Teleworkers avoid downtown congestion with the help of eWorkPlace

Nearly a decade ago, Minnesota launched its eWorkPlace program to help employers and employees understand the benefits of telework, with the goal of reducing congestion and pollution and creating a happier workforce. U of M researchers recently completed the third phase of a project that monitored the program and analyzed its results—and found dramatic shifts in both teleworker behaviors and overall traffic patterns in the state’s capital.

Symposium promotes cross-disciplinary research on connected and automated vehicles

Connected and automated vehicles (CAVs) offer tremendous potential for improving the lives of all Minnesotans, but a great deal of work is still needed to ensure that their potential safety, mobility, and equity benefits are realized.

To meet this need, researchers from across the U of M are already engaged in numerous projects focused on the challenges and possibilities of CAVs. In March, CTS convened many of these researchers, along with a sampling of transportation stakeholders, at the Automated Vehicle
The expanding Twin Cities transitway system will connect some of the region’s areas of concentrated poverty with more opportunities. Although proposed transitway routes are largely set, decisions about station sites, connecting bus service improvements, and station-area pedestrian infrastructure improvements have yet to be finalized. These decisions may affect the extent of the accessibility benefits people actually receive.

In a new study, U of M researchers explored how planners and policymakers can maximize the benefits of transitways for people living in areas of concentrated poverty—census tracts where 40 percent or more of the residents have incomes below 185 percent of the federal poverty threshold. (In 2017, this was $46,424 for a family of four or $23,103 for an individual living alone.)

“Twin Cities residents who live in these areas face burdensome commutes to reach jobs and other opportunities,” says Professor Yingling Fan of the Humphrey School of Public Affairs, the project’s principal investigator.

In their work, researchers took an innovative approach to collecting input from residents in these areas. They began by meeting people at locations in their daily lives, including food shelves, social service providers, libraries, and transit centers. In this way, data collection filled study participants’ waiting time rather than taking their free time.

Additionally, researchers employed a brief, graphical survey that used visual aids and a mix of closed- and open-ended questions. Meeting locations were in both urban and suburban areas. For data analysis, they used an unusual approach that blended quantitative and qualitative techniques.

Study participants indicated a clear need and desire for improved regional transit services. “We learned that the commutes of residents without access to a car aren’t much shorter than households with a car,” Fan says. “People need to travel throughout the region for jobs and other purposes.”

Their actual travel, however, varies significantly based on whether a car is available and the quality of the pedestrian environment near transit stops. “The quality of pedestrian access to the transit system via the street network stands out as a critical issue,” Fan says.

The team also found that transit issues such as safety, comfort, and security shape the quality of life of regular transit users, particularly those who have no other transportation options.

“This research is an important addition to the growing literature on how important good pedestrian access is for transit customers, especially for those who live in areas of concentrated poverty,” says Lucy Galbraith, director of transit-oriented development for Metro Transit.

Based on their findings, the researchers conclude that enhancing the regional transitway system will help residents in areas of concentrated poverty reach jobs and other activities. In addition, they believe best practices for improving neighborhood walkability—such as wide and well-maintained sidewalks, traffic-calming measures, and convenient and safe street crossings—are best practices for
Known for bridging the gap between academics and the community in his research into nonmotorized transportation, CTS Scholar Greg Lindsey has been named the winner of the 2019 University of Minnesota President’s Community-Engaged Scholar Award.

The award recognizes University faculty who demonstrate academically relevant work that advances scholarship in one or more academic disciplines, is conducted in partnership with external entities, and addresses critical societal issues. Lindsey was chosen from six finalists by a committee of peers from throughout the University and honored at an April 4 ceremony.

Lindsey works in the urban and regional planning area of the Humphrey School of Public Affairs. His current research involves analysis of active travel, or nonmotorized transportation, with a focus on bicycle and pedestrian traffic and infrastructure. His work has had significant impacts and is shaping the ways state and local governments plan for active travel across the country.

The Minnesota Department of Transportation (MnDOT) and CTS have worked with Lindsey for more than a decade on research projects to build evidence to inform policymaking and guide investments in active travel.

In 2009, CTS awarded a grant to Greg for exploratory work to measure and characterize nonmotorized traffic in selected Minnesota communities,” says Laurie McGinnis, CTS director. “The success of this work led to a series of three MnDOT research projects, collectively known as the Minnesota Bicycle and Pedestrian Counting Initiative.”

At least 10 public agencies, including MnDOT, the Minnesota Department of Natural Resources (DNR), and Hennepin County, have implemented new monitoring programs to measure bicycling and pedestrian traffic volumes based on research by Lindsey and his students.

Several of Lindsey’s faculty colleagues nominated him for the award, noting that his work is nationally recognized as an “exemplar of community-engaged scholarship.” Some of Lindsey’s former students also praised him for his approach to integrating research, teaching, and community outreach that helped them succeed in their studies and in the job market.

One example is Darin Newman, principal planner with the DNR Parks and Trails Division. “With Professor Lindsey’s direction, my capstone team developed a research plan for monitoring use of Minnesota state trails,” Newman says. “I am now responsible for implementing this plan at the DNR to collect systemic trail use data that is critical for better management and evidence-based decision making to guide investments in infrastructure and operations for the highest benefit to the public.”

Lindsey says he’s grateful for the recognition. “I am most gratified by the work my students have done in the community, and to build our field. I am fortunate to have had these types of opportunities and to have worked with bright, committed students and dedicated public servants,” he says. “My job has been a gift. I am extremely grateful to the Humphrey School, CTS, and the University of Minnesota for the opportunities they have provided.”

(Adapted with permission from the Humphrey School of Public Affairs.)

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everyone, whether or not they have other transportation options.

“People want these attributes not because of stigmas or fads, but because they are genuinely good things,” says co-investigator Andrew Guthrie, assistant professor with the University of Memphis and former Humphrey School research fellow. “Improvements often proposed to attract new riders also help people who already use transit and need it most.”

As a result, the research team says transit- and pedestrian-oriented design is a social equity issue. “The equitable implementation of a modern regional transit system in the Twin Cities requires a comprehensive program of pedestrian improvements,” Fan says. “An easy, safe, pleasant walk to a transit stop, and the wait for a transit vehicle, should be an unremarkable occurrence throughout the region—including areas of concentrated poverty.”

The project was funded by the Transitway Impacts Research Program. Other researchers included Fernando Burga, an assistant professor at the Humphrey School, and Shannon Crabtree, a former Humphrey School graduate student.
Telework has become common—this is both great news and the biggest challenge we faced in this phase of our eWorkPlace project,” says Adeel Lari, research fellow with the Humphrey School of Public Affairs. “Because so many workers are already aware of telework as an alternative to commuting to an office and so many employers offer remote work, there is less demand for the external telework consulting services that eWorkPlace provides.

Despite these trends, eWorkPlace made significant gains in the past two years. Most notably, eWorkPlace enjoyed success in promoting its services during the ongoing, multi-year downtown freeway reconstruction project and the Super Bowl in February 2018.

“Hundreds of new employees were recruited to telework in order to escape construction traffic, and hundreds more began teleworking in anticipation of the Super Bowl and then continued teleworking once the event was over,” Lari says. “These employees overwhelmingly reported significant improvements in productivity, work-life balance, and overall well-being.”

With the help of the eWorkPlace Comuter Savings Calculator tool, researchers were able to help quantify the benefits these employees—and hundreds of others like them—gained through telework. On average, each teleworker eliminated more than 94 commute hours, saved over $3,600, and reduced emissions by nearly 1,900 pounds of carbon dioxide each year.

The third phase of the eWorkPlace project ran from March 2017 through September 2018 and included a number of components, including productive local partnerships, a robust online presence, and a variety of promotional events. Notable program participants were the Minnesota Department of Transportation (MnDOT), the Minnesota Department of Education, 3M, Thrivent Financial, Allina Health, and Medtronic.

“In our transportation consulting work with downtown Minneapolis companies, we’ve found quite a bit of telework adoption, especially among tech-focused organizations that are used to using management and benchmarking software to guide projects,” says Mary Morse Marti, executive director of Move Minneapolis, a nonprofit program of the Minneapolis Regional Chamber that promotes sustainable commuting. “Really, that’s the key: teaching managers to manage outcomes rather than people. Once managers are skilled and comfortable managing deliverables, the where and when of how work gets done doesn’t matter nearly as much. We’d love to see more companies train their staff in these methods.”

A final takeaway researchers noted in this phase is that power in the workplace has shifted. “As telework has grown in popularity, employees are starting to enjoy greater autonomy in the workplace and have more control over their working conditions,” Lari says. “For eWorkPlace, this means shifting away from employer outreach efforts and instead working toward promoting eWorkPlace directly to employees.”

The project was sponsored by the Metropolitan Council and MnDOT. eWorkPlace is a state-sponsored initiative for Twin Cities-area businesses that fosters teleworking.

On average, each year a Twin Cities teleworker saves more than 94 HOURS in commute time, over $3,600 in vehicle costs and time savings, and nearly 1,900 POUNDS of carbon dioxide emissions.
Minnesota transportation practitioners now have access to a comprehensive culvert design guide to help preserve stream connectivity and promote the safe passage of fish and other aquatic organisms through culverts.

"Minnesota’s 140,000 miles of road and 92,000 miles of streams and rivers meet at tens of thousands of places," says Matt Hernick, an associate engineer with the U of M’s St. Anthony Falls Laboratory. "Because of the variety of ecological regions in the state, the range of culvert geometries, and other factors, no single solution can work for culverts statewide. The new guide fills this information void."

Culverts are a cost-effective solution to allow traffic to cross over smaller waterways, but they have historically been designed with only flood flows and the safe passage of vehicles in mind—and not the health of streams and the organisms that depend on them, says Hernick, the project’s principal investigator. Professor John Nieber of the Department of Bioproducts and Biosystems Engineering was the co-investigator.

The researchers used results from previous MnDOT studies and consultations with experts to develop the culvert design guide. They worked with experts from the Minnesota Department of Natural Resources (DNR), the U.S. Forest Service, and others with knowledge of civil engineering, aquatic organism passage, and stream geomorphology to determine the scope of the guide.

They also sought information for the guide from a wide range of resources including past research, documents from federal agencies, guidance from other states, permit requirements from the DNR, and databases of fish populations, stream attributes, and culverts. Additionally, researchers surveyed state and local highway transportation practitioners to identify current design practices and their degree of effectiveness.

The 221-page guide—amply illustrated with photos, charts, and more—is available to users online. Sections include site assessment, analysis and tools, best practices, the current regulatory context, and a design method selection chart. Benefits for users may include more-efficient design and permitting processes and lower construction costs.

“This design guide offers a practical, Minnesota-based perspective on how to design culverts that allow aquatic organism passage and preserve stream integrity and connectivity across the state’s diverse ecological regions,” says Nicole Bartelt of MnDOT’s Bridge Office.

The project was sponsored by MnDOT and the Minnesota Local Road Research Board. Additional research is under way to assess how storm vulnerability and future hydrologic scenarios could affect culverts and fish passage.
How will connected and automated vehicles affect agencies, industry in Minnesota?

As part of the Automated Vehicle Researcher Symposium, CTS invited a panel of representatives from public agencies and private industry to share their interests, hopes, and concerns related to connected and automated vehicles (CAVs) in Minnesota.

What is your organization’s biggest challenge and greatest hope for CAVs?

“Our challenge is trying to provide answers to our customers and make wise investments when not knowing the future,” said Jay Hietpas, director of the MnDOT CAV-X office. “Our greatest hope is that it will save lives and improve the quality of life for Minnesotans.”

Gina Buccellato, technical director of 3M’s Transportation Safety Division, noted that forming effective partnerships with automotive manufacturers and hiring employees with the right skill sets are two of 3M’s most significant challenges. “Our hope is that this technology starts driving the cost down and increasing accessibility.”

“The challenge is preparing our staffing, policies, and infrastructure for whatever is going to be coming,” said Danielle Elkins, a FUSE executive fellow working with the City of Minneapolis. “Our hope is that CAVs increase access, prosperity, safety, and equity for all of our residents. We want people to get where they need to go and access the goods and services they need to live a good life.”

How is industry approaching the transition to CAV-related products and services?

“We’re focused on how to address both user groups: human drivers and CAVs,” Buccellato explained. “An early challenge is elevating the role of infrastructure in enabling these vehicles.”

For example, we need to be thinking about what a pavement marking needs to do to be useful to the CAV in order to guide it. How do we enable sensors to provide information to the vehicle? We’ve had to reach out to vehicle manufacturers as well as the folks developing the sensors to understand their vision and work alongside them in developing these new materials.”

Where might AV be part of the solution to challenges your agency is facing?

“Our goal is to provide a transportation system that maximizes the health of people, the environment, and the economy,” Hietpas said. “CAVs could help us get people better access to things like jobs and health care. It could also help us with congestion problems, since we can’t build our way out of everything. Ultimately, we hope it will help provide more affordable, accessible transportation options.”

“One of the top things we consistently hear from residents is the need for access to transportation. Transit lines are finite and don’t serve some important locations in our county,” Sandberg said, citing the government complex in Stillwater as an example. “People can’t get to court dates, doctor’s appointments, or even their jobs. Depending on how CAVs are implemented, they could address some of these major transportation equity issues.”

“As a large city, we’re dealing with limited space,” said Elkins. “We need to convince as many people as possible to take fewer single-occupancy vehicle trips because there isn’t room. Our hope is that CAVs are also shared and electric and can address safety, equity, and climate issues as well.”

3M is exploring potential modifications to infrastructure elements such as pavement markings to meet the needs of CAVs.
Researchers are investigating how CAVs can be implemented to benefit all Minnesotans, including those in rural areas.

Researcher Symposium, an event designed to share information about this current work, identify pressing issues and research needs, and promote future cross-disciplinary collaborations that support CAV development in Minnesota.

Kicking off the event, more than a dozen U of M researchers from disciplines ranging from engineering to public policy to computer science gave brief overviews of their CAV-related work. Highlighted projects are investigating a wide variety of topics, including transportation policy and finance; engine, powertrain, and routing optimization; urban development; workforce education; freight; mobility; equity, and health; traffic management; deployments in rural areas; and sensors and other enabling technologies.

After hearing about this broad body of work, a panel of public agency and industry representatives discussed their organizations’ areas of interest and potential needs related to CAVs (see related article on page 6). Symposium attendees also had the chance to brainstorm their own ideas for future research. Breaking into several small groups, researchers and stakeholders focused their discussions on subcommittee topics from the Governor’s Advisory Council on CAVs: planning and land use; traffic regulations and safety; infrastructure; cybersecurity and data privacy; and economic development, business opportunity, and workforce.

These discussions generated a diverse list of potential topics for further investigation, including the future of parking facilities, ensuring equitable access to mobility as a service, potential implications for the Manual on Uniform Traffic Control Devices, smart city transportation management, the nature of work in a CAV world, and security vulnerabilities in transportation infrastructure.

“I hope symposium attendees were inspired by these discussions, had a chance to network with researchers from other disciplines, and gleaned some research ideas from our agency and industry participants,” says CTS director Laurie McGinnis. “I look forward to seeing the rich, exciting work that is sure to continue around connected and automated vehicles in Minnesota.”

READ Catalyst ONLINE for links to research reports and other resources.
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