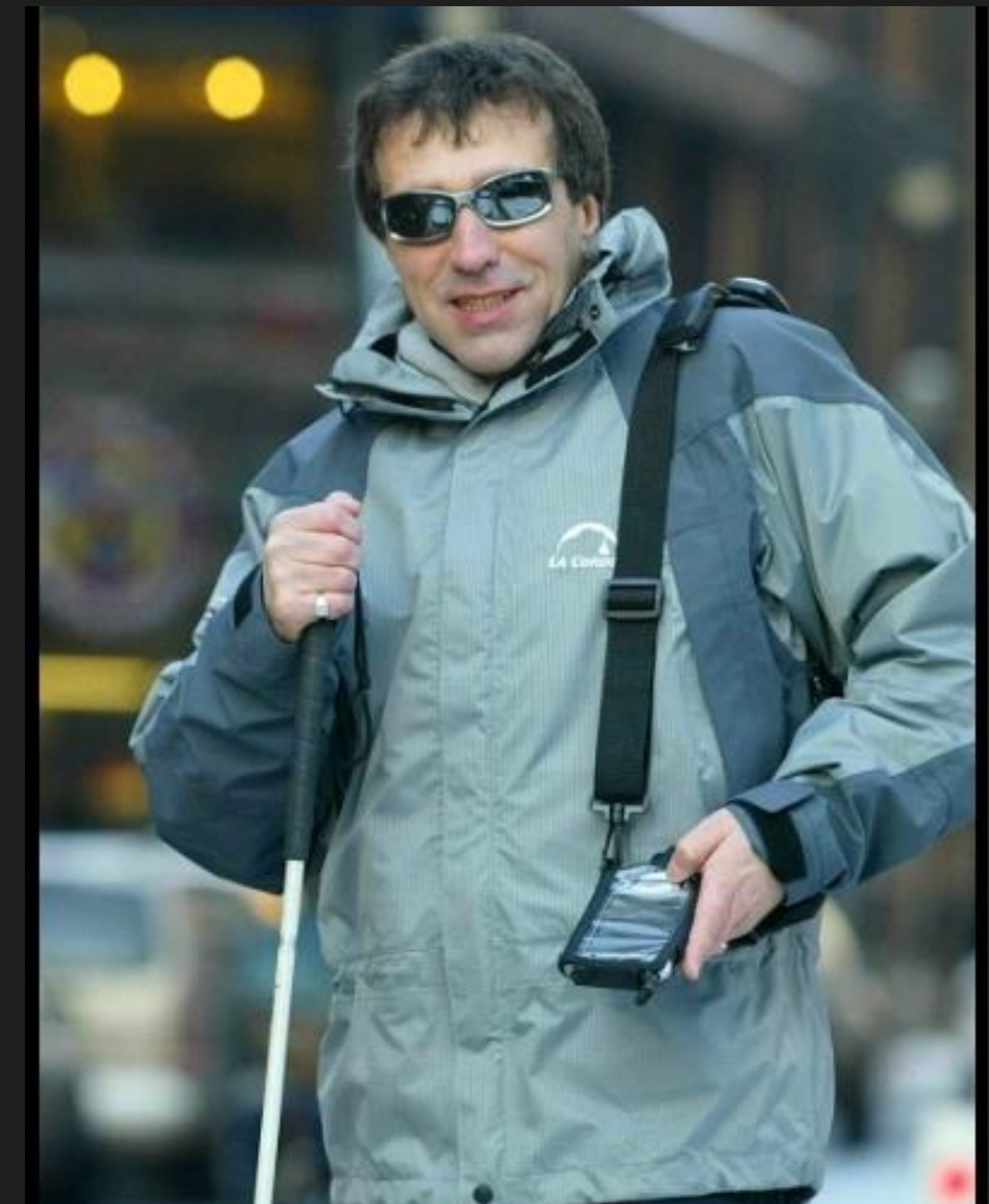
Sidewalk Congestion & Confusion

Health & Environmental Feedback with Wearable Technology

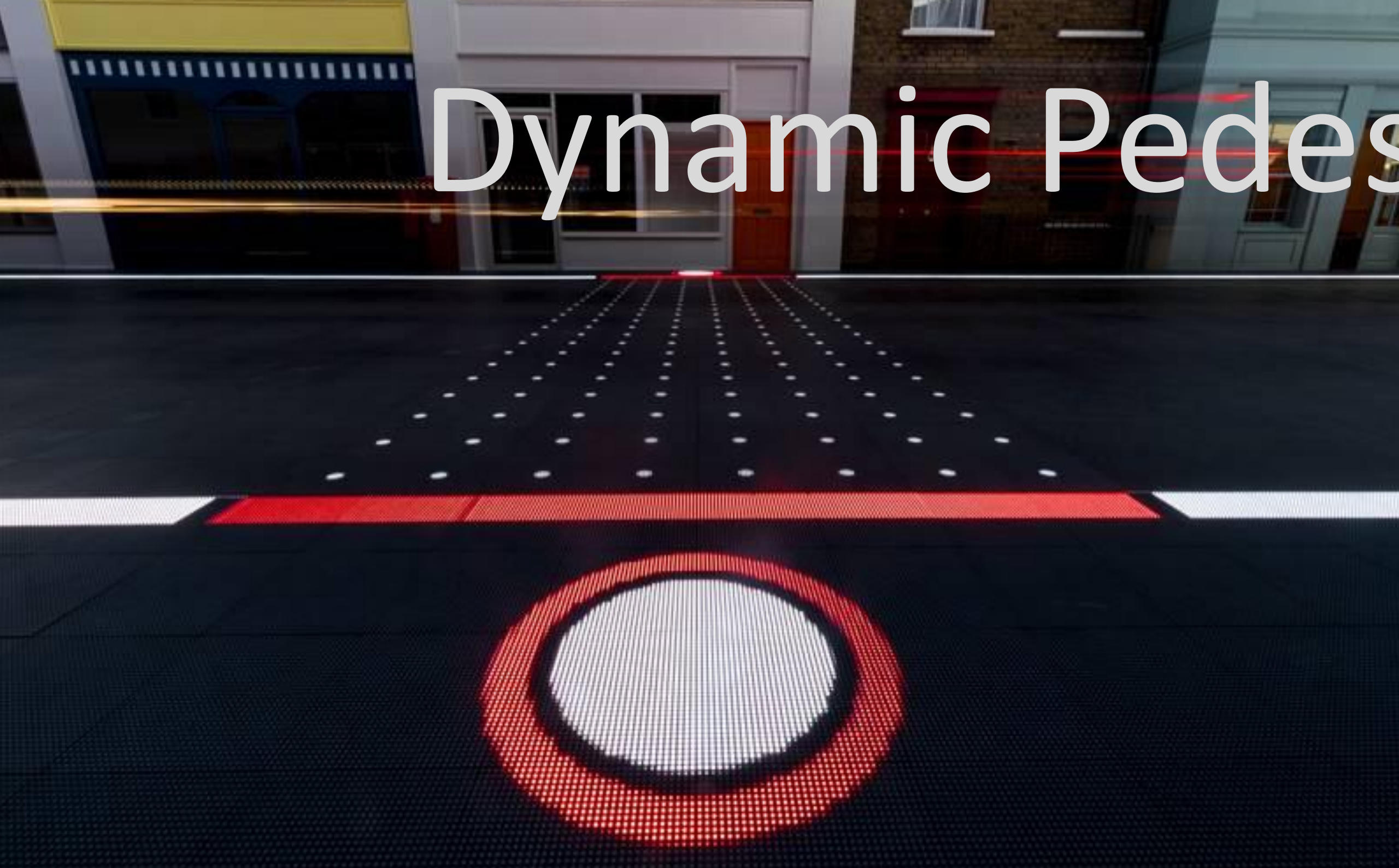




Routing & Wayfinding



Dynamic Pedestrian Crossings



Starling (STigmergic Adaptive Responsive LearnING) Crossing Prototype by Umbrellium

AARIAN MARSHALL TRANSPORTATION 05.11.18 07:00 AM

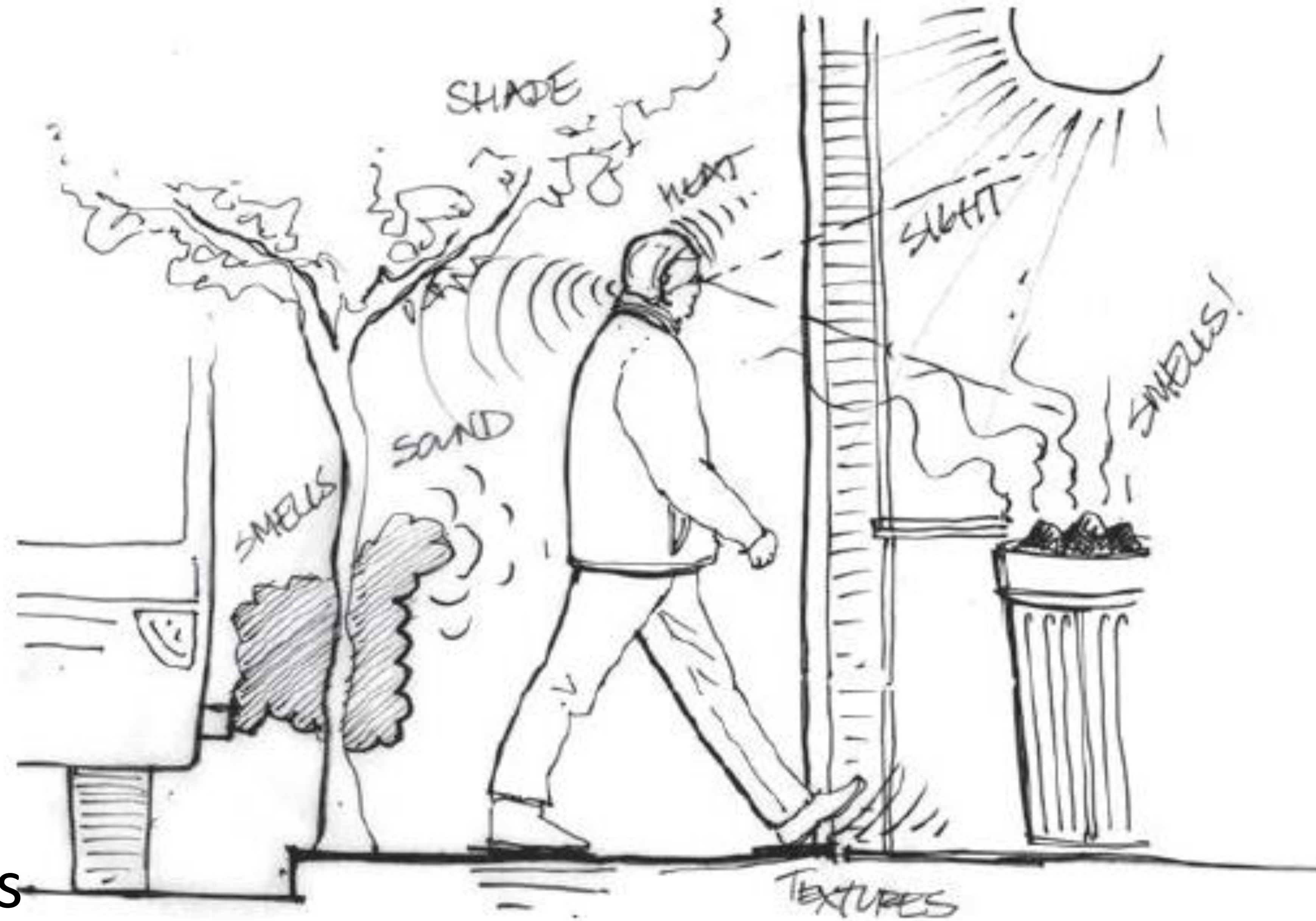
SAVE LIVES WITH SMARTER, SLOWER STREETS—NOT SELF- DRIVING CARS

WIRED



3. Comfortable

- Wayfinding & navigation
- Connecting people
- Lighting & environmental conditions
- Designing Spaces



Source: New York City. 2013. "Active Design Shaping the Sidewalk Experience"

The "Humble Lamppost"



www.UrbanDNA.eu

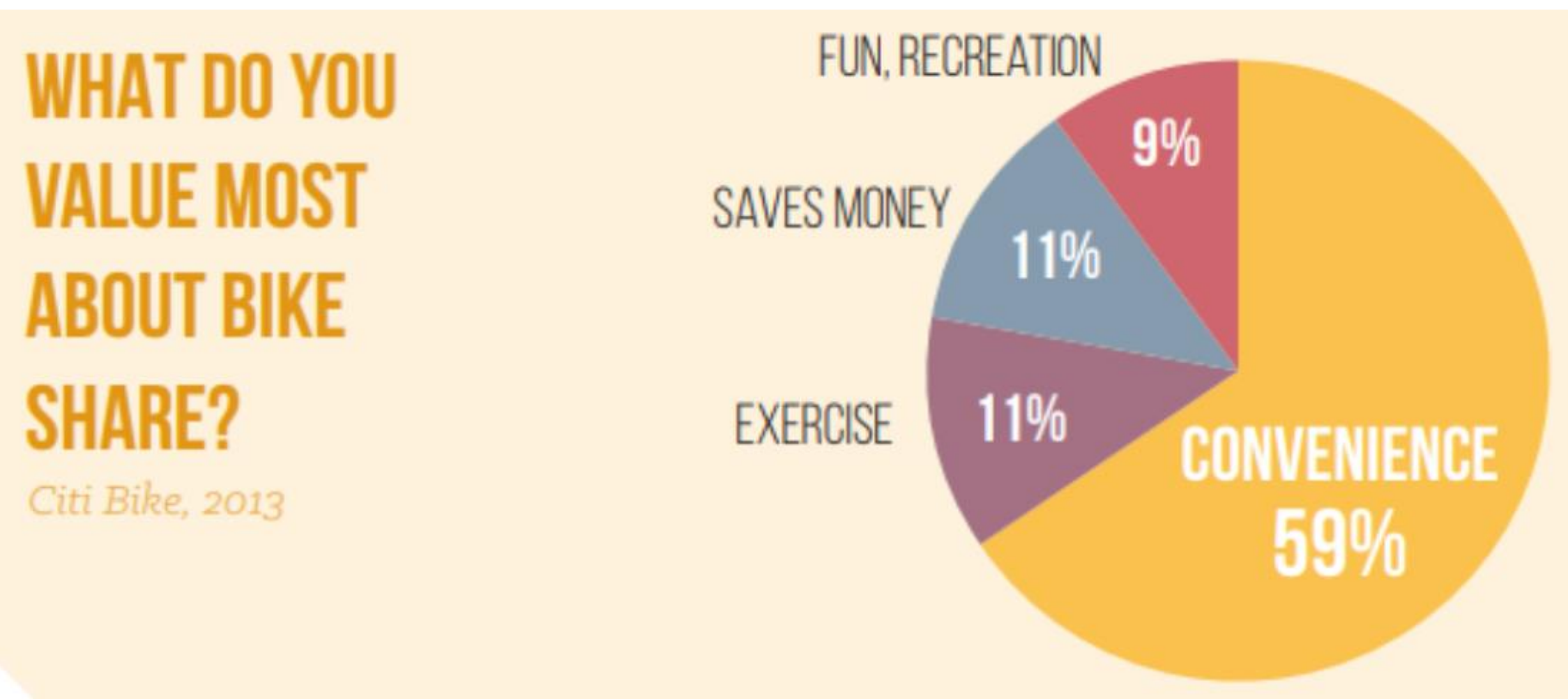
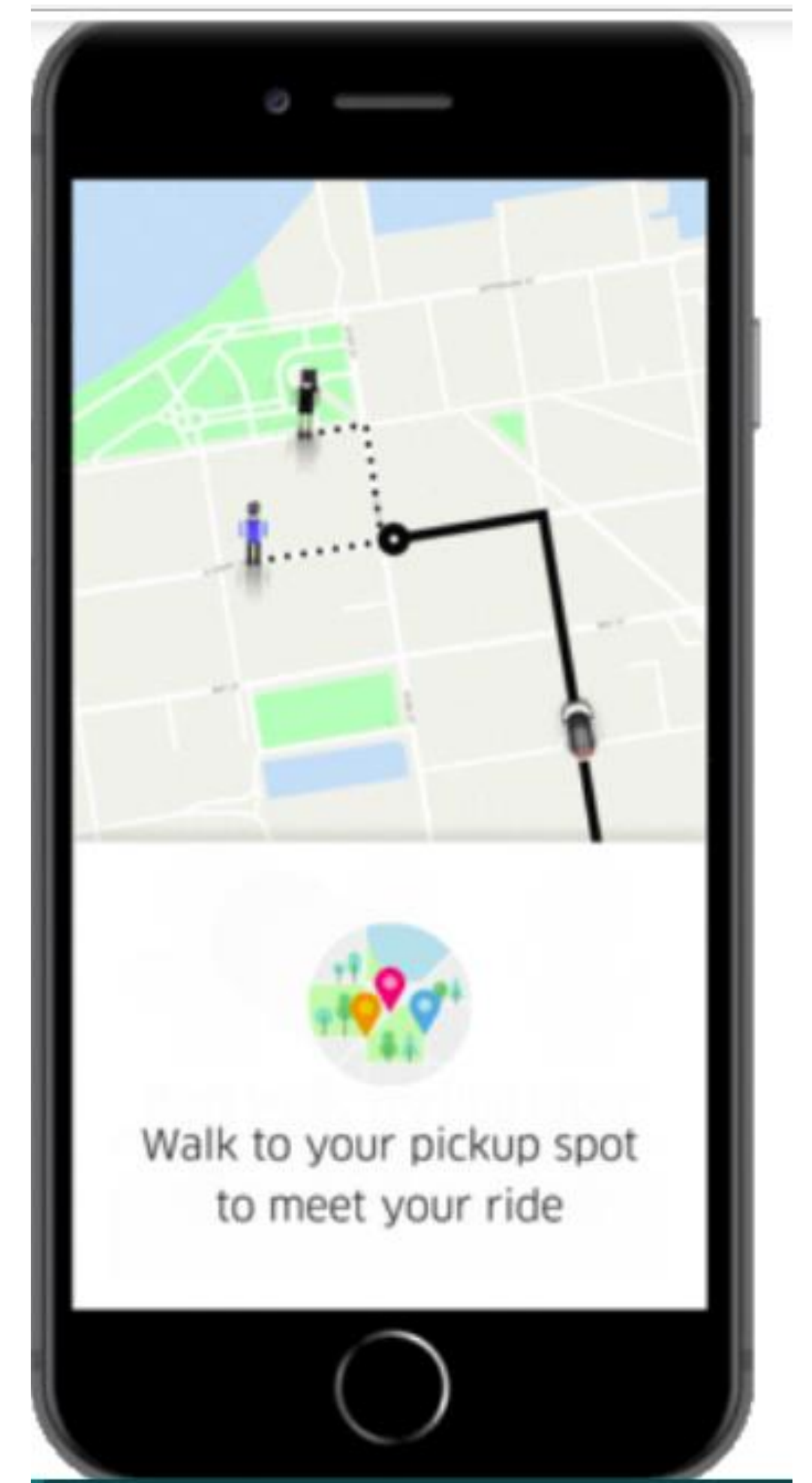
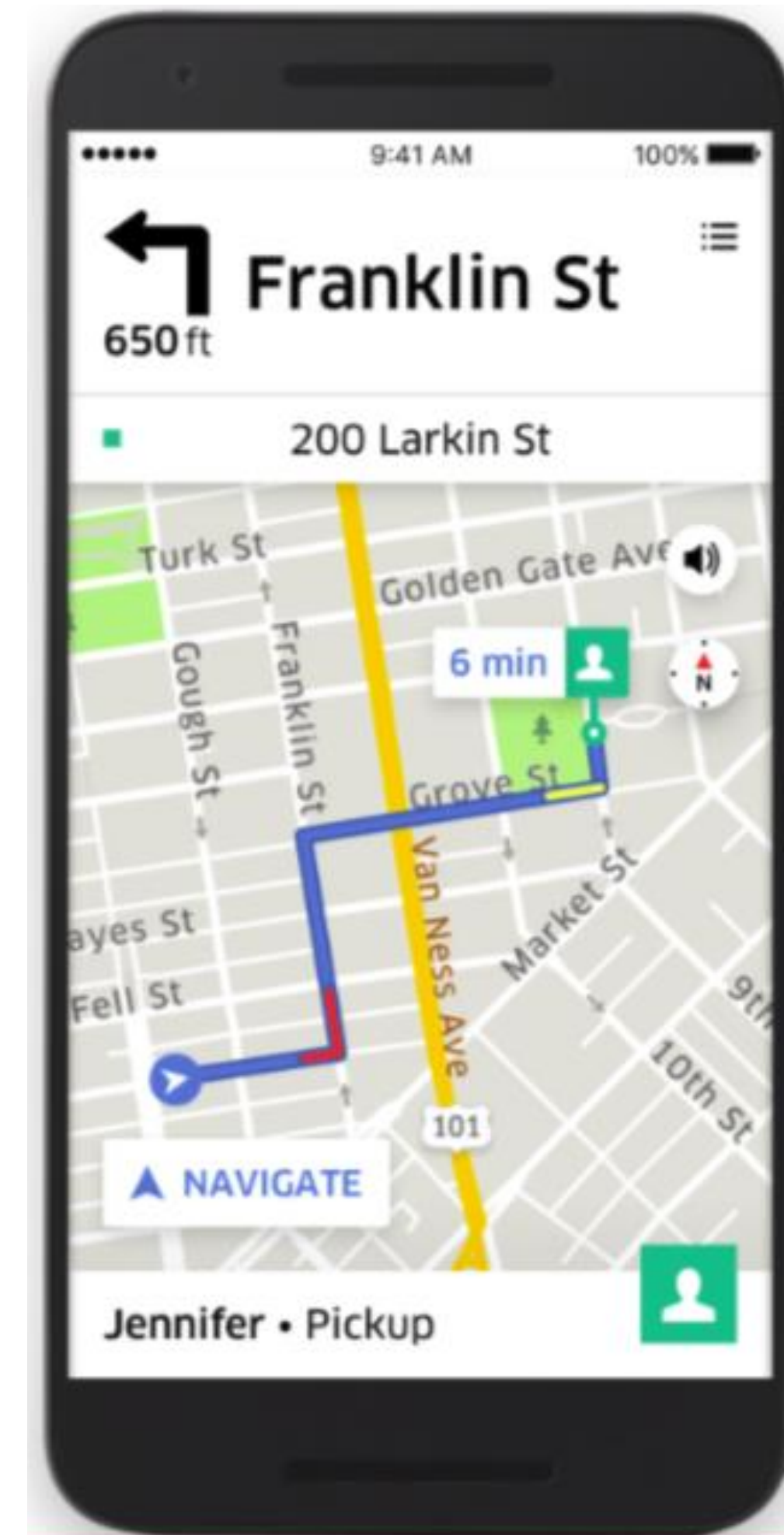
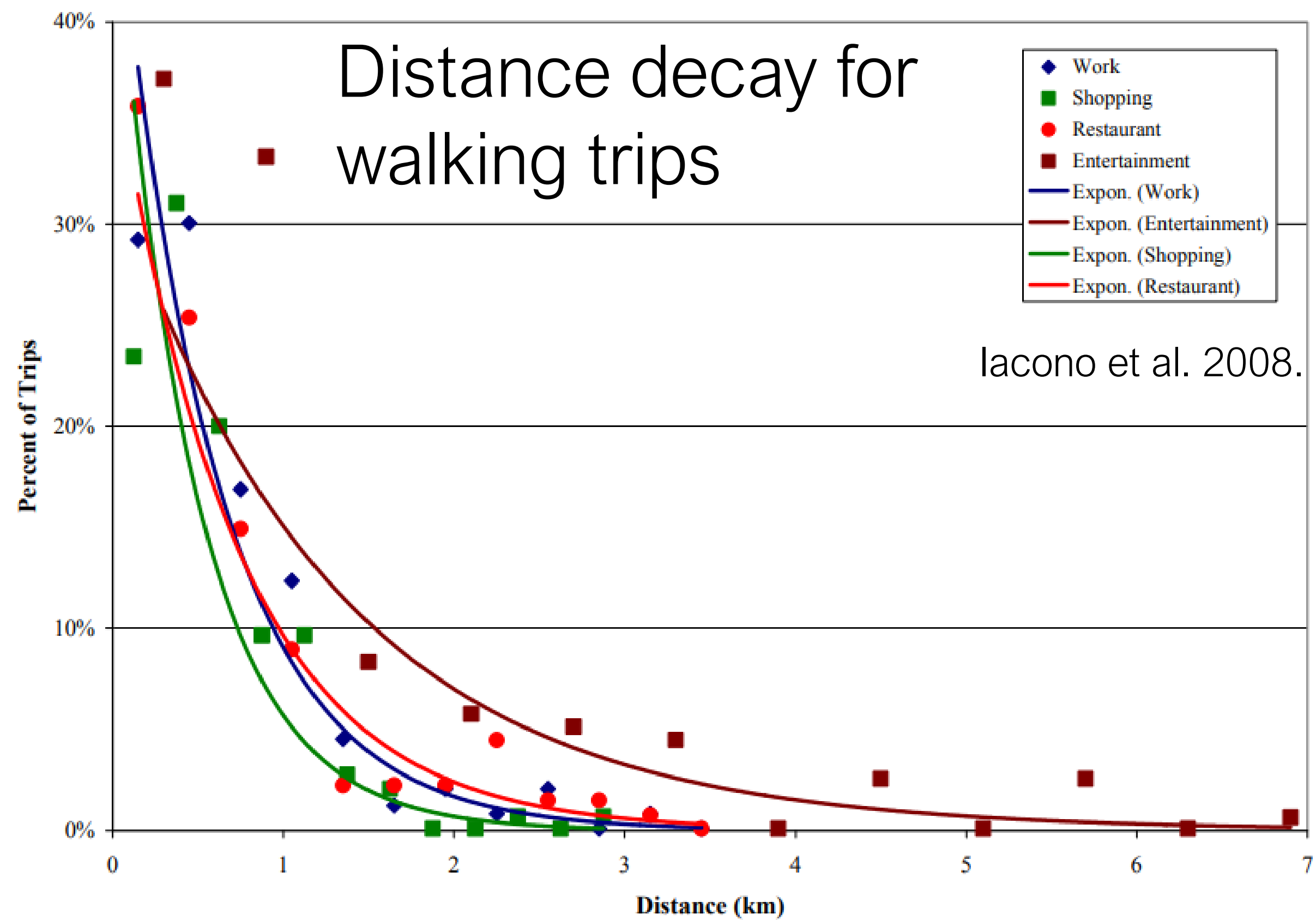
UrbanDNA
innovate incubate accelerate

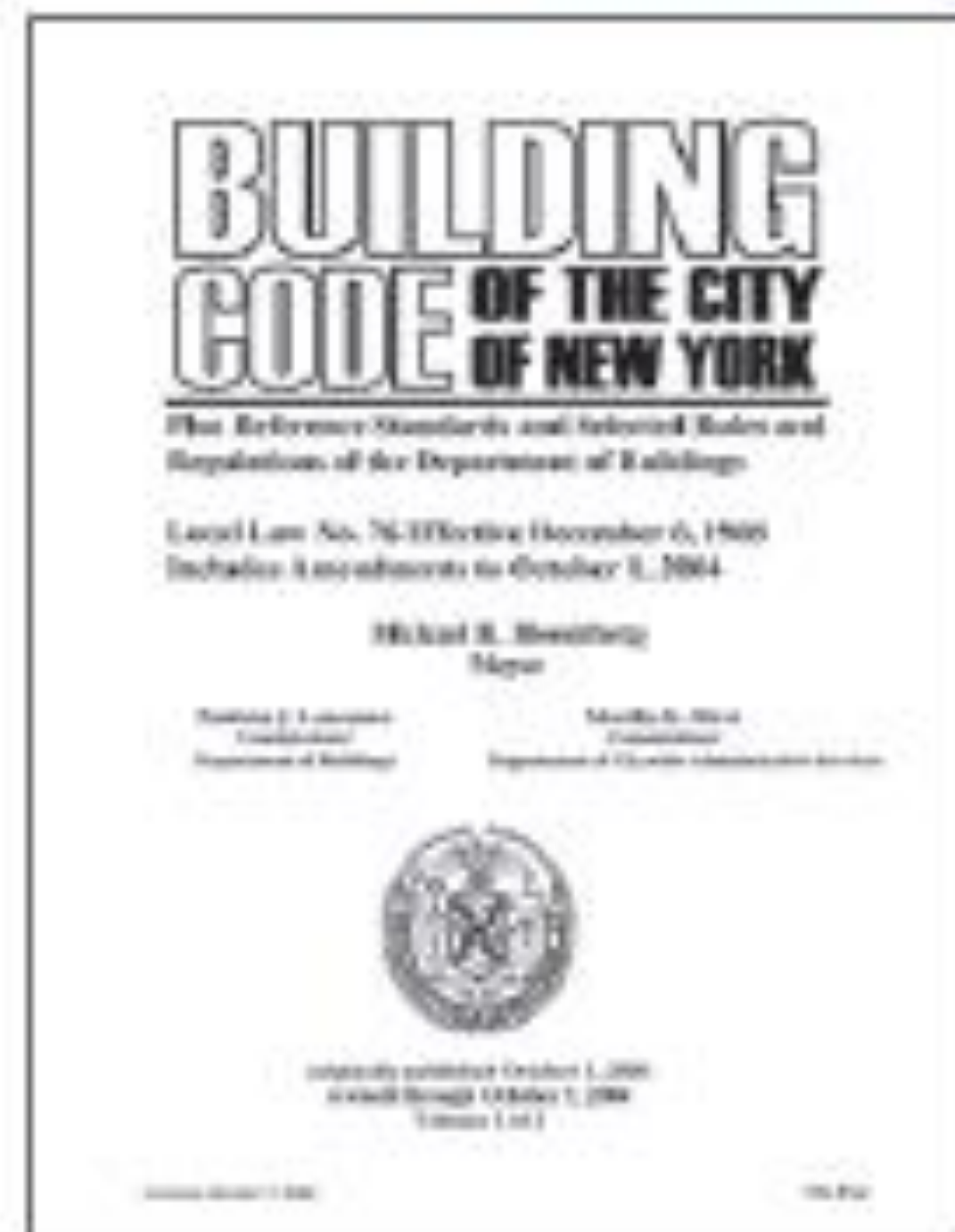


Question: Below is a list of factors that other researchers have found to influence the routes people walk along. For each one, please mark how important it is to you.

Factor	Very important	Somewhat important	Not important
Shortest route	82%	17%	1%
Traffic devices are present	55%	30%	15%
Traffic drives at safe speeds	46%	41%	13%
Sidewalks in good condition	43%	44%	13%
Presence of attractive buildings, trees, and landscaping	35%	44%	21%
No traffic lights where it takes a long time to cross	29%	39%	32%
Other people out walking	23%	37%	40%
Shops/businesses to stop in	14%	32%	54%
Shops/businesses with window to look in	11%	25%	65%
Benches/places to sit	11%	15%	75%
Friend/neighbour along the route	7%	18%	75%

New Modes: Competition & Complementarity





4. Interesting

- Connecting people & creating communal spaces
- Gamification
- Virtual reality
- Urban design



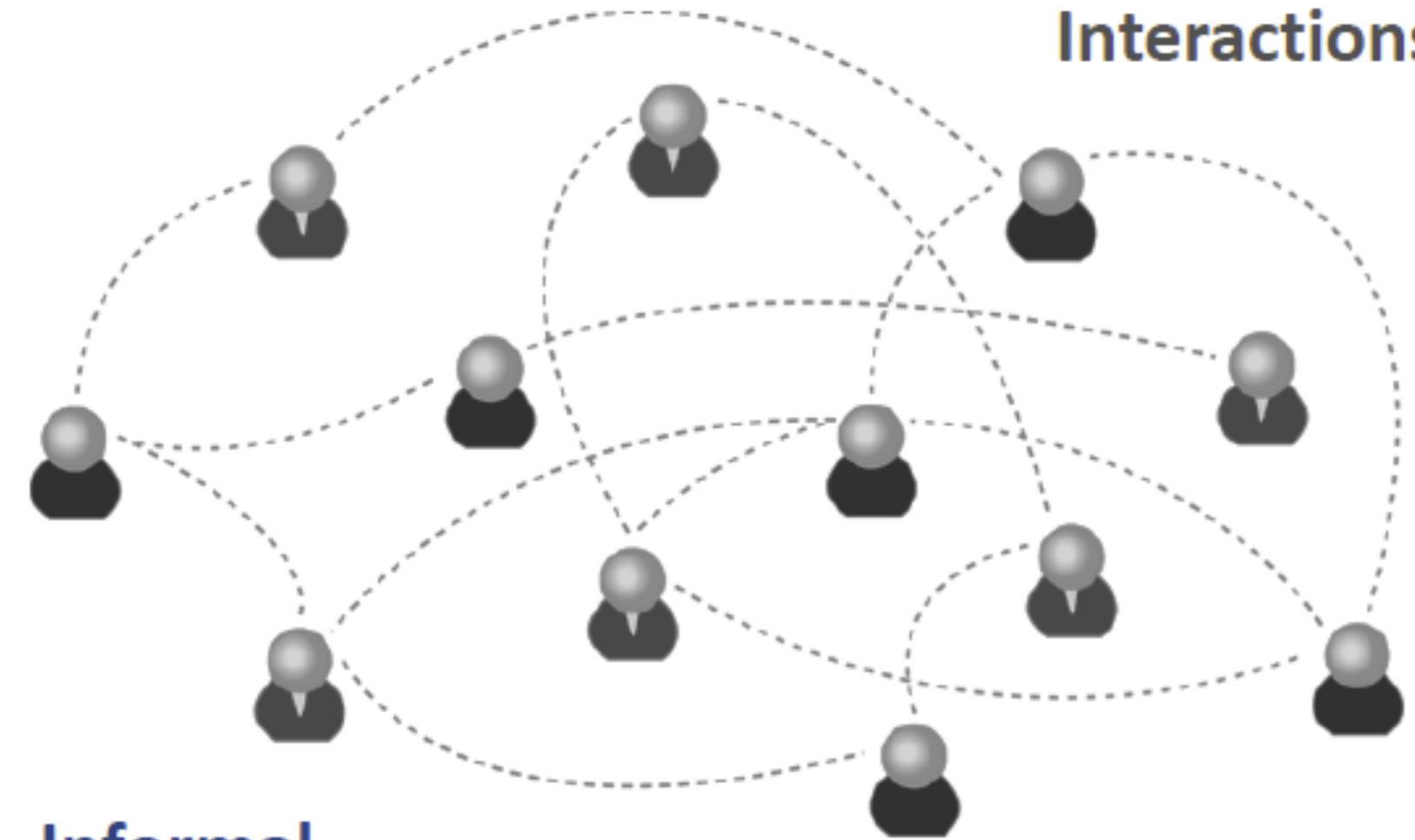


(Matthew Ransom + Violet Whitney)

Spaces for social interaction



**Formal
Interactions**



**Informal
Interactions**





Photograph: Cole Burston/AP

4



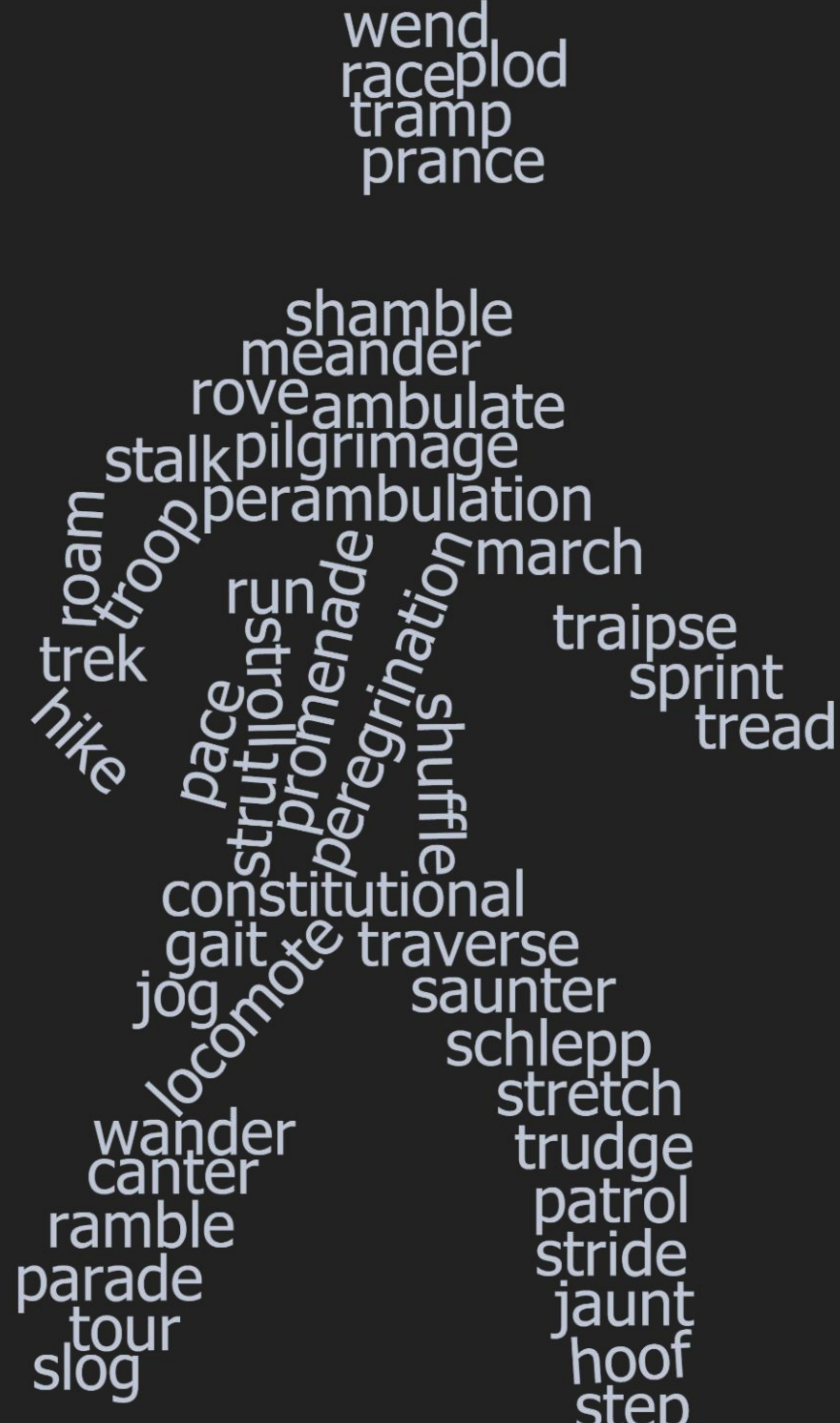
Happily Ever-After?
(Epilogue)

Collaborators



Passenger Travel-Goods Movement

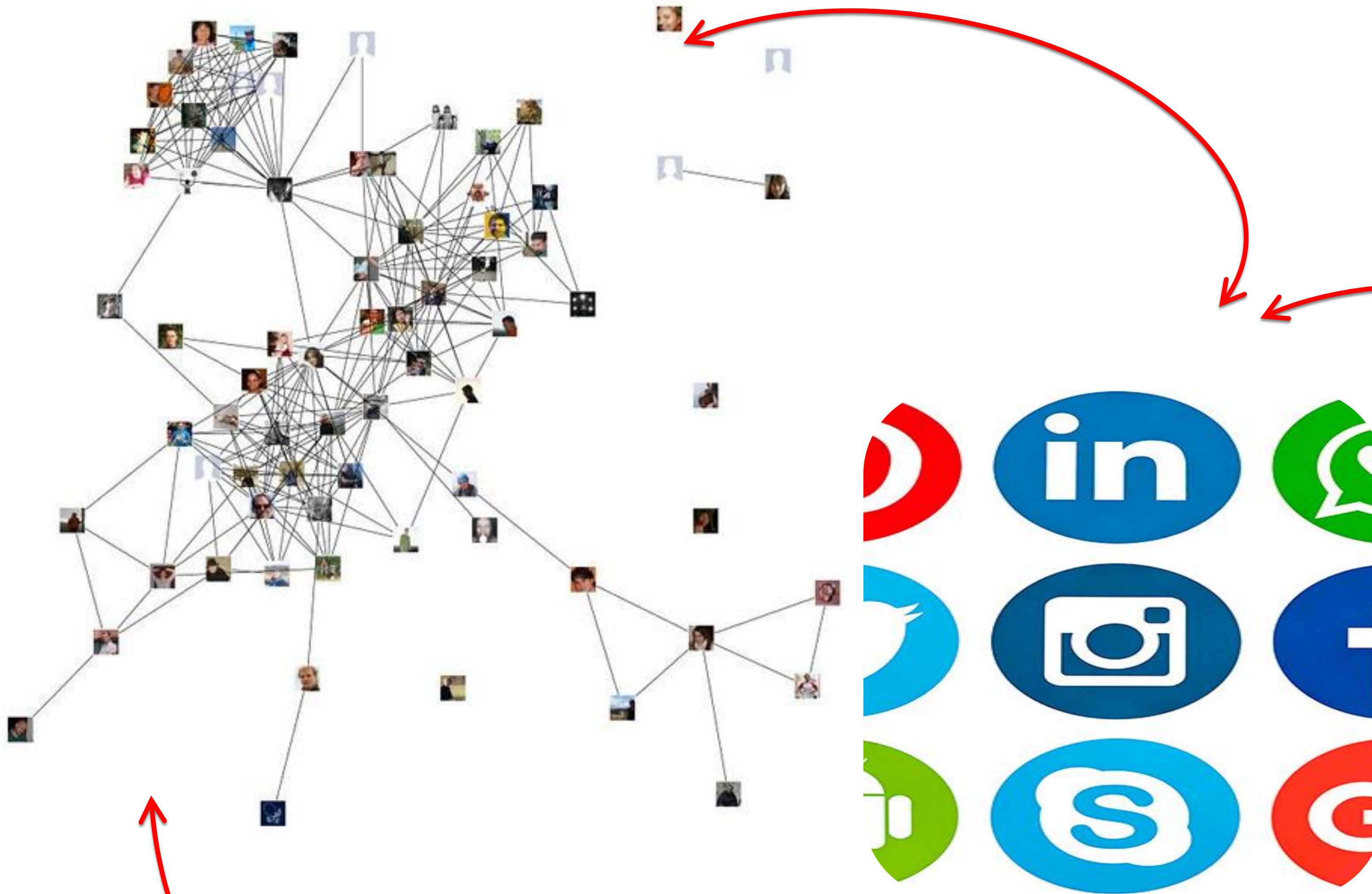




Different considerations
for different trips...

... & trip makers

Social Media & Travel





Person Capacity & Performance Measures

Resign the Right of Way

Cities could seamlessly manage streets to mitigate the negative impacts of private motor vehicle traffic on city life. Vehicle infrastructure would be given significantly less space, giving streets back to people.

Travel lane and intersection size could greatly decrease—minimizing crossing distances and maximizing the pedestrian experience.

Fully separate bikeways and widened sidewalks could elevate the experience of the street as a public space. Low vehicle speeds make it safe to move in any mode.

Pedestrians can be prioritized on every inch of future streets. Required vehicle yielding, completely flush accessible surfaces and shorter crossing distances would create safe and pleasant street environments for people.

Frequent gaps in short vehicle platoons could allow opportunities for pedestrians to cross the street without the need for long, complex signals that create delay for vehicles and pedestrians alike.

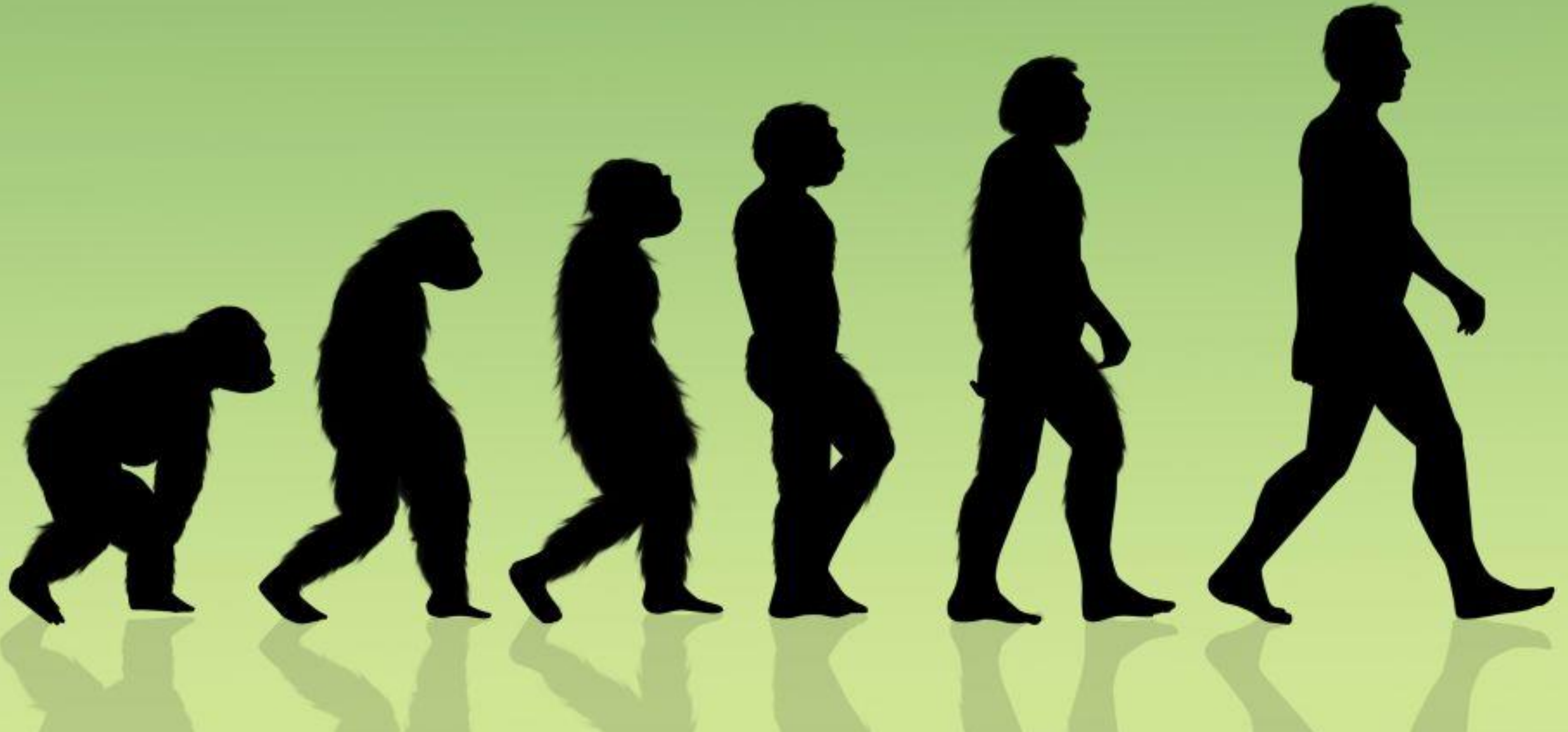




Resilience & Redundancy



Walking: What makes us human



Thank You!





Portland State
UNIVERSITY

Professor
Department of Civil & Environmental
Engineering
Maseeh College of Engineering and
Computer Science
Portland State University



kellyjclifton.com
SUPERLab.us



kclifton@pdx.edu



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