

# The New Mobility Revolution, Smart Cities and Global Perspectives

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# Mobility in the 1990s

<https://youtu.be/-t547eSOam0>

# U.S. Smart Cities

- In 2016, the U.S. Department of Transportation (U.S. DOT) has leveraged nearly \$350 million in public and private funds for smart city and advanced transportation technologies.
- Building on Beyond Traffic 2045, the Smart City Challenge provided a spark for cities looking to revolutionize their transportation systems to help improve people's lives.
- Through the Smart City Challenge, the Department committed up to \$40 million to one winning city. In response, cities leveraged an additional \$500 million in private and public funding to help make their Smart City visions real.
- In October 2016, the Department announced an additional \$65 million in grants to support community-driven advanced technology transportation projects in cities across America, including 4 of the finalists in the Smart City Challenge.

# What is a Smart City?



# Smart Mobility Society is expanded with connected services.

Toyota aims to create an exciting and secure society by connecting vehicle, people and community, so as to improve the convenience of daily lives.

## Connected with vehicles and roads

- Toward the realization of Toyota's ultimate goal: Zero traffic casualties.
- The vehicles constantly exchange their location and speed information with each other so as to avoid collisions.
  - The vehicles receive useful information from the road infrastructure so as to prevent accidents.

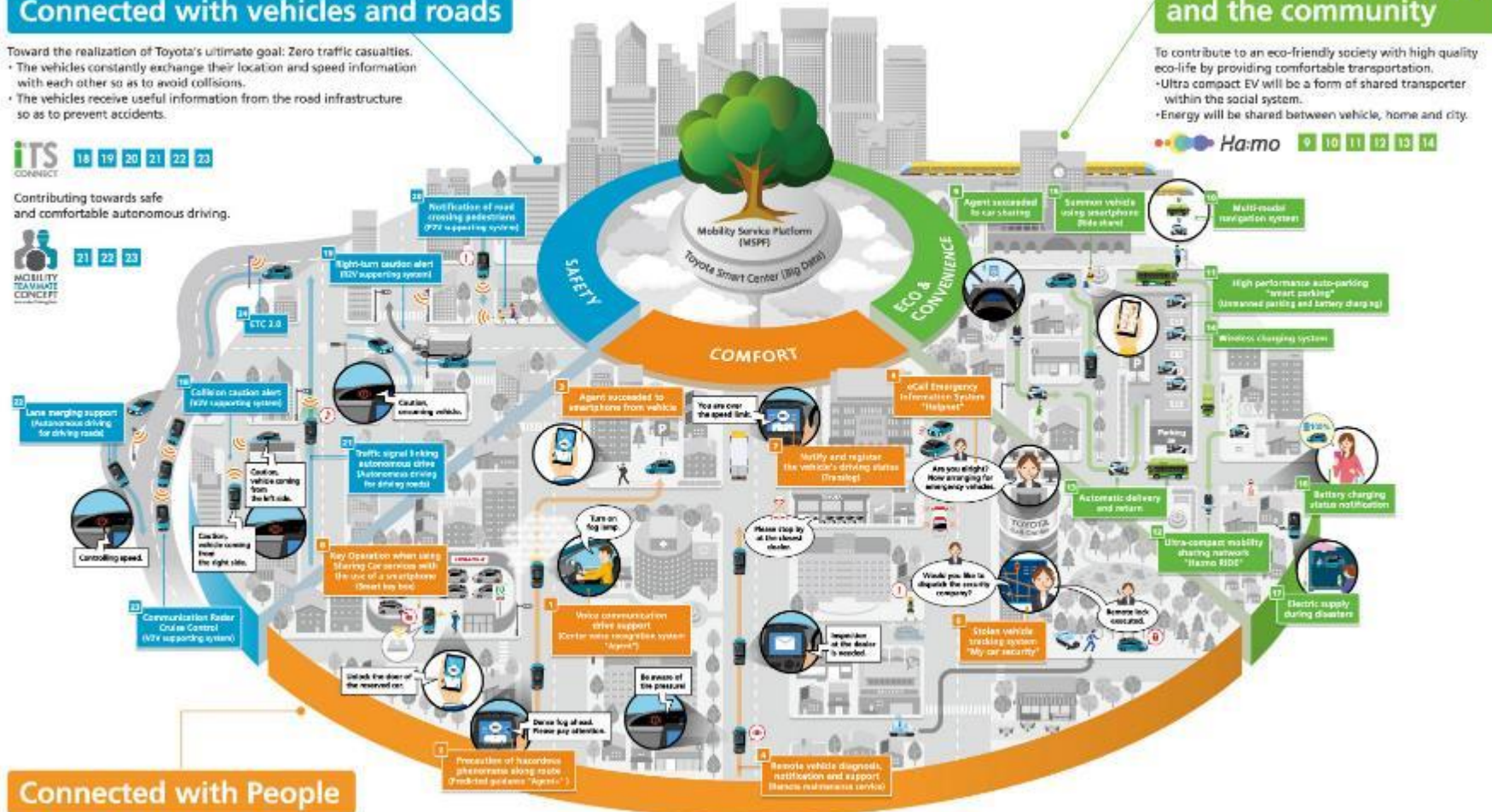


Contributing towards safe and comfortable autonomous driving.



## Connected with society and the community

- To contribute to an eco-friendly society with high quality eco-life by providing comfortable transportation.
- Ultra compact EV will be a form of shared transporter within the social system.
  - Energy will be shared between vehicle, home and city.



## Connected with People

- The vehicle will become a trusted partner for the driver by having the "Agent" providing guidance.
- The vehicle is able to communicate with the driver verbally.
  - The vehicle will provide services by predicting the driver's actions.

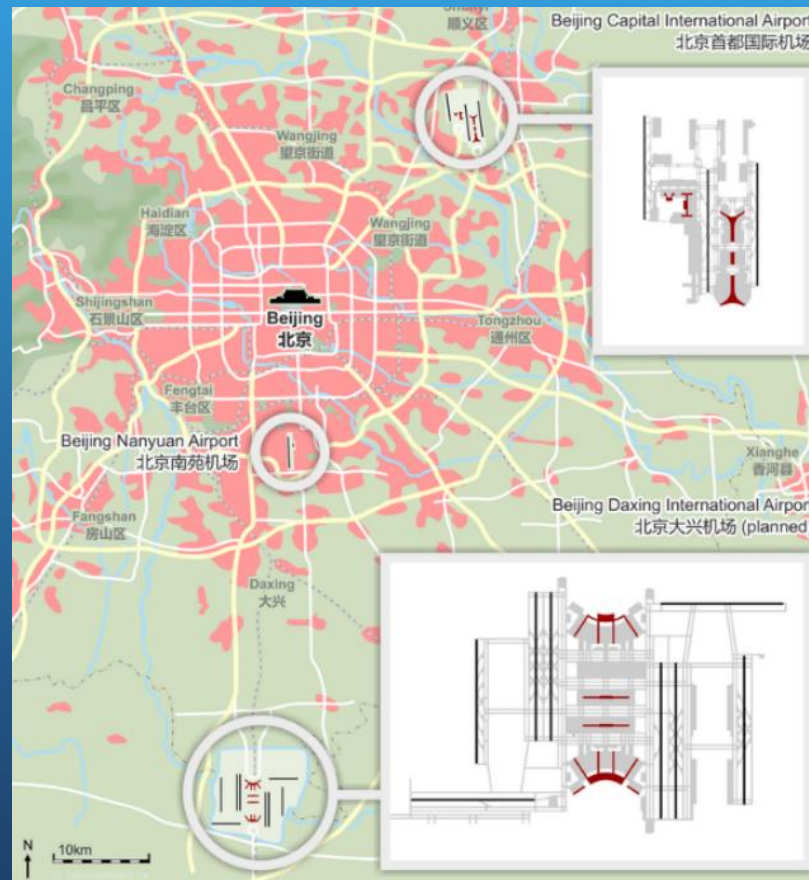


# China Smart Cities

- China intends to move over 350M people from the rural communities to urban cities for its long term economic strategy.
- In 2008 - 2015 China had constructed 207 airports and by 2025 their goal is to have a total of 260 new airports in China.
- China already has the largest high speed rail system in the world.
- China is using AI-directed traffic, smart parking and cashless systems for citizen services

# New Beijing Nanyuan International Airport

- Will have (7) new runways
- 100 Million Annual Passengers
- 2 Million tons of cargo and mail



成都

国际化大都市





# 路交通



# 天府商务区

**地下空间**  
 充分利用地下空间，建设地下商业、地下停车场、地下步行系统等，提高土地利用效率。

**空间形态**  
 采用组团式、生态型、步行友好的空间形态，营造高品质、有特色的城市空间。



# 特色镇规划 CHARACTERISTIC TOWN

根据镇域资源禀赋、区位优势、产业基础等因素，科学谋划镇域发展定位，打造各具特色的特色小镇。







# Singapore/China Smart City

<https://youtu.be/iP11XeIV1ZA>

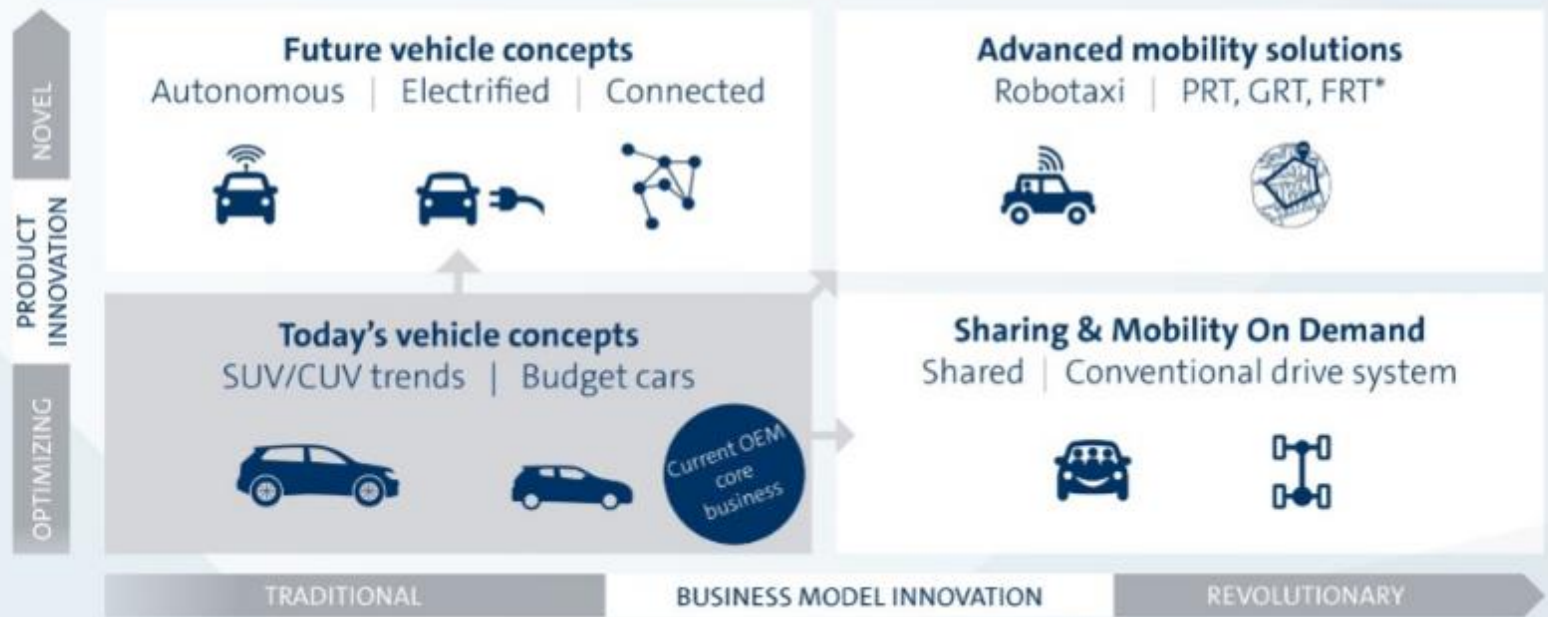
# Mobility Landscape – Many Players, New Partnerships, New Models

In both B2C and B2B environments customers are demanding intuitive services; many actors investing significantly in order to deliver the 'killer' seamless proposition & user experience.



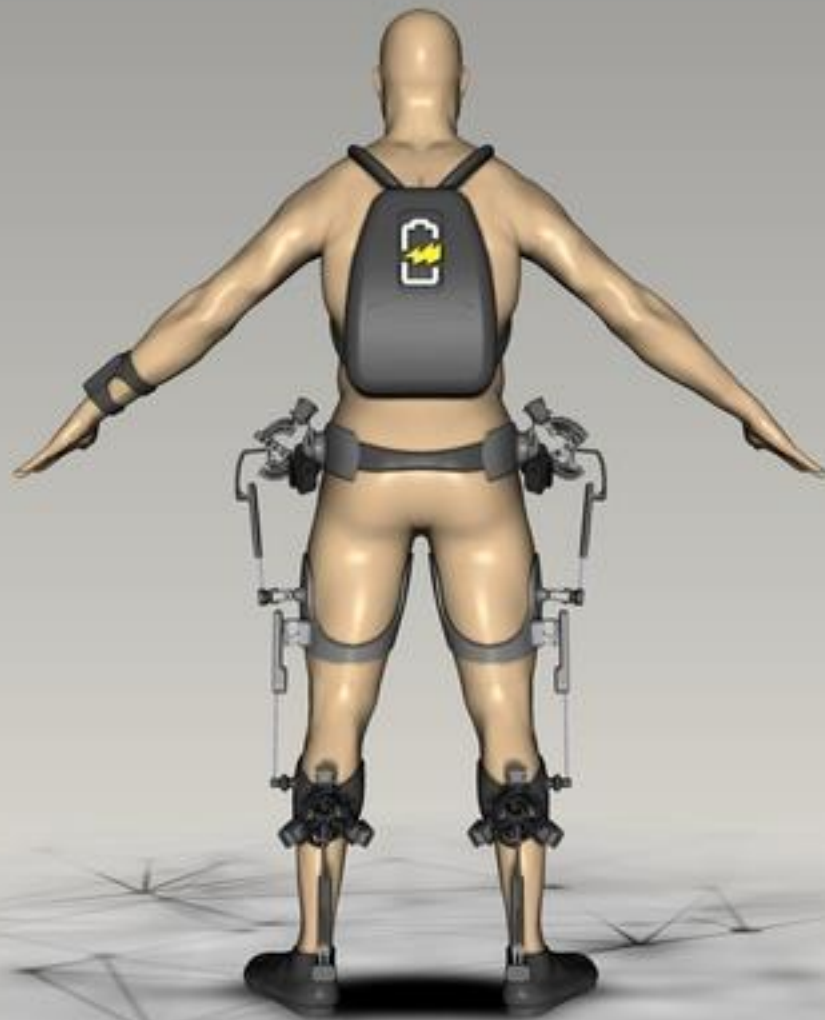
## HOW OUR INDUSTRY IS CHANGING

The key trends in the automotive world at a glance



\*PRT = Personal Rapid Transit; GRT = Group Rapid Transit; FRT = Freight Rapid Transit





# Range of Motion: ANKLE



NEUTRAL

EVERSION



20°



30°

INVERSION

ADDUCTION



45°



45°

ABDUCTION

DORSIFLEXION



20°



45°

PLANTAR FLEXION

# Range of Motion: HIP



NEUTRAL

EXTENSION



70°



90°

FLEXION

ADDUCTION



30°



50°

ABDUCTION

INTERNAL ROTATION



20°



30°

EXTERNAL ROTATION







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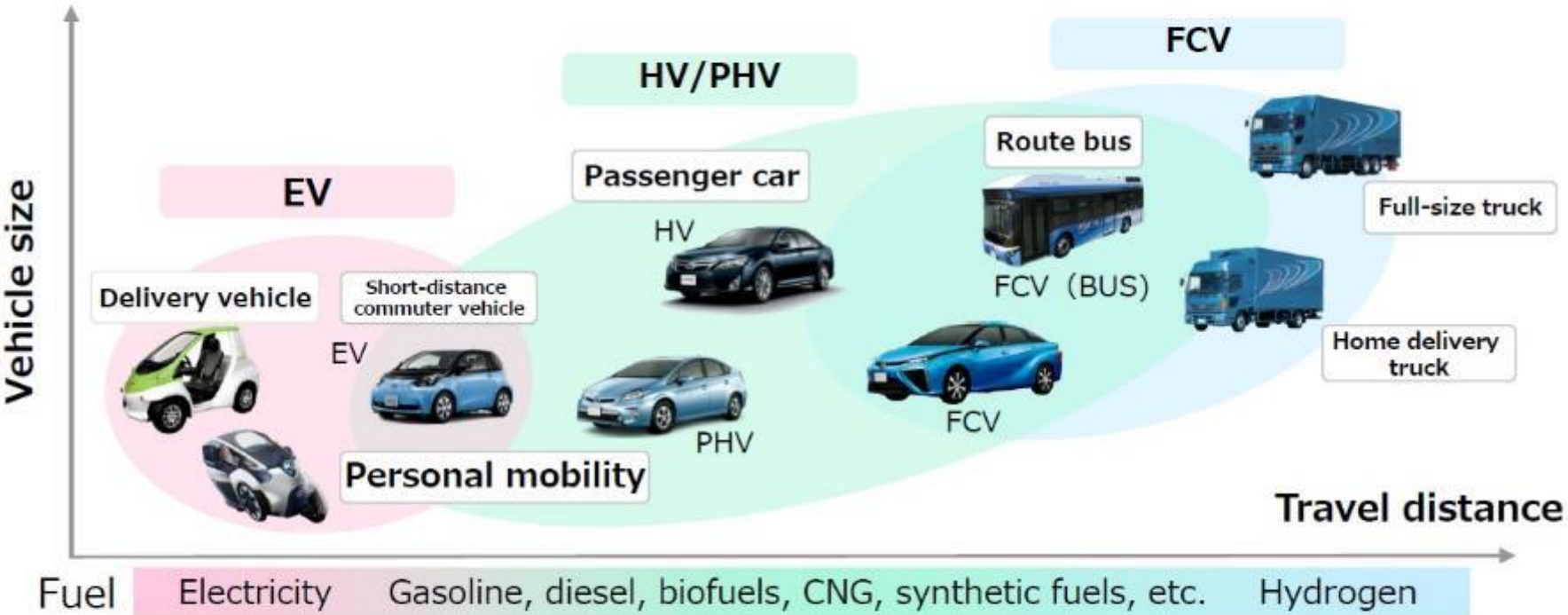
DUNLOP

U-DRIVE





Fuel diversity and uses



**EV: Short-distance, HV & PHV: Wide-use, FCV: Medium-to-long distance**

# Generating electricity with hydrogen and oxygen



Conceptual diagram does not necessarily show placement of fuel cell system components inside vehicle

# H2 Fuel Cells



# H2 Fuel Cell Buses



# New Mobility Innovations



# Connected Homes & Cars



# Smart City Organizations

- Smart Cities Council: <https://smartcitiescouncil.com>
- Meeting of the Minds: <https://meetingoftheminds.org>
- Venture Smarter: <https://www.venturesmarter.com>
- National League of Cities:  
<https://www.nlc.org/topics/technology/smart-cities>

# Global Mobility Trends & Opportunities

- Autonomous Cars are 20 - 30 years away from full deployment (Federal & State Legislation)
- EV's & H2 Fuel Cell Infrastructure Opportunities - Geographic and Climate Limitations
- Artificial Intelligence & Traffic Management
- Smart Homes Connectivity
- Local City & Open Data Initiatives
- Sharing Economy (Ride Share, Delivery of Services)
- First Mile/Last Mile Opportunities (Connecting underserved communities)
- Workforce and 3<sup>rd</sup> Shift Mobility
- Senior, Accessibility & Health Care Mobility - Medical Districts
- Smart Parking Mobility
- Agricultural and Rural Mobility
- Water Mobility
- New alignments in government and corporations: Chief Mobility Officers, Chief Accessibility Officers

# Auto Mobility Trends & Opportunities

- Automotive Industry is facing stiff competition from tech companies and disruptive mobility technology.
- Toyota and others are developing Mobility as a Service Lines of Businesses (MaaS)
- Automobile manufacturers could be like the aviation industry. Supplier of cars for various services (airlines).
- Cars are not a right of passage anymore for the young. The mobile device is!
- Automakers have manufacturing assets that can be used for other mobility technologies.
- Future of Mobility: Toyota Mobility Foundation:  
<https://youtu.be/2DhI7D5sS5U>

# The New Mobility

<https://youtu.be/2DhI7D5sS5U>

# Thank you!

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