Memorandum

To: Institute of Transportation Engineers (ITE) Board

From: LeadershipITE Team Chillax
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Subject: Preparing for Transformative Technology Recommendations

Date: 8/17/18

Problem

Transportation professionals know big changes are coming to the industry. Public agencies, consultants, and private industry are faced with tough decisions about what technologies to plan for, to invest in, and how to best implement and integrate technologies that do not yet have standards. So, what is ITE’s role in preparing for transformative technology? How can ITE guide the industry to implement these technologies safely and effectively - and quickly enough to save lives, reduce congestion and improve the environment? We interviewed industry leaders and worked together to come up with several recommendations for ITE.

Recommendations

I. ITE International Provide Guidance and Resources

ITE International is ideally poised to guide the industry to prepare for transformative technology. Throughout this program, our group has become more informed of ITE International’s initiatives and has seen a need to strengthen the connection and information flow between ITE International and local districts, sections and chapters. ITE has already been making great strides in educating industry professionals on Smart Communities (recommended by LITE SMART, LeadershipITE). By providing resources and sharing success stories with transportation professionals, we will all learn how to best implement new technologies. Specific strategies include:

A. Create a one-stop online tool box for agencies and professionals.
   - Compile published documentation on various emerging technologies.
   - Ask agencies to share any published technology evaluations they have done. Set a goal of collecting one technology study, paper or evaluation from each agency.

B. Highlight success stories and cautionary tales.
   - ITE Podcast on emerging technologies in our field with interviews of the people implementing these technologies with lessons learned.
   - Ask presenters to be more candid about pros and cons. Nobody wants to look bad, so many times “lessons learned” focus solely on “things we did well” and gloss over things that did not go well that others could learn from.
   - Keep publishing good ITE Journal articles (feedback from industry leader survey). Add case study column on emerging technology.
C. Provide meeting content and speakers to district and section meetings.
   - Provide international perspective in one session per meeting. This could cover where to find resources on the website, or discuss specific initiatives.
   - Create a speakers bureau/rolodex: a vetted list of approved expert speakers on various topics who are willing to speak at ITE events.
   - Assist districts in pulling in bigger keynote speakers.
D. Create “ITE Minute” videos to share information (example in presentation).
   - ITE Minute videos could be used to keep members up to speed on international initiatives and committee activities.
   - ITE Tech Minute videos could quickly showcase a technology or study from the one-stop shop.

II. Challenge Transportation Professionals to Think Differently
In the engineering and science world, we too often get used to doing things “by the book” and tend to take a conservative approach. Due to the new transformative technologies which are here and that are coming, we need to challenge transportation professionals to think critically and take the time to imagine what the future might look like. These strategies can be implemented at the international, district, or section level. Our own Carissa McQuiston has volunteered to test out new session formats at the next Michigan Section meeting.

A. Implement new session formats at meetings.
   - Brainstorming sessions: Present a problem, break into teams and ask teams how they would approach the problem. Example: what assumptions would you make about our transportation system and technologies when modeling this retail area 10 years out? Consider current trends towards online shopping and how trips may be made in the future. The purpose is not to solve the problem but to learn and envision different approaches.
   - Visioning sessions: Ask each participant to describe what they think the future of transportation looks like. Start from least to most experienced attendee.
   - Test other formats such as hackathons, technology demonstrations, panel interviews of agency leaders on their experience implementing technology.
   - Pick a theme of the year (new technologies) that would allow local chapters to create a program based on that. It could have suggested topics and suggested speakers. It could be a top-down approach from ITE HQs, or it could be bottom-up with trying it at a local level first.
B. Cover nontechnical topics at meetings.
   - How to present transformative technology ideas and impacts to the public and legislators. All the great quality work we do has less meaning if we cannot present it clearly and concisely to nontechnical people.
   - How to quantify benefits of new technology. Many benefits are difficult to quantify, but doing this can help agencies secure funding to implement new technologies.

Appendix A - Summary of Interviews
1. How do you feel we, as a transportation industry, are doing in accepting and implementing new technologies? (Scale of 1 to 5 with five being the best)

1. I would give us a 3. It takes time to vet new technologies and many agencies don’t want to be the ones taking the risks on something that is not proven yet. This leads to more “research” implementations at a smaller scale of the new technologies with agencies that have the resources to do this, while many smaller agencies are left looking to the larger agencies for the results of these implementation and guidance from our industry professional societies. This would seem to be a responsible approach, but it does create for limited implementation at the beginning and slow adoption.

2. Public sector will always lag private sector in innovation, new technology, etc. No profit motive. Difficult procurement process. Very difficult to create new positions (are repurpose old positions) within a bureaucracy that can focus on new technologies. We rely far more on consultant assistance for ITS which has been around for 25+ years, and still haven’t really adjusted our workforce to properly accommodate that technology.

3. Overall, in the middle around 3. We have a big variety of agencies. For example, the City of Seattle is able to implement many new technologies (like adaptive signal control) based on their staffing and funding. Others are not even doing basic CCTV camera monitoring. Others in more rural areas, their stakeholders (traveling public) is not clamoring or asking for new technologies, they want potholes repaired.

4. I would rate it a 3. While we have been good at getting out to the way, we have not been good on setting national standards for communication. Same thing happened when we started ITS deployment. Every manufacturer had their own protocol. We had a tough time with simple things like variable message sign communication until we got NTCIP developed. There must be national standards to some degree to facilitate communication between the connected vehicles and the infrastructure. Does that exist? Is it proven? Is it robust? How would a Chevrolet talk to a Ford? Can this be done? The standards on how two manufacturers talk to one another should be a federal standard. Also, there needs to be national standards developed for deployment. Who gives the certification that a vehicle is a class 5? If a vehicle is class 5 in one state, will it be in all other states? This again is a standard that must be developed at the national level.

5. Probably a 3. Some of this is funding, some is inertia. Some of this is the realities of running an operations and maintenance program. You need to spend $$ to get new technology, and when you put it in someone has to operate and maintain it to keep it working. So, if you don’t have staff to operate and maintain it, and some way to get spare parts when you need them, it won’t work long term.

- Example – A rural county that required a new school development to construct a traffic signal. The signal was the first one on the County’s road system. When the time came to open the school there was a realization that they had no idea how to keep it running which resulted in a debate as to whether or not to turn it on. In the end they did but had to learn some new skills.
6. We are typically supportive of technologies that improve transportation. However, the public sector can be slow adopters because we want to ensure it is done well and the impacts of the implementation have been considered.

7. in ITS America works with a lot of people on cutting edge, but from former days as DOT director many don’t adopt new tech—uneven adoption of technology throughout the industry

2. What are some of the biggest changes you see coming?
   1. AV/CV technologies
      - Adaptive signal systems
      - Real-time performance monitoring (various detection and alert technologies)
      - Big Data processing algorithms
   2. Reducing serious injuries and fatalities (for now, still focused on a non-CAV world). Improving safety and operations for non-motorized users. Disconnect between land use and transportation decision making. Applying new technologies to all of the above. Figuring out how important “connected” is in the forthcoming CAV world. Planning, designing, implementing, operating, and maintaining V2I technologies. Transition period.
   3. As a consultant, I haven’t heard much about CAVs from my clients. They seem to be ignoring it. No serious considerations of technology. Had one project where we talked about it at a planning level, but there was no attempt to quantify the impacts. The overall environment is budget limitations and funding uncertainty.
   4. Challenges are what will this do to vehicle miles traveled? What will it do to headways? The information that I have seen varies the VMT by a 60% decrease to a 200% increase. This is a huge range. We need to know the answer as this will tell us if we need to prepare for more or less cars.
   5. In the future, AV may lead to zero non-recurrent congestion
      - The CCCTA Walnut Creek Circulator uses an inductive charging loop at the Walnut Creek BART station to recharge the electric bus during its 10 minute layovers.
   6. The fundamental need for transportation isn’t going to change. It has existed since there have been people. The need for good roads isn’t going away in our lifetime. It has been around since ancient times. However, the technology that goes onto the roads has evolved over time and is now changing quickly. The data that we use to plan and design the transportation system is also changing quickly. The models and tools that we use for our work continues to evolve. I don’t worry about job security — transportation engineers will be around for a long time. I believe that we will also continue to fight for adequate funding as we always have. The fundamentals of engineering will remain, but – the data, technology, and tools will continue to change.
      - Also, how we think about transportation continues to evolve. We are rediscovering that streets are not just for mobility, that they are public spaces as well. One other big change, in the past our main performance measures were delay (LOS) and safety. Our performance measures are going to get far more robust and complex, factoring in things like transportation and health. As we rediscover the value of our streets as public spaces and the impact that they have on quality of life we need new measures to know how the system is performing in these areas.
7. Increased automation of cars, trucks, and transit vehicles. I think our jobs will be shifted heavily towards trying to influence the implementation of automation to emphasize shared mobility. There are going to be extreme pressures for increased sprawling development. I see funding programs and decision making centered on making automated vehicles equitable for all and trying to minimize their negative externalities.

8. Going to see a complete change of the way we experience transportation – big data, artificial intelligence, v2x, for 100 yrs the idea behind transpo agencies was you put down asphalt and cars drive on it so this is a big change, big potential for safety benefits, potential for improvement impressive, but brings a lot of challenges like cybersecurity

**How do you see that affecting your job, funding, and decision making?**

1. Starting with funding and decision making, I think you will see an eventual shift to funding more of these types of emerging technologies because they provide for efficiencies that help to better manage an entire transportation network for both safety and operational improvements. They also provide A LOT of information about a networks overall transportation health that would have been cost prohibitive to regularly obtain prior to these emerging technologies. Regarding my job, it will need to evolve with the needs of the industry requiring me to stay informed on the latest technology trends and understanding when and where these technologies are appropriate for use and having the appropriate staff experience level with these technologies. This also means new opportunities in different transportation areas of practice.

2. No idea. Opinions range from V2I/CAV simply being the next step in ITS, vs. a “revolution.”

3. I see it impacting my job by making me consider a new user type (automated vehicles ... zero occupancy vehicles) and we may even consider them a new ‘mode’ of transportation. The way we design roads could change based upon this mode. We may find it possible to adjust our traditional geometric elements like lane widths, turning radii, or crosswalks.

**3. In your opinion, what are challenges/barriers that are keeping us from implementing new technologies?**

1. Funding deficiencies – It is difficult to justify paying for new technologies when you don’t have budget to maintain an existing system.
   - Communication/Education - Champions of the new technology and decision makers are not usually the same people, so being able to clearly communicate the benefits a new technology is critical.
   - Proven track record – some people are just not risk takers and need to see an established track record of where a technology has been implemented and how it has performed.

2. Federal and state procurement rules often slow the process considerably. It’s hard to test out new equipment with these rules. Also, this sounds a bit counter-intuitive, but there’s too many federal grants available. Going after these takes considerable time and effort. Just give us the money like all of our regular federal highway funding.

3. Funding, motorists not demanding them, and information overload with so much coming at us (webinars) from ITE and other organizations (ITS America), etc.). We are not well connected with the people implementing these technologies now (vendors, researchers, big state DOTs). When I was webmaster for ITE Washington, I wanted to create a calendar of events from ITE and other related organizations (ITS America), but it was a struggle and I didn’t have the time. We in ITE Washington struggle with how to stand out and provide value.

4. Fear of change. Similar to implementation of roundabouts, people were against them at the beginning, but are slowly warming up to them. This is the same for connected/autonomous vehicles. People will be weary of them at the beginning and then they will become more accepting. The only thing we can do regarding this is education.
Certification ... the vehicles need to be certified at some level to remove liability from the auto manufacturers. If we allow them to be self-regulating and to perform their own certification, this is a trap. Once manufacturers realize their liability associated with self-regulating/certifying, they will move away from it pretty fast. A national level of standard for certifying is important.

5. He sees how our methods and means today affects the long range transportation plan, which in turn affects our methods and means today (circular)
   - For example, he brought up how old-school TIA guidelines cause us to widen roads. We then cater to TIA guidelines (e.g. LOS), which brings additional legitimacy to LOS based criteria.
   - Agencies need the right people. Not just civil engineers. Need good planning to know what is coming
   - Had example on installing empty ducts for fiber at intersections
   - Agencies need the right environment.
     - Government does not incentivize risk taking like private companies do.
   - Speak in plain English.
     - His example: HOT lanes as a service. He convinced a county supervisor to stop calling them “Lexus Lanes” by showing objective data that the most common users drove Chevys. They are regressive if you consider a user paying toll every time they commute, but they can provide opportunity when used sparingly. For example, he said a plumber might pay $10 on SR-91 to save 30 minutes in travel, allowing the plumber to access an extra job for the day and make additional income.
     - It can take 5-7 years to see if decisions were good or bad.
   - Agencies need a leader who will take a bullet for the team. Not everything will succeed, but most government officials are too afraid of the failures to pursue the successes.

6. Funding, inertia, (it is hard for people to change), and the realities of operations and maintenance. To implement new technology you need people to maintain that technology for the long term.

7. Have we fully considered all of the impacts this technology will have?
   - Are we sure the technology won’t be obsolete in a few years. We don’t want to base or infrastructure maintenance decisions on a technology that will be outdated long before the facility’s useful life.

8. Cultural issue with DOTs – we’ve always done it this way, can only make incremental change, but huge change is coming, engineers or maintenance employees are most risk-averse, salary limitations to hire talent,
   - There will be new/emerging issues – like the invention of the car solved a lot of problems but created some we didn’t know we had
   - When you run a DOT with 3K employees, you have different tiers of people - top 3% leaders, next 20% really good employees, middle decent (but might not notice if they quit), then there are people working against you, and some who are just bad people – focus on persuadable upper middle piece, get leaders to buy in so not just “new leader’s initiative”
4. In what ways do you think we can do a better job at accepting and implementing technological changes?

1. As an industry, sharing of information is key and allowing people to ask questions about the technological changes can build a comfort level. This means education through our professional societies and conferences. Justifying how these technologies may save an agency money in the long run may also help an agency that would normally not consider this due to funding deficiencies reconsider if it offers a net gain to the budget in the long run by making their allocations more efficient. There will still be people/agencies that won’t do anything until the track record has been established. Communicating and sharing of information as an industry helps to get more projects implemented and will grow the track record of implemented projects more quickly.

2. Change is hard anywhere, but particularly hard in a public sector environment. Difficult to impossible to get new staff, new positions, new types of positions. Consultants can help with this but this can be inefficient.

3. We are advocates of moving people for the least amount of taxpayer dollars. If a new technology allows us to keep the same infrastructure and move more people, we tend to latch onto it pretty fast. With that said, Washington State is a very litigious friendly state and we are therefore pretty risk adverse. So, we don’t move too fast until we have thought about the liability exposure.

4. We need to get past the “shiny new toy” and the “sales pitch” and start at creating better communities. The question needs to be how can these new tools help us to create better communities.

5. Work with tech companies to determine long-term standards for what is needed from an infrastructure standpoint. More pilot projects. Find a way to be less risk-averse.

6. Do a better job at cost/benefit analysis, better job of quantifying to sell to people. DE1 example when I was DelDOT secretary: would have cost 250 million to widen DE1 North of 72 – I said go back and find operational improvement, ended up doing hard shoulder running which saved a lot of money and was implemented quickly. Example in CO going to do intelligent ramp metering I-25, expect it will get us equivalent of adding a lane for about 18 miles for 8 million, but if we had tried to widen, we couldn’t even get right of way (and cost would be huge)

5. Can you think of any success stories you have seen regarding acceptance and implementation of new technologies?

In your opinion, what made them successful?

1. Yes. I have seen implementation of Adaptive Signal Systems as well as real-time travel time monitoring systems. I think what made them successful was that these were relatively small installations to basically provide proof of concept to the agency. This set the stage for larger subsequent installations.

2. We have many examples, but I don’t know if any of them are particularly noteworthy. We don’t necessarily have a great long-term plan on rolling out new technologies. We usually just muddle through. We could do better using a more formalized systems engineering approach.

3. NTCIP revolutionized ITS interoperability. ITS interoperability was extremely suspect prior to NTCIP.

4. Tons of them. It is all around us. One example: [https://www.sccmo.org/210/Gateway-Green-Light](https://www.sccmo.org/210/Gateway-Green-Light) Another, things like Google Earth, GIS, and microsimulation created big changes in how we
approach transportation planning. They work through lots of hard work, political support, and good planning.

5. Pierce Transit installed automated braking and pedestrian detectors on some of their buses. This eliminated pedestrian collision claims (on the buses equipped with the tech) and therefore reduced the agency’s legal liability against injury claims.

6. Already seeing importance of new tech in vehicles – automatic emergency braking is helping curb low speed collisions, trials on truck platooning show 7% fuel savings per vehicle, optimization with connected signals Salt Lake City able to manage traffic. In near future going to see even more. But at the same time people will cite the Jeep that was hacked – not even an autonomous vehicle, just an infotainment center hacked.

6. Can you think of any cautionary tales of not accepting and implementing new technologies?

1. I can think of plenty of situations where people have said after the fact that if such and such technology was installed at a location, it could have prevented a crash. I think if there is a continued ignorance to considering a technology for a safety benefit, that can lead to a lack of trust from the public and potentially lead to legal situations. If a technology cannot be installed for whatever reason, that is fine, but it should at least be on the table for discussion.

2. The jury is still out on the HAWK signal. We are closely studying this every year, and may someday decide they are not operating as well as intended and could just change them to traffic signals. In my opinion, the VSL system on I-495 does not change driver behavior, but police and many DelDOT folks like this system. I have yet to see good research that shows VSL alone having any impact on driver speeds. So this system is working, I just think it’s a waste of time/money. There should have been clear goals, study, and research when these were originally installed. Instead, it was just the latest fun ITS toy to play with.

3. Spending a lot of money on a particular infrastructure investment only to find out it cannot be used reliably as an input for the autonomous vehicle. Take for example striping. If we went out and spent millions on improving our striping using high-build paints or durable plastic, we would do so thinking the auto makers need this for inputs to keep cars within their lanes. We might find out afterwards that striping is not always there year around in Washington State and therefore the autonomous vehicles manufacturers cannot rely on it and they write their programs to not use striping information.
   - We might also find a pitfall providing an improvement for Manufacturer A that is not used or needed by Manufacturer B. Back to the striping example above. Maybe Manufacturer A needs the strips, and Manufacturer B does not. Do we restripe for the benefit of Manufacturer A? What if Manufacturer B comes uses signs, but Manufacturer A does not? Do we maintain signing for Manufacturer B?

4. An (unnamed) agency put in a new adaptive traffic signal system. The problem is that the agency’s technical staff couldn’t make adjustments to the signal timing when the system didn’t do what they wanted it to (e.g., to address customer complaints). The agency turned it off in the end because they didn’t have any way to control what the system was doing.
   - Uber crash in Tempe.
   - MoDOT at one time put in variable speed limits on I-270 in St. Louis. The MSHP was not comfortable enforcing the system during peak traffic times. Without enforcement, people ignored the variable speed limits. The system was ultimately removed.
   - Consider cyber security.
5. They could invest in technologies that might become obsolete soon. Also, by quickly adopting different technologies, a public agency might get complaints about a lack of consistency in their services.

6. Example of not (fully) accepted: Still have states where there is not a primary seatbelt law, this still contributes to a lot of crashes. Haven’t seen much implemented and gone awry due to the conservative approach of the industry. Are we going to continue DSRC, or cellular V2X, put 10s of millions into roadside units – nobody wants to be branded this way. This is holding some people back.

7. What about pitfalls that an overly eager adopter might fall into?
   1. Overly eager adopters in an emerging technology market can hitch their wagon to a vendor that hasn’t proven itself with a long-term track record, and could go out of business leaving the agency stuck with a technology they cannot maintain, must be replaced with a different vendor’s equipment, or ultimately removed. A failed implementation like this makes it very difficult to gain traction for future implementations with the same agency.
      - Early adopters may also find themselves with a product that is not as robust as the vendor may be using their project to help refine/develop their product.
      - Early adopters may also find themselves in a situation where there is not a lot of competition yet in the market, which leads to paying top dollar for the technology until there is a more competitive market established.
   2. A system that doesn’t work as intended. More expensive (capital, maintenance, operating) than expected.
   3. People are different. Some want to be on the “cutting edge” and some don’t. A leader’s ability to be tolerant to risk constrains their eagerness to adopt emerging technologies.
   4. Going after the shiny new toy without fully understanding longer term implications. Is this technology compatible with other systems that the agency has? Does the agency have staff that are trained to operate and maintain the technology? If not, is there a plan to train the agencies staff or outsource the work?
      - Also, adapting technology for technology sake rather than using technology as a tool to improve communities. What value does the technology provide for the community?
   5. Some agencies want to be cutting edge, others want to learn from others’ experiences.
   6. Worlds first autonomous vehicle delivery could have gone wrong in CO, wouldn’t be talking to him now. We don’t reward innovation gone wrong, someone gets fired.

8. What can ITE as a professional organization do to better help the acceptance and implementation of new technological changes?
   1. FREE webinars on emerging technologies to educate. Document pros and cons of implementations (help to establish/document the track record). Being an industry resource for agency leadership (and engaging them prior to them asking...if they ever ask...on emerging trends). Would love to listen to an ITE Podcast on emerging technologies in our field with interviews of the people implementing these technologies with lessons learned (would just be one topic area of the podcast).
   2. Keep publishing good ITE Journal articles. Various ITE forums, listservs, etc. are helpful.
   3. Making better connections. ITE nationally has been working on this. But on a more local level, we struggle with finding speakers, as there is a desire to hear from them but those resources are
hard to come by if we’re not plugged in. A Speakers Bureau, or list of speakers, that we could pull from would be nice.

- Need to recognize there are different audiences that have different information needs, e.g., decisions makers like sessions on funding while agency technicians like nuts/bolts presentations.
- Figure out the role of ITE in the overall industry. Recognize ITE is typically more practical and practice-focused than some other organizations.
- Idea: pick a theme of the year (new technologies) that would allow local chapters to create a program based on that. It would have suggested topics and suggested speakers. It could be a top-down approach from ITE HQs, or it could be bottom-up with trying it at a local level first.
- I’ve found it’s hard to put time into ITE because we are so busy at our jobs. So, if there was packaged information/programs available to us, that would help. There are some packages/programs available to us from ITE HQs, like using EventBrite for webinars.
- How do we use Twitter to distribute information? Ex. On Twitter if you tweet about a treatment (like diverging diamonds), then there’s implicit endorsement of that, but it’s not appropriate anywhere.
- Idea: a technology demonstration/showcase building off different levels of audience. For example, we had a great demonstration of ATSPMs at our annual meeting last year. As engineers, we like to get our hands dirty. We don’t more webinars, something more in-depth like a technology demonstration or on-line training.

4. Participate in the developing of standards for implementing autonomous vehicles. This can be for manufacturers, intercommunication, or for infrastructure. I know that we want manufacturers to not be controlled and to develop freely, but we also want this to succeed and work across/between manufacturers.

5. ITE should take a cross section of members. Figure out percent city/county officials as opposed to state or other high-level agency officials

- He said that city/county officials aren’t going to ITS America. Rather, they’re coming to ITE. Everyone assumes CVAV is coming at the state level, but many smaller agencies (e.g. CCTA) are leading the charge.
- NACO invited him to “tell story” of a county leading the charge, as it was quite different to the standard narrative of state or regional officials taking the lead.
- ITE should have cities/counties as part of the CVAV Council
  - CCTA, City of Las Vegas, Navia (?) had CVAV presentations at NACO conference. “City/county ‘wannabes’ filled the room and refused to leave” asking questions well after time elapsed.
  - ITE should find “champions”. Be thought leader. Identify thought leadership and “work them to death”

6. Education and information sharing.

7. Work with technology providers to provide consistent tech that is compatible with previous investments and provide some level of certainty that the tech will not quickly become obsolete.

8. As long as we’re out there talking about the good things technology can do, this helps. Nobody wants to be the lone gazelle by the water – we need to have safety in numbers. Organizations
can show the industry that states aren’t alone. He did an autonomous vehicle trip because he wanted people to feel safe, pave the way for them to try implementation.

9. Do you think there are any important players in the industry who should “be at the table” and are not today? (i.e. Programmers, Car Manufactures, etc.)

1. I feel like most industry players are “at the table” in some capacity. They just aren’t necessarily at the same table and are driven by different markets and timelines that make coordination difficult. Not impossible...just difficult. I would like to see the automotive insurance industry more present. Some of these technologies, like AV/CV can be real industry changers, and I want to see them more engaged since it benefits their industry (less crashes means less payouts), and in turn it would be good to see those benefits passed off to their customers in the form of reduced premiums. At least until all cars are AV and we don’t need auto insurance anymore 😊.
   • I also feel the transportation industry has not traditionally been very attractive to computer programmers. I think this will change as Big Data becomes more available in the transportation sector and we will need to engage more programmers to develop applications.

2. Seems like we are getting there on the CAV side. Also on the IT side.

3. ITE needs to revamp its “vendor” program (and we are working on this). In the past the vendors were people who set up booths, provided sponsorships, and tried to sell us stuff. Now, technology companies are offering new solutions and they need to educate us on new tools and capabilities. They need to be brought off the exhibit floor and into the discussion about how we can use new technology solutions to help solve our problems.
   • We also need to talk with other disciplines. As one example, if we want to leverage our transportation investment for better health outcomes (and a lower national health care bill) then we need to bring health professionals in. If we want to have more enjoyable spaces we need to talk to people like artists who can help us create interesting places. If we want to better understand freight – should we bring FedEx drivers into some of our meetings to talk with us about their experience?
   • Finally – how can our technology better work with other systems? How can transportation technology help improve education, or crime fighting? We need to look across the hall (or street) to other departments and explore ways we can help and support each other to make government overall work better. There are many untapped opportunities here.

b. Do you have any ideas on how they can be integrated into the transportation profession/industry?

1. Invite them to speak at professional conferences and be involved in roundtables on relevant subject matter, possibly at ITE Annual Meeting.
   Maybe a 24hr App challenge at a conference where the Big Data is provided and the programmer teams must develop an App that they feel would be of benefit based on the data available (the development teams would also have traffic engineer(s) and or planner(s) on their team.

2. If you’re not in the conversation, you’re probably not going to be around very long. Sometimes too many people in the conversation at this point, but that will probably sort itself out.
10. Why do you think agencies differ in their approach to and eagerness of adopting emerging technologies?

1. Operating Budget
   - Bureaucracies in place to get approvals with certain agencies are not necessarily setup to deal with emerging tech and can often require approvals at many levels when it is outside of the normal approval process.
   - Leadership – leadership provides the direction on what kind of risk their agency can and should take on if it provides a benefit to the public within an achievable budget. I think this is the biggest factor with adoption of emerging technologies. Some folks are more risk averse than others. Building a comfort level through education with agency leadership would likely be the
2. Goals/objectives of each agency. Mindset of agency leadership.
3. It’s all about leadership. Agency leadership and enabling political leadership. A couple of years ago Michigan did a virtual truck platooning demonstration project. MoDOT tried to do the same thing. Michigan was successful while Missouri was not. I joked with Kirk that he needed to come to Missouri when he was done in Michigan and change the culture. The problem wasn’t with MoDOT, but with Jay Nixon, the previous Missouri Governor at the time who vetoed the enabling legislation due to pressure from the Teamsters. Kirk made the comment that his governor rode in the lead truck for the MI demonstration. The difference was in those two people.
4. Starts with leadership. Leaders more willing to embrace risk, take a few chances - you get that outcome from the DOT. More conservative leadership, more conservative DOT approach. It also depends on the scope of the problem you’re trying to solve – if you have lots of crashes, lots of congestion, you’re going to be more willing to adopt a riskier strategy.

Interviewees – participated in being interviewed or supplied email responses to the above questions (in no particular order):

Matthew Hill, Supervising Transportation Engineer WSP Michigan (ITE MI Section President)
Mark Luszcz, DelDOT Chief Traffic Engineer
Mike Hendrix, Senior Project Manager, Perteet Inc. (President of ITE Washington Section)
Jim Mahugh, Washington State DOT (WSDOT)
Randy Iwasaki, Executive Director, Contra Costa Transportation Authority
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