

RESEARCH SUMMARY

Getting America's Roads Ready for Autonomous Vehicles: Principles for Public-Private Partnerships

For autonomous vehicles to make the full transition from fantasy to reality, America's roads must make the transition with them. But despite a \$30 billion annual budget for federal highway programs, there is still relatively little vehicle-to-infrastructure (V2I) technology on US roadways. What is preventing its widespread application?

In “[Smart Cities, Dumb Infrastructure: Policy-Induced Competition in Vehicle-to-Infrastructure Systems](#),” Korok Ray and Brent Skorup explore V2I history and lay out principles for effective partnership between government and private enterprise.

GOVERNMENT UNSURE OF ITS ROLE

Despite two decades of federal efforts and funding, V2I technology has had very limited deployment. V2I services vary, and they are converging with wireless technologies like 5G: V2I could be used in adaptive street lighting that would save energy by turning lights off when there are no cars on the road. Other potential uses include dynamic speed limits that adjust for weather, road, and traffic conditions; congestion pricing; and autonomous vehicle mapping updates.

Government has been anticipating such technology for decades. After initially adopting a top-down, regulation-heavy approach, it realized how costly and ineffective it would be to micromanage each stage of V2I innovation. Federal and state transportation agencies have since taken a step back from designing V2I services—even as federal funding has ramped up.

BARRIERS TO PARTNERSHIPS AND POSSIBLE SOLUTIONS

Logistics and costs raise a huge barrier to V2I implementation. Highway projects are funded based on up-front—not long-term—costs. While V2I may not significantly increase initial costs, it is an ongoing investment. Over the long term is where public-private partnerships can help, outlining who pays for what and how it will be used.

Ray and Skorup propose distinguishing between three components of V2I systems:

- 1) Basic infrastructure, such as utility poles, right-of-way real estate, and other semi-permanent “street furniture”
- 2) Devices, such as roadside sensors, cameras, and 5G equipment
- 3) Network infrastructure, such as fiber optic cables, routers, and data networks

Government should exercise most control and funding over basic infrastructure, and the device market should largely be left to the private sector. Because network infrastructure is more complex and harder to monitor, it requires a mix of both public and private oversight.

To maximize use of V2I basic infrastructure, the market boundaries must be clear and enforceable because the market is vulnerable to monopoly. “Policy-induced competition,” where multiple companies have access to basic infrastructure, is essential in order to provide consistent service to the consumer. Without it, V2I deployment will be slowed by government control or private monopoly.

KEY TAKEAWAY

The technology for autonomous vehicles exists, and the government has available funds for V2I roadside infrastructure. However, the roles of government and the private sector in this industry have never been clearly defined. This study provides a policy roadmap.