Mega Trends Impacting the Automotive Industry and the Future of Mobility

Shwetha Surender, Frost & Sullivan
Connectivity & Convergence
80 Billion Connected Devices By 2025

10 Connected Devices for Every Household by 2020

5 connected devices for every user by 2020

5 billion internet users by 2020

500 devices with unique digital IDs (Internet of things) per square kilometre by 2020
Cognitive Era
What is Artificial Intelligence?

Three Types of Artificial Intelligence Systems

- Artificial Narrow Intelligence
- Artificial General Intelligence
- Artificial Super Intelligence
Autonomous Driving Market:

Definitions for Levels of Automation, Global, 2016–2030

Human

Change in Responsibility

Machine

No Assist

Early Warning Systems

Current Level of Automation

Traffic Control

Awareness for Takeover

General Awareness

2011

2016

2018

2025

2030

New Vehicles (2030)

40 million

15 million

5 million

2 million

1 million

Level 1

Level 2

Level 3

Level 4

Level 5

• Adaptive cruise control
  • Emergency braking

• Tesla Autopilot
  • Traffic Jam Assist
  • Lane keeping assist

• City/Highway pilot with minimal driver intervention—Audi Autopilot

• City + highway pilot, with minimal driver involvement
  • Fully auto parking

• Fully autonomous vehicles
Social Trends
Social Trends

- Geo Socialization
- "She-conomy"
- Ageing Population
- Heterogeneous Society
- Gen Y
- Middle Bulge
- Reverse Brain Drain
- Halal Economy
- Surge in Asian Work Pool
- Generational Political Shift
Smart is the New Green
Smart Cities
Smart Technology
Smart Infrastructure
Smart Energy
Smart Mobility
Smart Buildings
Smart Windows
Smart Clouds
Smart Materials
Smart Bandages
Smart Factory
Smart Meters
Mega Trend :

Future Of Mobility
Integrated Mobility Offers vast potential to offer multiple modes and services, and segment customer types using the same platform.

An ecosystem of partnerships is required to deliver this in multiple cities/countries.

Supporting Services

- Parking
- Financial Services

- eHailing Taxi (On-Demand)
- One Way Carsharing
- Dynamic Shuttle (On-Demand)
- Car Rental
- Public Transit
- Carpooling (Fixed)
- Bikesharing
- Micro-mobility
- P2P Carsharing
- Dynamic Carsharing (Corporate, Corporate)

Integrated Mobility: Plan, Book, Pay

Source: Frost & Sullivan
Carsharing to form an integral part of Integrated mobility

North America
- 1.6 Million
- 24,644

Latin America
- 16,743
- 291

APAC
- 3.09 Million
- 36,660

Europe
- 3.16 Million
- 50,041

Consolidation
- zipcar
- Enterprise
- SNCF

Launch & Expansion
- Bolloré
- Indianapolis + London
- zipcar
- Boston, Los Angeles, Denver, Seattle

OEM Strategies
- Ford
- GM
- Audi
- GoDrive, London
- Maven, Manhattan
- Audi Home, San Francisco
Ridesharing—The Next Hot Social Transportation Trend

**North America (Big Players)**
- Kangaride – 350,000
- Zimride – 350,000, 130 organization

**Europe (Big Players)**
- BlaBlaCar – 25 million, 22 countries (Global)
- Liftshare – 700,000, 700 Corporates

**Asia (Big Players)**
- Ryde – 30,000

**2015**

**Acquisitions**

**OEM Ridesharing Strategies**
- BMW → fline
- GM → fline
- FCA → easygo
- FIAT CHRYSLER AUTOMOBILES → easygo

**Future Technology Trends**
- Cloud-based systems
- Data-driven ridesharing
- Calendar syncing of rides
Proliferation of the Ride hailing Concept

Taxi Industry: Snapshot of Key Taxi Apps, Global, 2015

- **North America**: 8 million users
- **Europe**: 6 million users
- **Asia Pacific**: 11 million users
- **Latin America**: 1 million users

**More than 8 million users**
- Uber
- Lyft
- ARRO
- Curb

**631,000 users**
- Easy Taxi
- TapTaxi
- Safer Taxi
- Taxify

**17 million users**
- CABIFY
- 99 Taxis
- Ingogo
- GoCatch

**1 million users**
- Curb
- Tappsi
- Gett
- TaxiJa

**250 million users**
- Uber
- Ola
- Meru
- Jugnoo

**200,000 users**
- Hail
- MyTaxi

**40,000 monthly users**
- GrabTaxi

**350,000 users**
- Zoomy

Source: Frost & Sullivan
Case Study—New York Yellow Taxi
As the vehicle-on-demand model more readily caters to people’s commuting needs, a migration from personally owned vehicles to mobility-as-a-service shall largely benefit the taxi market.

### Mobility Solution Business Models: Case Study—New York Yellow Taxi, NA, 2015

<table>
<thead>
<tr>
<th>2015</th>
<th>Parameter</th>
<th>2050</th>
</tr>
</thead>
<tbody>
<tr>
<td>36</td>
<td>Average number of daily trips per taxi</td>
<td>~50</td>
</tr>
<tr>
<td>200</td>
<td>Average daily miles covered by a taxi</td>
<td>~350</td>
</tr>
<tr>
<td>7.1%</td>
<td>Taxi user base (% of population)</td>
<td>15–20%</td>
</tr>
<tr>
<td>22.39</td>
<td>Number of taxis per 1,000 daily commuters</td>
<td>~18</td>
</tr>
<tr>
<td>$552 (2015)</td>
<td>Driver cost per day</td>
<td>$0</td>
</tr>
<tr>
<td>50,000</td>
<td>Number of drivers</td>
<td>0</td>
</tr>
<tr>
<td>$6.44 (2015)</td>
<td>Average fare per mile</td>
<td>~$4</td>
</tr>
<tr>
<td>$29,900 (2015 Nissan NV200)</td>
<td>Taxi price</td>
<td>$40,000</td>
</tr>
</tbody>
</table>

Note: Taxi user base in New York City was 600,000 passengers per day in 2014. Source: NYC Taxi And Limousine Commission; Frost & Sullivan
Autonomous Driving—Potential for Uber

The potential to tap into 80% the driver revenue provides incentives for aggressive investments in autonomous technology R&D for Uber.

Uber Revenue Split, Global, 2014

- Driver: $10,945 M
- Uber: $2,737 M
- Potential: 80%

Uber Annual Revenue Forecast, Global, 2014–2025

- Annual Revenue Potential

Source: Princeton Study; Frost & Sullivan
Smart Parking

Parking Analytics and Big Data
Parking Sensor Integration
Payment
Apps & In Car Reservation
P2P Parking

Smart Parking in Pisa, Italy

Smart Parking Revenue forecast $bn

<table>
<thead>
<tr>
<th>Year</th>
<th>North America</th>
<th>Europe</th>
</tr>
</thead>
<tbody>
<tr>
<td>2014</td>
<td>3.99</td>
<td>3.06</td>
</tr>
<tr>
<td>2025</td>
<td>24.06</td>
<td>19.02</td>
</tr>
</tbody>
</table>

- CAGR: 18%

Connected Parking

1. Sensors detect parking space occupancy
2. Transmit data to central server about the status
3. Users on smartphone app search for free space and guides
4. Parking payment through the app
5. Inclusion of special permit – taxi, residents, etc.
6. Legitimation—Access control system assistance
Roadmap towards Integrated Mobility

- **Journey Planning**: Multi Modal Planning of journeys via smartphone or web platforms (business model: usually advertising or commissions)
- **Booking**: Booking of transportation modes via technology platforms, including referrals from third parties (business model: direct revenue or commission)
- **Payment & Reconciliation**: Facilitating payment for transportation services and clearing / expense management (business model either commission or service fees)

Source: Frost & Sullivan
New Mobility Business Models & Partnerships

What is needed for mobility solutions to become “mainstream”? **Policy, Investment & Behaviour Change**
Changing Role of Public Sector in Mobility

- Flexible scheduling & on-demand transit
- Parking Supply & Monetisation
- Automated Driving
- Open Data
- Carsharing Tenders, Operations, SLA’s
- Bikesharing Tenders
- New Regulations for eHailing services
- Integrated Mobility-As-A-Service

Source: Frost & Sullivan
Mega Trends Leading to a Convergence in Mobility

Mobility Convergence

Enabling Layers
- Data Security
- Safety
- “Real-Time” Maps, Images & interpretation
- L1-5 Automation

Autonomous
Influence of Self-Driving Features on Vehicle
Interior / Exterior

Mobility
Mega Trends Influence on new mobility

Connectivity
In Vehicle, Infrastructure, Grid

Exciting New Business Models

- Shared Mobility
- Carsharing
- Ridesharing
- Ride hailing / taxis
- Parking
- Bikesharing
- Dynamic minibuses
Contact Us

FROST & SULLIVAN

Shwetha Surender
Program Manager
Automotive & Transportation
Direct: +44 297 915 7841
Mobile: +44 757 043 0962
shwethas@frost.com

Check out our Future of Mobility Video on Youtube, and join our LinkedIn group

LinkedIn
http://www.linkedin.com/companies/4506

Slideshare
http://www.slideshare.net/FrostandSullivan

Twitter
http://twitter.com/frost_sullivan
http://twitter.com/FS_Automotive

Facebook
http://www.facebook.com/FrostandSullivan