What Excites Me

MIT Mobility Forum
September 26, 2025

Lawrence D. Burns
(lawrencedburns.org)

What Excites Me

Autonomous Driving

Electric + Autonomous + Connected Vehicles

Physical + Virtual Access

Design Innovation

The Power of “And”

The Future of Living

Autonomous Driving

Autonomous Driving

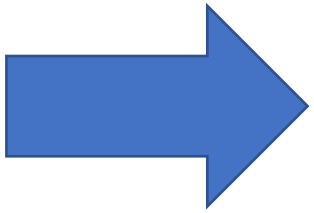
Compelling “Prize”

Deep-Pocketed Players

Impressive Progress

Several Growth Pathways

Further Enablers

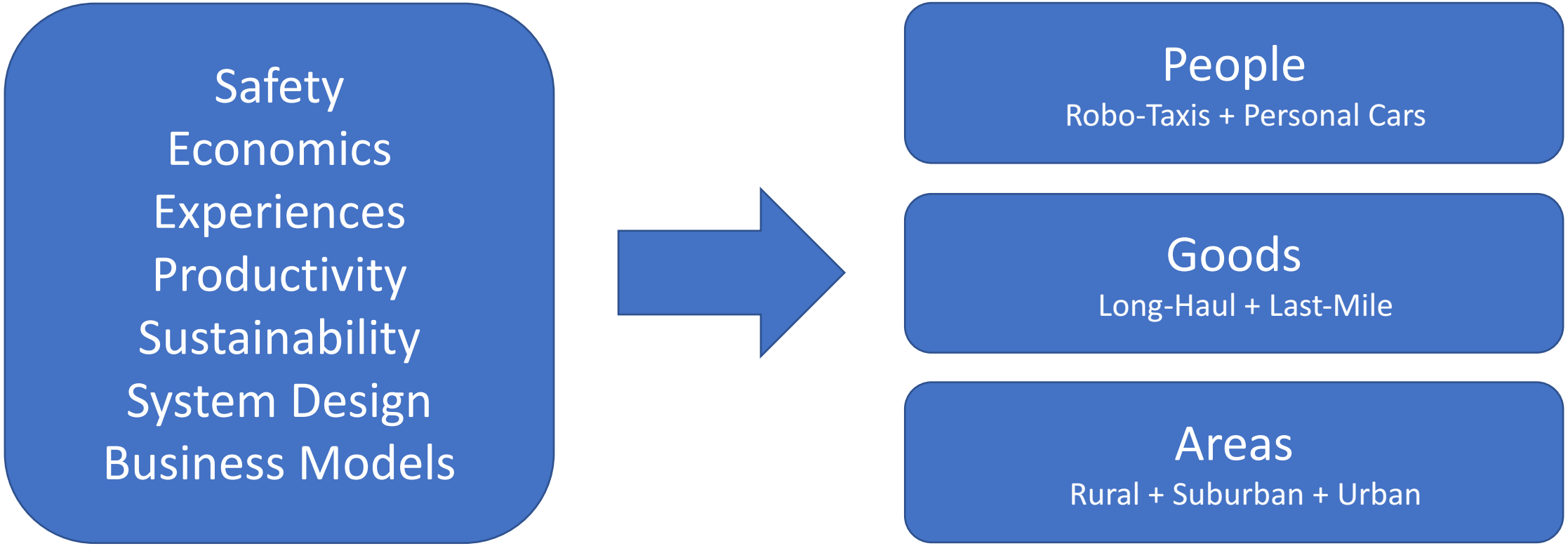


How & When,

Not Whether

Is Inevitable

Autonomous Driving



Changes Transportation Fundamentals Broadly

Safety Leaders
Will Be
Market Leaders

Two-Mode Driving

Enhanced Situation Awareness

Anticipate the road ahead
- Roadway data (on steroids)
- Advanced sensors
- Artificial intelligence (new algorithms)

Determine when a human driver **could** be required
- Autonomous driving system capability
- Vehicle state
- Actuarial science

Ensure a human is engaged when required
- Human factors
- System design

Two-Mode Driving

Advanced Driver Assistance Systems (ADAS)

Technology Assists Humans

Advanced Technology Assistance Systems (ATAS)

Humans Assist Technology

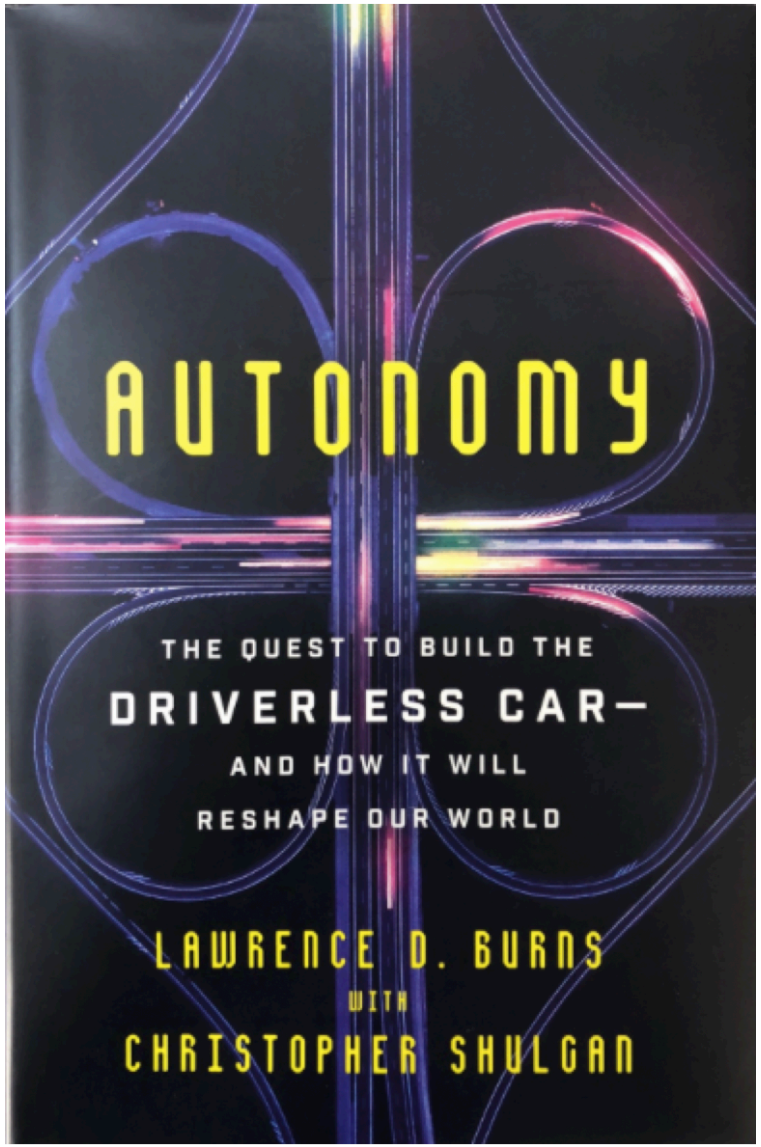
ATAS + Autonomous

Two-Mode Driving

For Personal Vehicles

Electric + Autonomous + Connected Vehicles

Electric + Autonomous + Connected Vehicles



Better Experiences
+
Lower Costs
+
Profound Societal Benefits

Biggest risk is
not realizing benefits
as soon as we safely can!

Americans Buy Autos For Extreme Occasional Trips

Typical Auto	**Typical Use**
99+% of cars have 4-to-8 seats	80% of trips have 1-or-2 people
Top speeds > 100 mph	Average speed 30 mph
Range > 400 miles	90% of trips < 25 miles 70% of autos driven < 40 miles/day
Max payloads of 1000-3000 lbs	2 adults + 2 suitcases weigh about 500 lbs
Available 8760 hours per year	Used about 450 hours per year (5%)

Trend

Since 1982, U.S. autos are

40% heavier

175% more powerful

55% faster

25% more costly

Chevrolet Silverado 2500

1993 (4300 lbs) vs. 2023 (6500 lbs)

EV Implications

Silverado

+

Lions Offensive Line

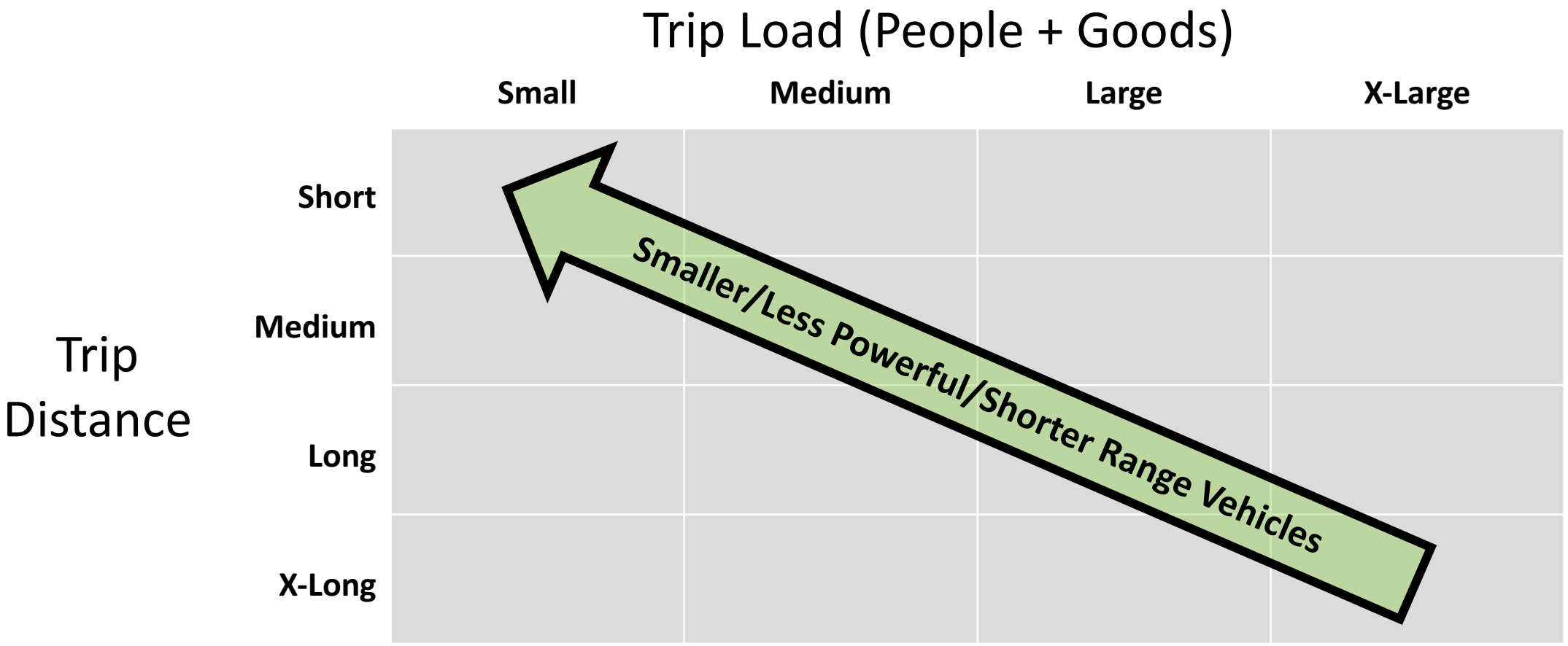
2200 lbs

=

Silverado EV

Yikes!

Opportunity



Electric + Autonomous + Connected Vehicles
Tailored to Trip Requirements

What Must Be True?

Tailored vehicles must be safe, provide compelling experiences and cost less than alternatives

Occasional trips must be easy to make and affordable

People must be free to choose how they travel

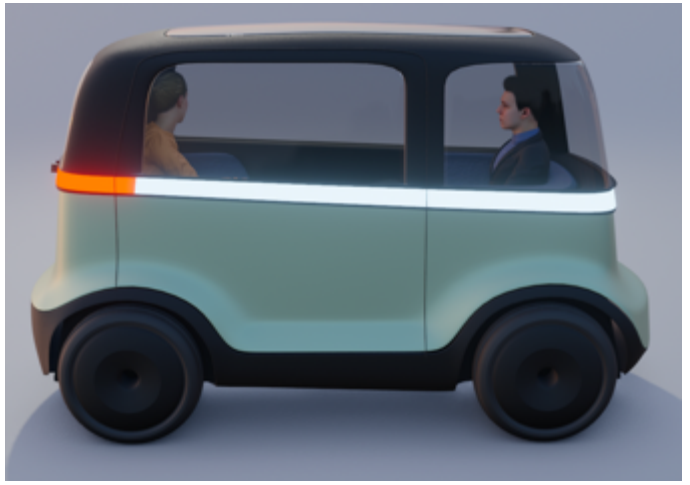
People who prefer to drive large, powerful and fast vehicles must be accountable for the public side effects of their choices

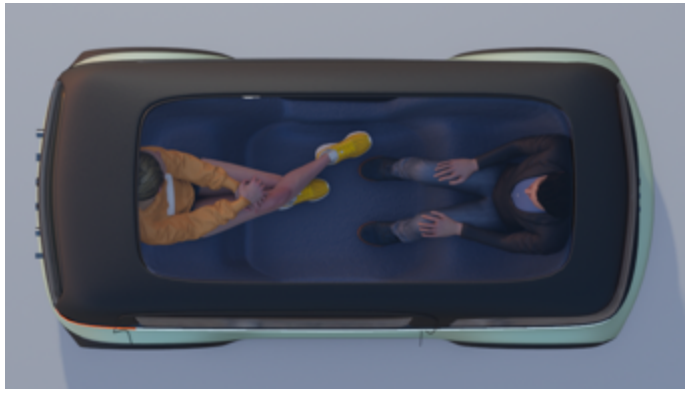
Example Opportunity

Vehicles Tailored for Typical Frequent Trips

80% of trips have 1-or-2 people
2 adults (90th percentile) weigh 500 lbs
Average trip speed 30 mph
90% of trips < 25 miles
70% of autos driven < 40 miles/day
85% of Amazon packages < 5 lbs

Two-Seat In-Line Autonomous Electric Vehicle

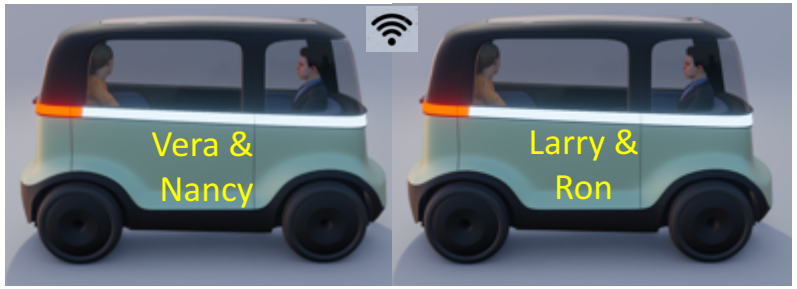




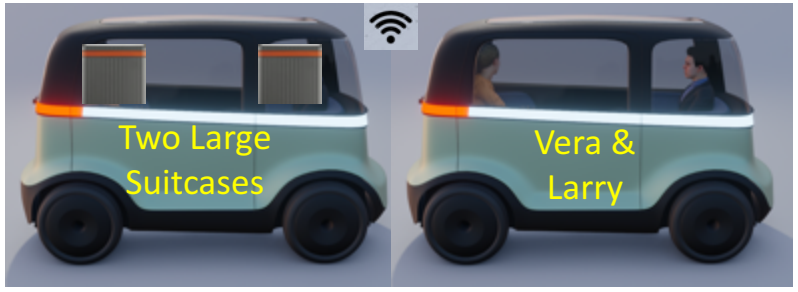
Images: Dan Sturges (mobilitee.us)

Conveniently Enable Occasional Trips

Family Trips

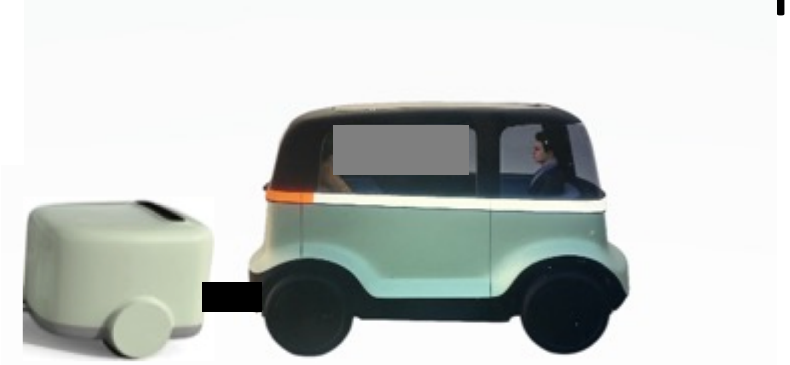


Double Dates



Airport Trips

= Virtually Connected



Long Trips (Range Extending Energy Module)

Long Trips (Interstate Ferry)

Special Trips (Rental/Outfitter)

Physical + Virtual Access

Stupefying!

275 M automobiles

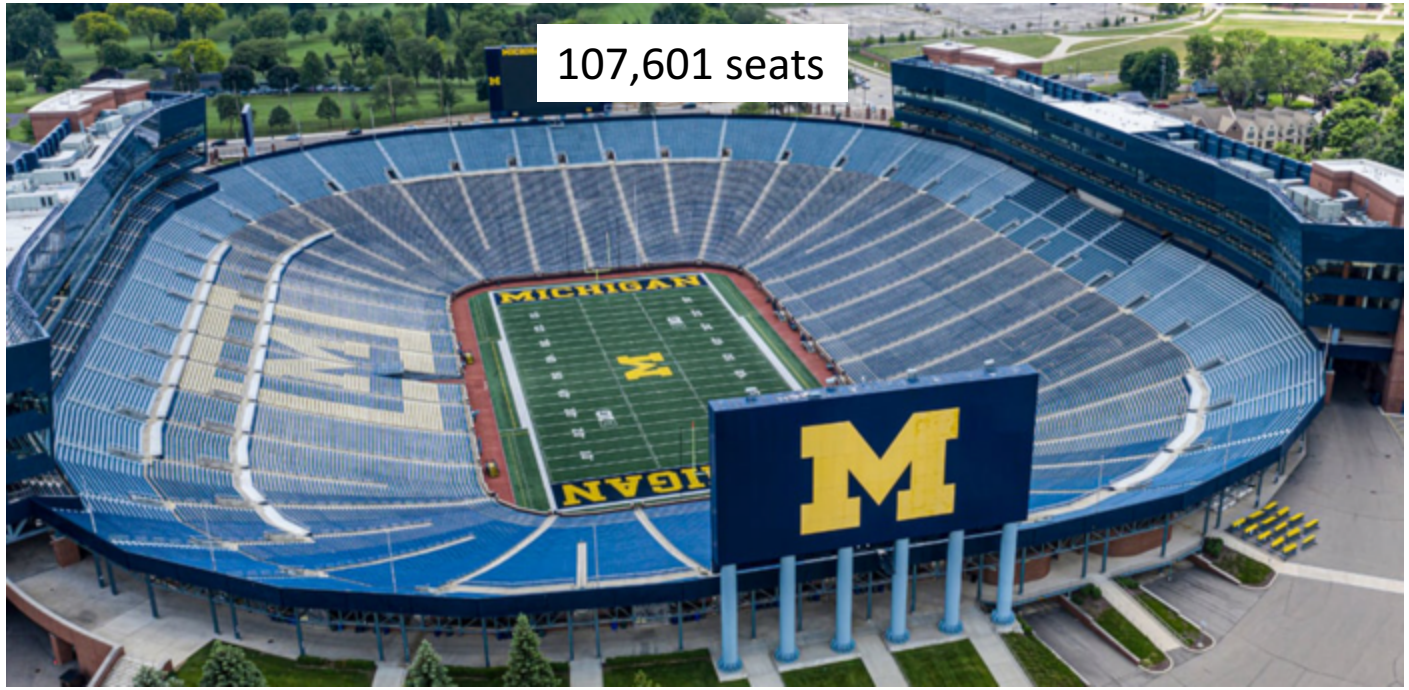
Parked 95% of time

5 seats per automobile

1.5 occupants per trip

~ 1.4 B seats empty 98.5% of time

=



~ 12,600 empty UM stadiums

Why?

Buying a car is buying

***access** to activities*

wherever they are located

and

whenever they are available

Activities

Work
Shop
Learn
Eat
Self-Care
Meet

Socialize
Play
Entertain
Vacation
Worship
….

What We Do

Activities

Use time

Take place at different locations

Occur at various times

+

Activity Access

Physical + Virtual

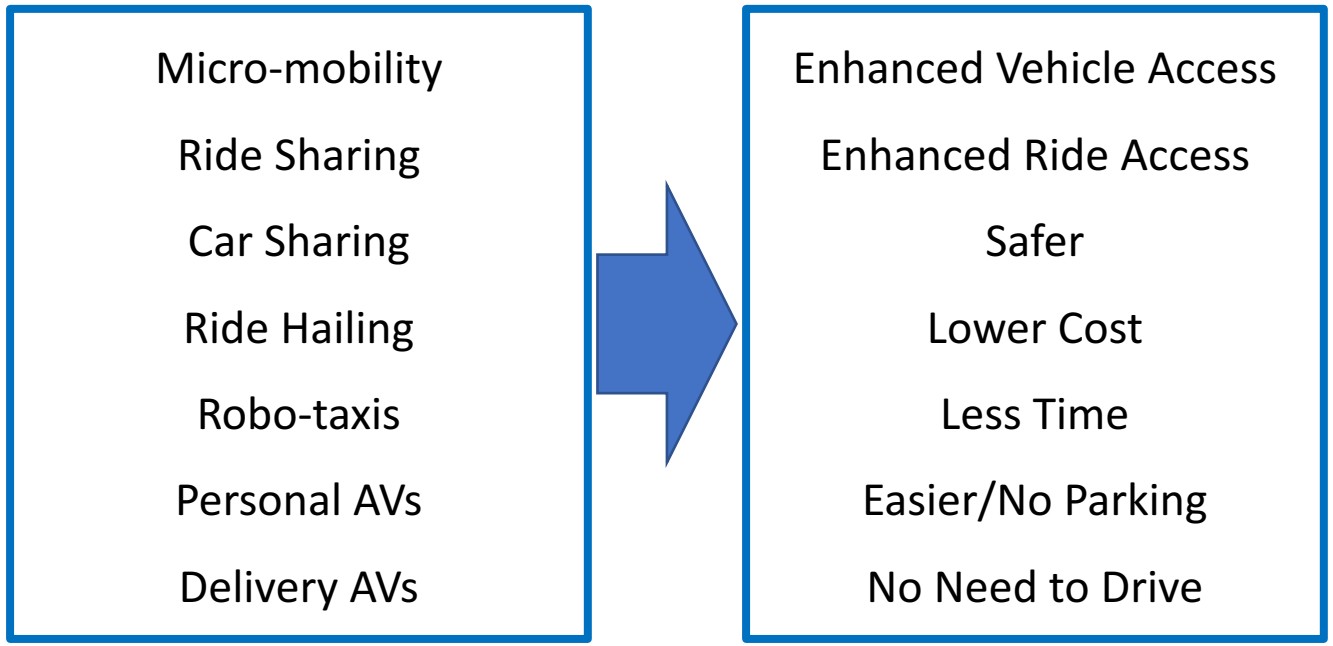
(Transportation) (Internet)

Americans Value Access

Population :	330 million	
Population > 18 Years Old :	260 million	
Automobiles :	275 million	Access Devices
Personal Computers :	250 million	
Smartphones :	310 million	

Enhanced Physical Access

Electric
+
Autonomous
+
Connected



Enhanced
Access

Virtual Access

E-Commerce

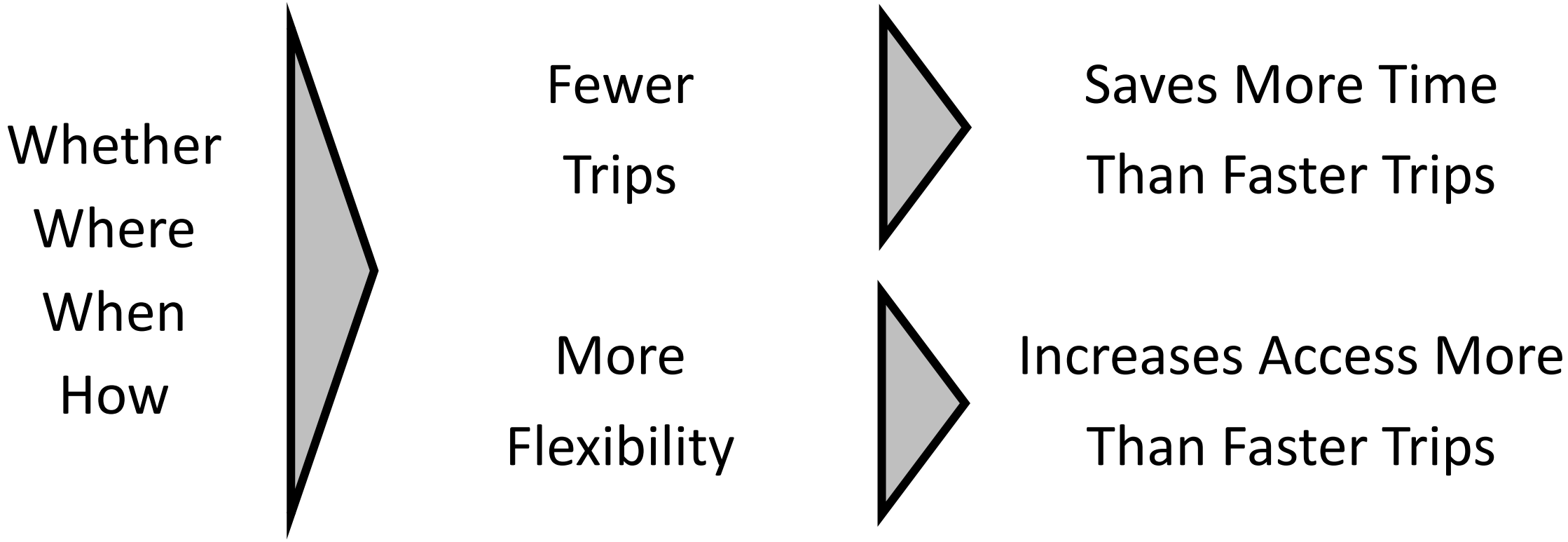
$9.99, 30 Mins

$5.61, 5 Mins

Virtual Access Is Widespread

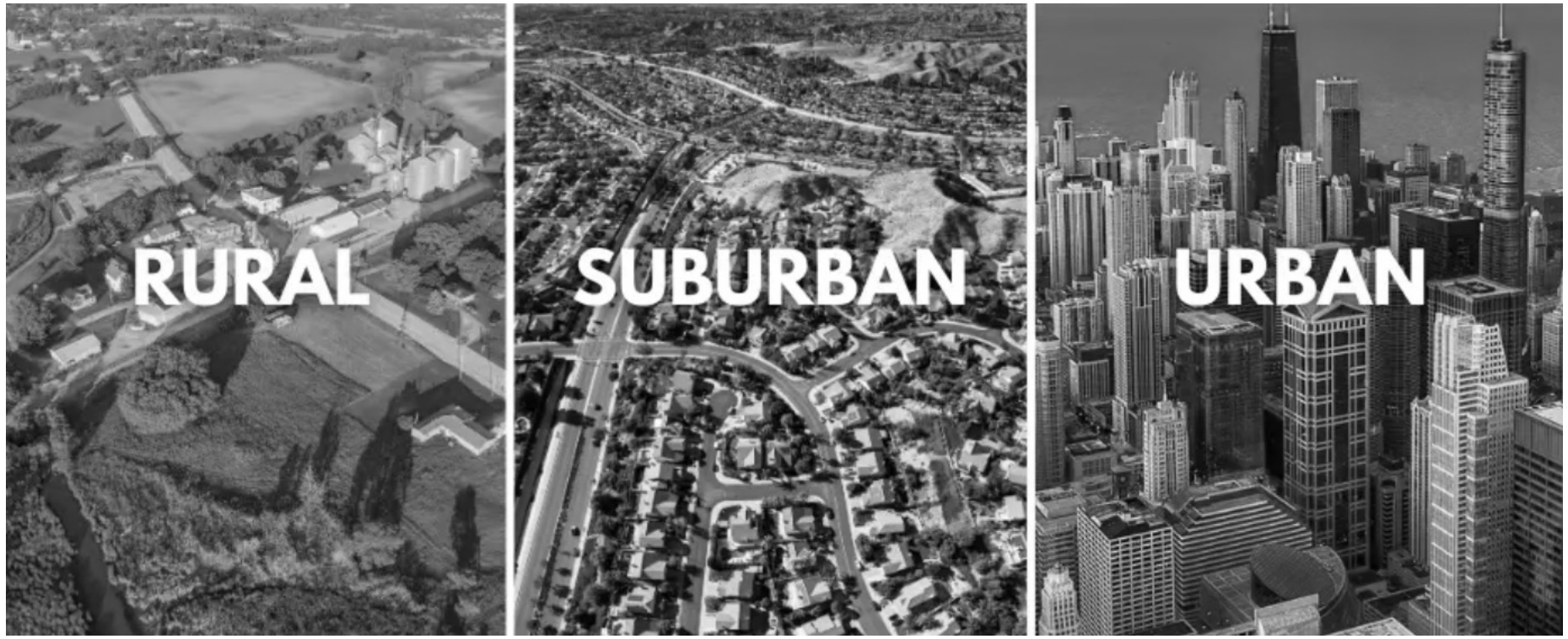
What We Do	Virtual Access
Work	Remote Work
Shop	E-Commerce
Learn	Search, Online Courses
Eat	Food Delivery
Self-Care	Telehealth, Online Fitness
Meet	Video-Conferencing
Socialize	Social Networking
Play	Video Games
Entertain	Streaming
Vacation	Virtual Vacations
Bank	Online and Mobile

Virtual Access Impacts Trips



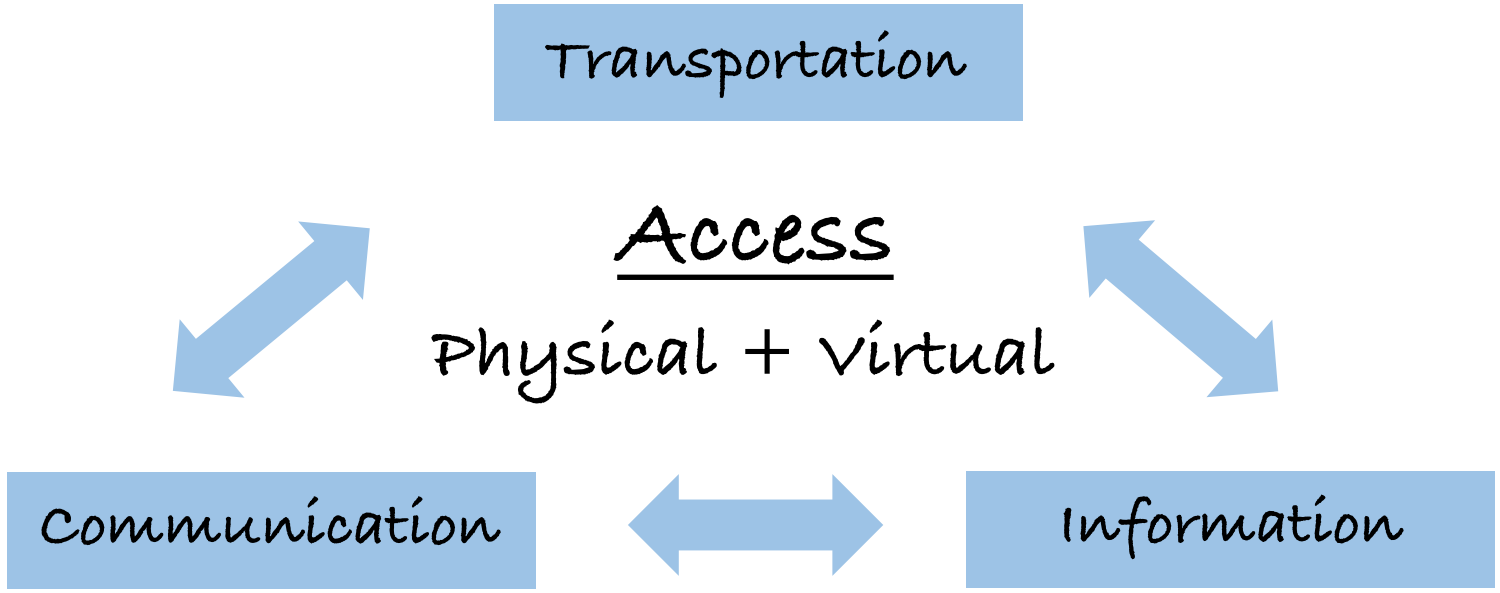
Virtual Access Impacts Time Use

Virtual Access Impacts Areas



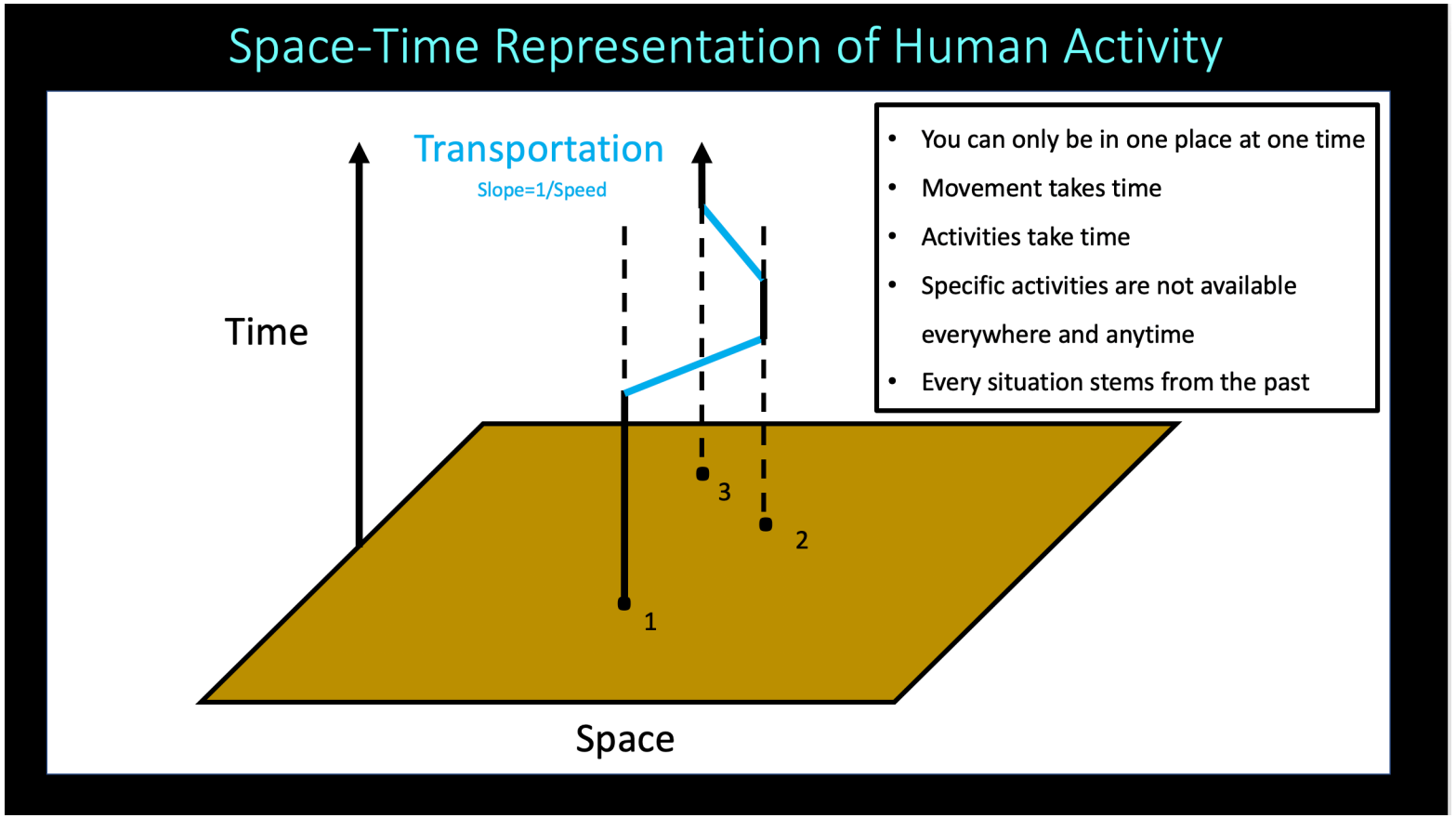
Access to Markets, Workers, Goods, Jobs, Knowledge, Innovation

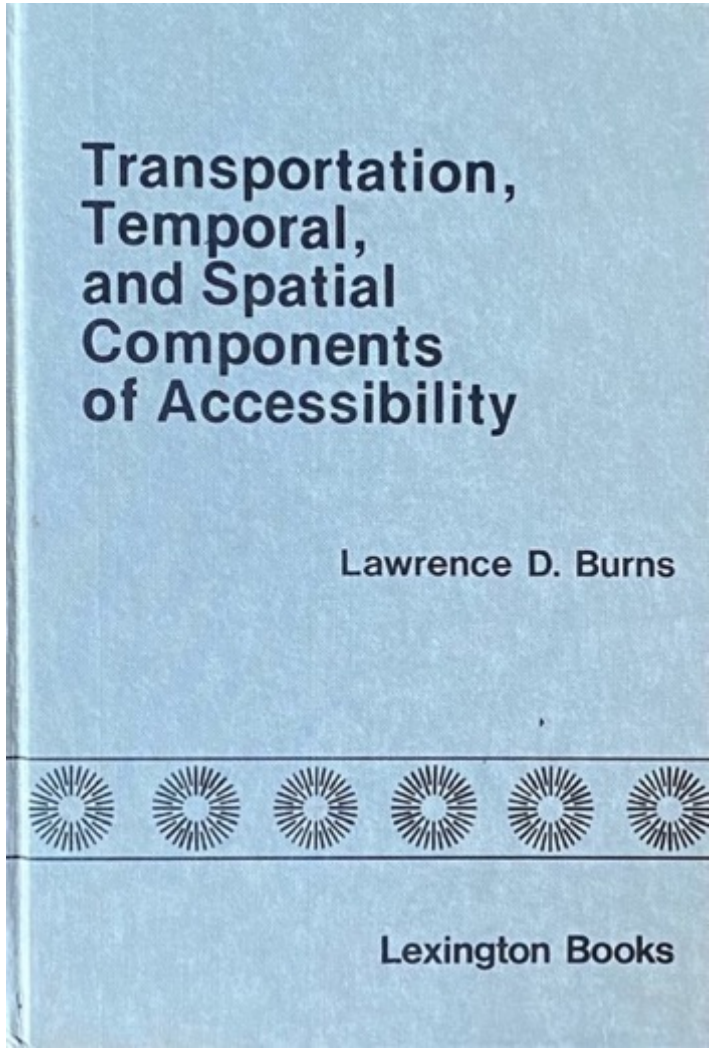
Access



Integrated System

Access “Science”





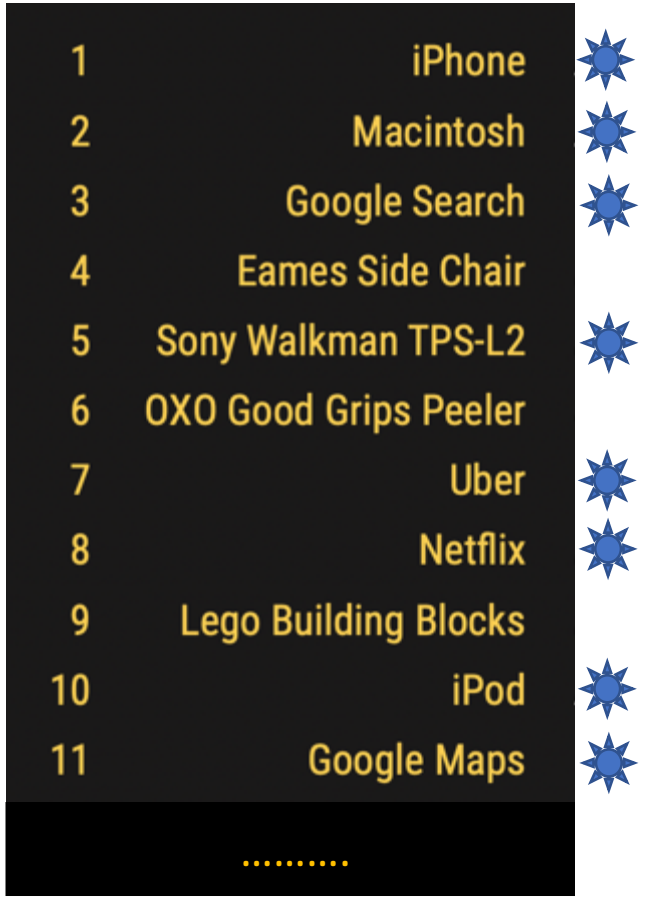
1979

Design Innovation

A Winning Strategy

Design Innovation
Focused on the Total Customer Experience

Fortune Magazine
Best 100 Designs of Modern Times
(Illinois Institute of Technology, Institute of Design, 2022)



= Virtual Access

Design Innovation

Value Adding → Value Driving

Objects → Experiences

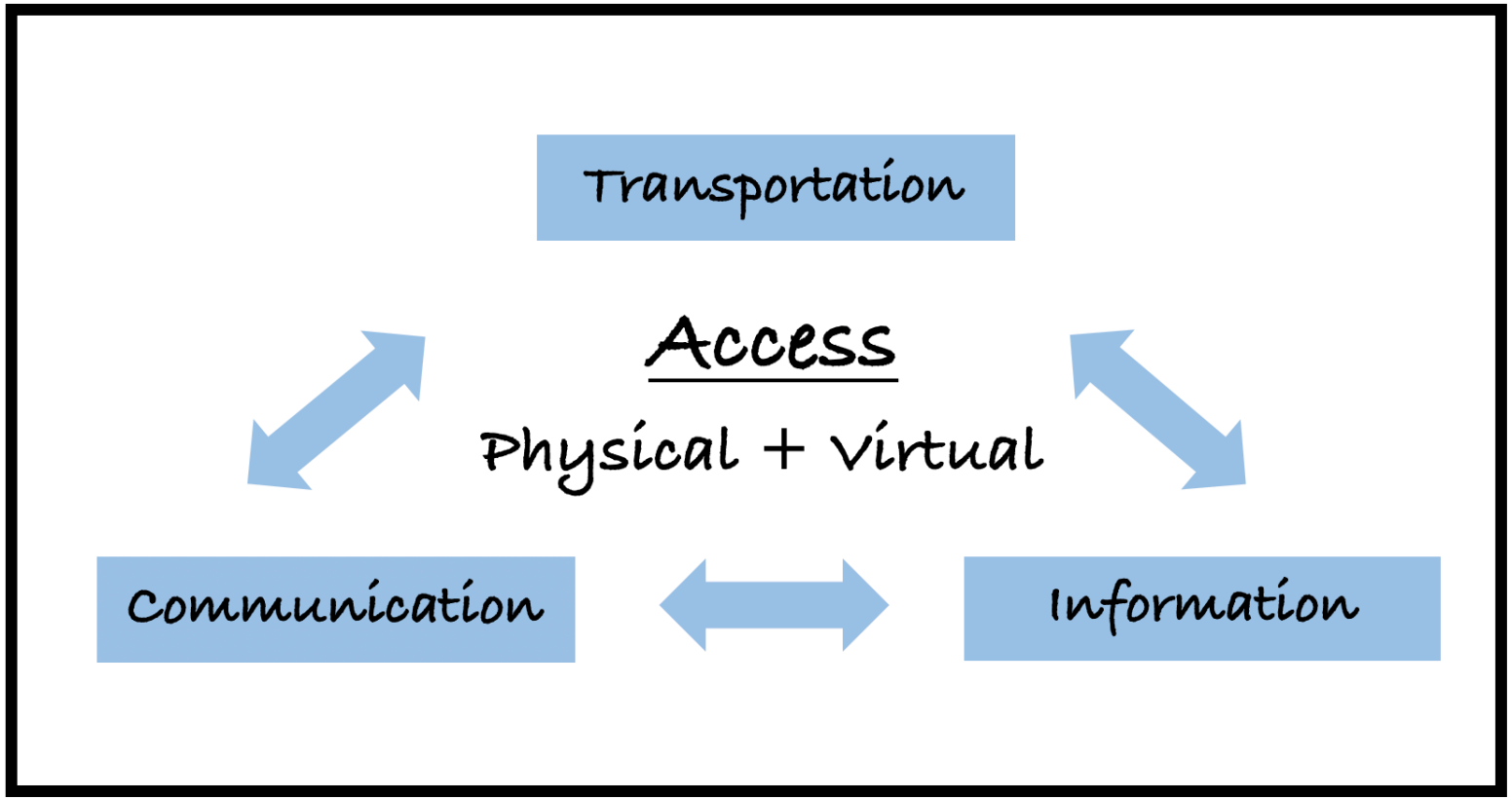
How it Looks → How it Works

Products → Eco-Systems

Unlocks Technology Value

Key to Sustainability

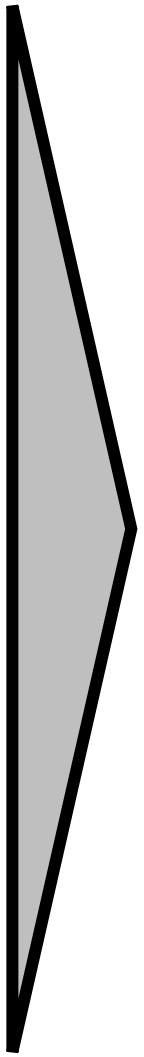
A Winning Opportunity



Design Innovation
Focused on the Total Customer Experience

Future of Access

Robots
Sensors
Smartphones
Smart Glasses
Virtual Reality
Artificial Intelligence
“Big” Data
Advanced Analytics
Holography
….



Better Virtual Experiences

- More compelling
- Higher quality
- Lower cost

Access to Insights

- Virtual companions and tutors
- “Digital Butlers”
- Omnipresent assistants
- AI that can hear, see, speak, infer and advise

Enhanced Physical Access

- Safer
- More compelling
- Lower cost
- Better tailoring

Access “Blended” With Living

The Power of “And”

The Power of “And”

A ***and*** B usually better than A ***or*** B

Ask ***“and”*** rather than “***or”*** questions

Focus on the whole

Pursue integrated opportunities

“And”	vs.	**“Or”**
Add		Subtract
Combine		Separate
Connect		Select
Synergy		Trade-off
Integrate		Differentiate
Portfolio		Choice
System		Component
Complement		Compete
Transform		Compromise
Whole		Parts
UNITE		DIVIDE

The Power of “And”

Examples

Combustion + Electric

Batteries + Fuel Cells

ADAS + Autonomous Driving

Robo-Taxis + Personal Autonomous Vehicles

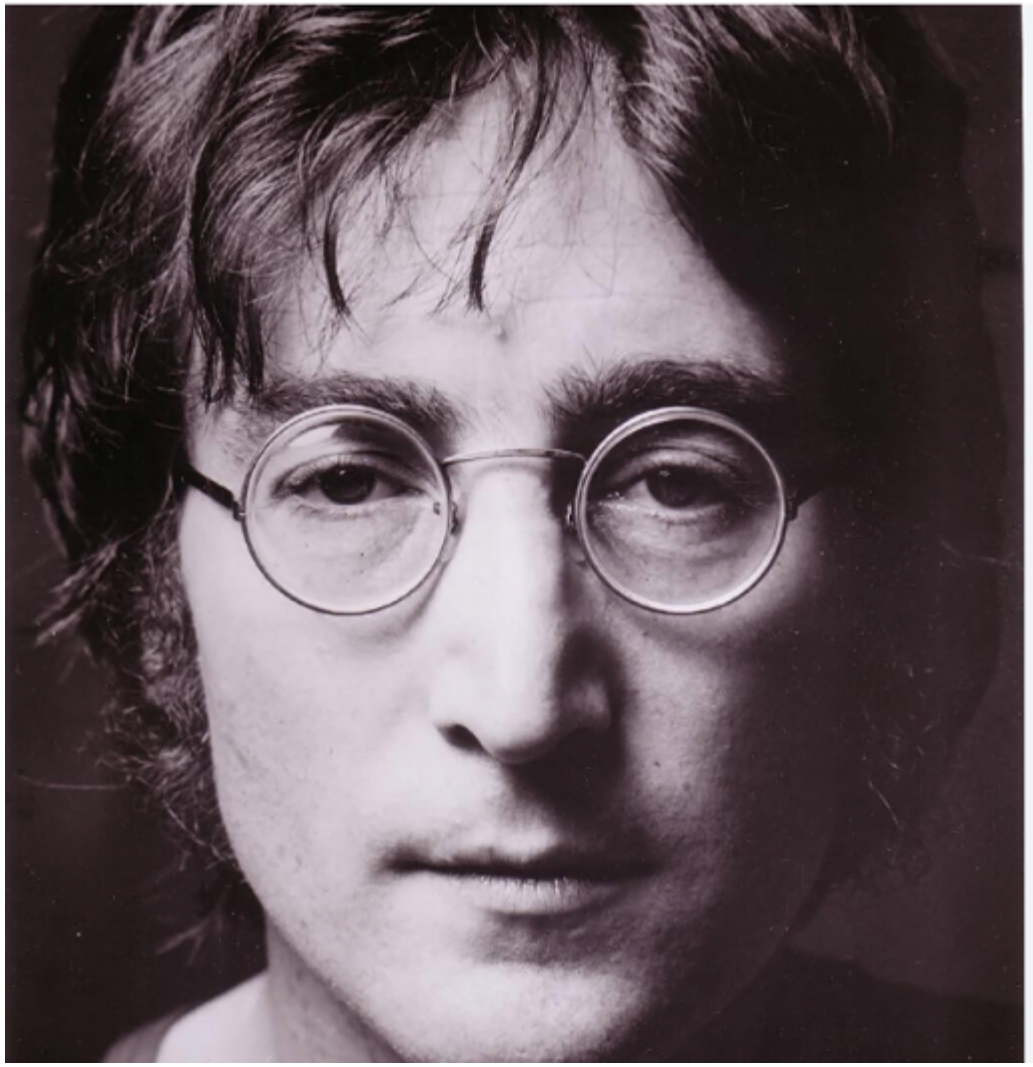
People Movement + Goods Movement

Physical Access + Virtual Access

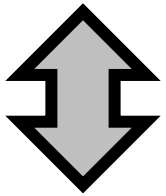
The Future of Living

“Life is what happens to you while you’re busy making other plans”

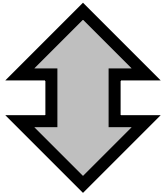
John Lennon



Future of Living



Future of Access



Future of Mobility

Future of Access Will Shape How We Live

How We Interact Physically and Virtually

Where We Live and Work

Trips We Make and How We Travel

Design Innovation Will Transform Our Lives

How We Experience Life

How We Create and Consume Value

Key to Sustainability

The Future Is Promising

Breathtaking Science

Inspiring Technology

Compelling Innovation

Engineers

with integrative minds

will lead

by designing innovative systems

that turn science and technology into

compelling + sustainable value

“He wants to dream like a young man, with the wisdom of an old man.”

Bob Seger, 1975

Enjoy the Ride!