Modeling Adoption of Technological Innovations and Infrastructure Impacts in a Smart City

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Presentation by Dr. Sabya Mishra

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FedEx Institute of Technology, University of Memphis
Motivation

• Connected autonomous vehicles (CAVs) are about to become a reality
• Key question: *how much will be the demand for ownership of CAVs and how will be the timing of adoption in long-term?*
Methodology

• The concept of resistance explains why individuals defer adoption

• Resistance is lowered by
  - Peer-to-peer communication
  - Exposure to media advertisement
Survey

- 327 complete responses received (13.3%)
- Reliability scores (on a seven-point scale)
  - Information received from peers: 5.58 ($\sigma = 1.08$)
  - Media: 3.79 ($\sigma = 1.36$)
  - Car dealership: 3.63 ($\sigma = 1.44$)
- Willingness to pay for full automation
  - $5,000 or less: 69.1$
  - $20,000: only 5$
- Using the sample, a synthetic population of UofM is developed. Then a synthetic network is developed
Survey
Major findings

- CAV price reduction rate increased from 5% to 20% with an increment of 5%

- With 5%, only some 15% of individuals will adopt by 2050

- The share will reach about 90% if price is reduced at 20%

- The share will be close to 100% only if all adopters are satisfied with their purchases
Selected findings

- DOI lit.: advertisement does initiate diffusion but its impact is limited
- Six levels if ad intensity
- No ad: CAV market share will be only 4% by 2050 (only innovators will adopt)
- There exist a cap for CAV share
Thank you for your time

Q/A?

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