Opportunities and Barriers of Smart Vehicles and Cities for RITI Communities

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Introduction: Towards Smart Cities

Opportunities for Smart and Safe Mobility in RITI Areas
- Smart Mobility Solutions
- Smart Safety Solutions

Barriers for Smart Mobility in RITI Areas

Conclusion
Outline

- Introduction: Towards Smart Cities
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    - Smart Safety Solutions
  - Barriers for Smart Mobility in RITI Areas
- Conclusion
Towards a Smarter Future

SMART CITY

- Open Data
- Internet of Things
- Smart Agriculture
- Smart Retail
- Smart Mobility
- Smart Health
- Smart Government
- Smart Grid/Smart Energy
- Smart Home
- Education

Smart = Sensing + Connectivity + Analytics for Action
Smart Applications

**Smart Health**

- Connected devices/wearables/implants monitoring medical indicators
- Indicators sent to clouds to:
  - Predict possible risks
  - Alert physicians intervene
  - Send actions to patient or implants
- Send ambulance request if needed

**Smart Homes**

- Remote Control
- Automated ON/OFF Options
- Voice Commands
- Automated Supply Management
- Advanced Security Features

**Smart Energy**

- Smart Streetlights
- Smart Metering
- Smart Grids
- Demand Side Management
- Electric Vehicles (Vehicle-to-Grid)
Smart Mobility
Question?

- Focus is on cities
- How about RITI Communities?
Mobility Challenges in RITI Areas

- Lower vehicle penetration
- Narrower and quieter roads and highways
- Higher percentage of non-paved roads
- Less driving licensure
- Less/Slower maintenance in bad weather conditions
- Longer trips to access services (shopping, government services)
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Smart Mobility Solutions

Car Pooling
- Low vehicle penetration
- Quiet rural roads

Demand Responsive Transportation
- Low vehicle penetration
- Mobility of elderly, disabled, and non-licensed customers

Road/Weather Condition Alerting
- Less-maintained, and non-paved roads
- Quiet rural roads

Relevance

Car Pooling
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Opportunities

Car pooling apps
Hitchhiking apps with tracking options

Smart reservation apps
Real-time alerts to drivers with e-map directions and trajectory schedulers

Phone/dashboard alerts
Alternative routes given road/weather ratings
Smart Mobility Solutions

Cooperative Shopping/Services
- Low vehicle penetration
- Distant trips to services

School Bus Monitoring System
- Less maintained roads
- Distant trips to services

Autonomous Vehicles
- Less traffic, bikes and pedestrians
- Fewer intersections

Relevance

Opportunities
- Cooperative shopping apps
- Real-time group delivery trackers
- Smart and real-time tracking
- Information on driver, child, and bus
- Testing prototypes
- Early deployments
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Smart Safety Solutions

**Driving Behavior**
- Unexperienced drivers
- Non-paved roads and long/quiet highways

**Driver Monitoring/Alert System**
- Long travels on quiet rural roads
- Safety

**Wrong Entry Detection/Warning**
- Less maintained rural roads
- Unexperienced drivers

**Relevance**

**Opportunities**
- Advanced driving behavior tools/apps
- Real-time alerts
- Detection of fatigue, sleeping, lack-of-focus
- Possible connection to engine or ADAS
- Smart pavement markers
- Visual and/or vibration warning systems
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### Barriers

<table>
<thead>
<tr>
<th>Barrier</th>
<th>Possible Solution</th>
</tr>
</thead>
<tbody>
<tr>
<td>Limited broadband (3G/LTE) coverage</td>
<td>Satellite and/or landline</td>
</tr>
<tr>
<td>AT&amp;T</td>
<td>58%</td>
</tr>
<tr>
<td>Verizon</td>
<td>53%</td>
</tr>
<tr>
<td>T-Mobile</td>
<td>40%</td>
</tr>
<tr>
<td>Sprint</td>
<td>13%</td>
</tr>
<tr>
<td>Longer distances (delays) to cloud servers</td>
<td>Edge computing</td>
</tr>
<tr>
<td>Less mastery/interest in technology</td>
<td>Education</td>
</tr>
<tr>
<td>Cultural barriers</td>
<td>Awareness</td>
</tr>
</tbody>
</table>

Another major issue in rural areas is the power outages and sometimes the long restoration time which will have a huge impact on smart cities capabilities in such areas.

The following suggestions can be implemented in rural areas to increase the safety of drives:

- **Satellite and/or landline**
- **Edge computing**
- **Education**
- **Awareness**
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Barriers for Smart Mobility in RITI Areas

Conclusion
Take Away Messages

- Smart mobility solutions need to find their way to serve RITI areas
- Different smart mobility and safety solutions are very relevant to and tailorable for these communities
- Several technical and cultural barriers need be resolved
- Many doors are open for innovation
THANK YOU!

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