Advanced Mobility
The future of the Connected Vehicle
IBM Advanced Mobility is dealing with the future trends of mobility

- 60% of the population will live in cities by 2025
- Megacities from the emerging markets will have a CAGR of 7% in car ownership per 1000
  - 1,200 new vehicles are purchased in Beijing daily
  - Only 2% of China’s population today own cars
- Megacities CAGR in developed economies is 0.5%
  - More than 25% of consumers are willing to give up their personal vehicles in developed economies
  - 80% of the consumers expect mobility services which integrates public and other transportation modes like car sharing
- It is expected that 80% of electric vehicles will be sold with Connectivity Services
- 50% of executives expect that in the future 25-35% of the revenue will come from new mobility services based on vehicle connectivity

Source: IBM IBV studies, IBM market research, Frost & Sullivan © 2011 IBM Corporation
How does a new mobility scenario based on vehicle connectivity look like ... and what impact does this have?

Sample: New mobility scenario in 2020

A family with kids owns two cars (one electric) and has signed additional **Mobility Services** offered by one OEM.
- Pay per Use access to special vehicles ... Van, Cabrio, other
- Car-sharing in the residential area

All vehicles comes with **Connectivity Services** and Telematic Devices. Like ...
- Remote diagnostics for vehicle monitoring, predictive maintenance and dealer scheduling
- In-vehicle Safety & Security services
- Infotainment ... access to Internet radio, video on demand
- Smart EV charging ... best price, quick charging
- Optimized routing and parking ... by using GPS data
- Smartphone application to handle mobility services remotely

Technology trends inside ...

- **Connected vehicle / Telematic**
  Key-technology in the 21. century
- **Always connected, always online**
  Consumer and devices will be always online, sending and receiving information
- **App-ification of everything**
  Usage of smartphone application will increase dramatically
- **Digital data mass production**
  Accessed more quickly than ever before
- **Power of analytics**
  Real time and predictive analytics key to fulfill customer expectations
- **Cloud** - Flexible, scalable, robust service delivery
In our recent Global CEO study:

What percentage of revenue comes from new sources, such as new products, services or markets?

Last 5 years: 13%
Next 5 years: 30%

130% more

...any scenario for achieving results like this would have to be centered around connected vehicles
CEOs’ view of where customer expectations will change to the largest extent?

- New or Different Products: 85%
- New or Different Services: 69% (19% less)

…success will be linked to offering new services enabled by product that address the limitations of how we use vehicles.
Advanced navigation
Traffic prediction
Green routing
Multimodal optimization

Road warnings
Driver status
Automated drive

What will be open?

Productivity

Mobility commerce

Information services

Emergency & safety

Multimedia entertainment

Stolen vehicle tracking
Emergency assistance
Remote diagnostics

How will you profit?

eMail, contacts & calendar
Workflow management
Business applications

Pay-as-you-drive
Road charging
EV charging & billing
P2P transactions

Location based
News & weather
Smart home

Infotainment
Pervasive gaming
Computer, games
Social media

What will be open?

How will you profit?
Auto electronic and software systems will be open and customized by Smartphone apps…

Automotive executives agreed

41% 51% 59% in the US
The **battleground** for connected vehicles will be about what can be controlled and by who…

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**Closely Controlled**

- Emergency & safety
- Intelligent driving
- Mobility commerce
- Productivity
- Information services
- Traffic & navigation
- Multimedia / entertainment

**Potentially Open**

**Controlled by automakers**

**Control point**

**Battleground for revenue**
We also assessed financial performance to identify *standouts*…
...and asked CEOs what they will focus on to realize their strategy over the next 5 years?

- Getting closer to the customer: Same
- Revenue Model Innovation: 22% less
- Enterprise Model Innovation: 32% less
- Industry Model Innovation: 33% less

Long-term, steady-state performance
Top 50 percent
Standouts

Short-term, crisis performance
Top 50 percent

Global Standouts
Automatic OEMs
Disruptive forces *undermine* business models…

Consumer expectations for personalization, control, relevance, and timeliness

Ubiquitous low-cost communications

Virtually unlimited low-cost bandwidth and real-time data processing power

Rapid technological and competitive innovation

… these forces leave executives *searching for revenue sources* that can survive in this new world
Revenue Models

Pricing Innovation
New ways to charge for your product—in terms of both the amount of money charged and the point when the customer is required to pay

Payer Innovation
Finding customers who are not ultimately the consumers of the product

Package Innovation
New ways to expand product or brand value to different customer behaviors and segments
Revenue model framework…

**Pricing**
Variable pricing strategies
- Subscriptions
- Variable
- By parts
- Bundle vs. a la carte
- Rentals

**Payer**
Beyond Traditional Advertising
- Ad-supported
- Fee-based
- Social networking
- White labeling
- Product placement
- Sponsorships

**Package**
Seamless experience across the value chain
- Componentization
- Mode shifts
- Brand Extension
- Selling the parts (Atoms)
- Mash ups

...revenue strategies help define what consumers want and offer flexibility and choice
Delivery models are **rapidly changing** requiring integration points…

…depending on what is best suited for the application
After-Market | Brought-In | Built-In
---|---|---
**Key Characteristics**

<table>
<thead>
<tr>
<th>Cost</th>
<th>After-Market</th>
<th>Brought-In</th>
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<tr>
<td><strong>Cost of Hardware</strong></td>
<td>$</td>
<td>$$$</td>
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<td><strong>High Degree of Integration in Driver HMI</strong></td>
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OEMs will need to determine which vehicles get which technologies.

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GM OnStar
What are the best options for automakers to develop mobility solution offerings?

- Migrate product portfolio toward electrified vehicles: 83%
- Provide Telematics Solutions: 80% of 65%
- Provide Mobility-as-a-service: 44% of 63%
- Provide Car Sharing: 41%
- Provide Charging Infrastructure: 19%
Common access across a portfolio of vehicles:

- Common settings
- Preferences
- Calendar
- Navigation

- Music / media
- Business applications
- Vehicle adjustments
- Other content
Automotive companies can embrace new potential business models that change the consumer experience…

Enable consumers with your full portfolio of vehicles…

...help them link to other modes…

...control the commerce of transportation

...also, the user data generated by this type of offering will be unique and very valuable
The opportunity for the automotive industry is exciting…

1. Invest aggressively in new business model strategies just as the technology strategy

2. Develop and execute pilots, learn and adapt

3. Focus on developing, harvesting and capitalizing on the data these models will generate
"Always on" vehicle connectivity is enabling advanced mobility services

Smart Devices

Vehicle

Infrastructure

Stakeholder
- OEM
- Dealer
- Fleet Operator
- Mobility provider
- Service Provider
- Public transport
- Utilities

All Individuals
- Driver
- Operator
- Provider
- Owner

Owner
- Private
- Public
- Operators
- Mobility Provider

Offside the Road
- Parking
- Traffic Gates
- Charge Spots

Transportation
- RFID Gates
- Warehouses

Value Added Services

Core Services

Connectivity

Smarter Transport

Pay-as-you drive

Asset Sharing

Pay-as-you-behave

New Mobility Services

IBM Advanced Mobility Service Hub

Back end systems
A portfolio of compelling Value Add Services is differentiating on the market

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<th>Driver</th>
<th>Fleet Operator</th>
<th>Mobility Provider</th>
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<tr>
<td>User Profiling</td>
<td>Service Provisioning</td>
<td>Mobility-as-service</td>
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<tr>
<td>Advanced Routing</td>
<td>Charging &amp; Billing</td>
<td>Car Sharing</td>
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<td>Parking lot finder</td>
<td>Performance Monitoring</td>
<td>Ride Sharing</td>
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<td>Location based Info</td>
<td>Fleet Management</td>
<td>Intermodal travel</td>
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<td>Location Finder</td>
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<td>Traffic Prediction</td>
<td>Asset Planing</td>
<td>M-Commerce (App Store)</td>
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<td>Emergency &amp; Breakdown</td>
<td>Asset Maintenace</td>
<td>Marketing &amp; Sales</td>
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<td>Vehicle Monitoring</td>
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<td>Customer Data</td>
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<td>Financial Data</td>
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<td>Driver Behaviour</td>
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<td>3rd Party</td>
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<td>Analytics &amp; Reporting</td>
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<td>Performance &amp; Planing</td>
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<td>Business Process Integration</td>
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IBM has developed an Advanced Mobility Service Framework

Vehicles with a Telematic Device are connected and “always online”

All different devices are integrated ... like mobile devices, web-portal as well as backend systems

Infra-structure connected ... like road side devices, Call Center and EV charging stations

Mobility Cloud reduces the computing power and storage requirements in the vehicle

1. Vehicles with a Telematic Device are connected and “always online”
2. All different devices are integrated ... like mobile devices, web-portal as well as backend systems
3. Infra-structure connected ... like road side devices, Call Center and EV charging stations
4. Collect and manage data
5. Data + Customer analysis
6. Customer Contact Mgmt
7. Order Management
8. Provisioning and billing
9. 3rd Party integration
10. Mobility Cloud reduces the computing power and storage requirements in the vehicle
Advanced Mobility Framework – Key Build/Buy/Partner Decisions

Stakeholders:
- OEMs & Suppliers
- Insurance
- Service Provider
- Fleet Operator
- Utilities
- Government

Business Models:
- Car Sharing
- Car on Demand
- Pay as you Use
- Intermodal travel
- Concierge Services

IBM Advanced Mobility Service Hub

Value Added Services
- Track and Alert
- Remote Vehicle control
- Vehicle reporting
- Emergency Handling
- EV Services
- … other services

Business Core Services
- Order Management
- Offer Management
- Contract Management
- Client Data Management
- Claims Management
- Customer Support
- 3rd Party Data Integration
- Application Management
- Device Management
- Security & Privacy Mgmt
- B2B2C Service Management

Technical Core Services
- Vehicle Data Collection
- Device Management
- 3rd Party Data Integration
- Product Data Management
- Accounting and Billing
- Planning & Reporting

"Always On" Vehicle Connectivity

Infrastructure

System Integration

Backend Systems
- 3rd Party Content
- Dealer Backend

Social Media
- Facebook, Twitter

Web Portal / User devices

Stakeholder Management
- Stakeholder Mgmt

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