HARNESSING THE 'SMART CITIES' INITIATIVE TO IMPROVE MOBILITY FOR AGING AND DISADVANTAGED POPULATIONS
# TABLE OF CONTENTS

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Executive Summary</td>
<td>2</td>
</tr>
<tr>
<td>Project Problem Statement</td>
<td>5</td>
</tr>
<tr>
<td>Background</td>
<td>5</td>
</tr>
<tr>
<td>- Growth of the US Transportation System</td>
<td>5</td>
</tr>
<tr>
<td>- Focus Populations</td>
<td>6</td>
</tr>
<tr>
<td>- Aging</td>
<td>6</td>
</tr>
<tr>
<td>- Disadvantaged</td>
<td>7</td>
</tr>
<tr>
<td>Smart City Challenge</td>
<td>8</td>
</tr>
<tr>
<td>Finalists' Approach to Aging and Disadvantaged Populations</td>
<td>9</td>
</tr>
<tr>
<td>- Columbus</td>
<td>10</td>
</tr>
<tr>
<td>- Pittsburgh</td>
<td>10</td>
</tr>
<tr>
<td>- Denver</td>
<td>10</td>
</tr>
<tr>
<td>- Austin</td>
<td>11</td>
</tr>
<tr>
<td>- Kansas City</td>
<td>12</td>
</tr>
<tr>
<td>- Portland</td>
<td>12</td>
</tr>
<tr>
<td>- San Francisco</td>
<td>12</td>
</tr>
<tr>
<td>ITE Smart Communities</td>
<td>13</td>
</tr>
<tr>
<td>ITE’s Role in Smart Communities</td>
<td>14</td>
</tr>
<tr>
<td>ITE Smart Communities Task Force</td>
<td>14</td>
</tr>
<tr>
<td>Core Audiences &amp; Stakeholder Group</td>
<td>15</td>
</tr>
<tr>
<td>- Transportation Associations</td>
<td>15</td>
</tr>
<tr>
<td>- Technology Associations</td>
<td>16</td>
</tr>
<tr>
<td>- Transportation Network Companies</td>
<td>16</td>
</tr>
<tr>
<td>- Public Health</td>
<td>17</td>
</tr>
<tr>
<td>- Planning and Development</td>
<td>17</td>
</tr>
<tr>
<td>- Specialized interests</td>
<td>18</td>
</tr>
<tr>
<td>Action Plan: Strategies for Implementation</td>
<td>18</td>
</tr>
<tr>
<td>- Foster partnerships and collaborations</td>
<td>18</td>
</tr>
<tr>
<td>- Coordination with existing ITE task forces</td>
<td>20</td>
</tr>
<tr>
<td>- ITE Vision Zero Task Force - Video Analytics Project</td>
<td>20</td>
</tr>
<tr>
<td>- Transportation &amp; Health Task Force</td>
<td>21</td>
</tr>
<tr>
<td>Leight’s LITE Lights</td>
<td>22</td>
</tr>
<tr>
<td>Author Bios</td>
<td>22</td>
</tr>
<tr>
<td>References</td>
<td>24</td>
</tr>
</tbody>
</table>
HARNESSING THE 'SMART CITIES' INITIATIVE TO IMPROVE MOBILITY FOR AGING AND DISADVANTAGED POPULATIONS

"HOW CAN THE TRANSPORTATION PROFESSION UTILIZE THE 'SMART CITIES' INITIATIVE TO IMPROVE MOBILITY FOR AGING AND DISADVANTAGED POPULATIONS?"

EXECUTIVE SUMMARY
The objective of this paper is to encourage ITE to emphasize its Smart Communities initiative on these two population groups that have traditionally both been catered to and ignored: the aging and the disadvantaged. ITE was actively involved in the lives of the current aging sect of the population as it played a significant role in the transportation...
The transportation focus in this county was on one affordable car for every household, and the roads had to be designed with that in mind. Further, faster transportation with greater mobility was touted with the dawn of the interstate system. Unfortunately, this boom only focused on vehicular mobility and many urban neighborhoods were dissected and left to wither upon the promise of burgeoning suburbs. The Smart Communities initiatives offer ITE an avenue to advocate for better transportation options for the aging and disadvantaged populations. As a society, we have a responsibility to care for the needs of the entire population, especially the aging and disadvantaged groups.

In the Smart City Challenge, US DOT asked applicants to respond to 12 specific vision elements in their proposals. These are: urban automation, connected vehicles, intelligent, sensor-based infrastructure, urban analytics, user-focused mobility services and choices, urban delivery and logistics, strategic business models and partnering opportunities, smart grid, connected and involved citizens, architecture and standards, communication technology, and smart land use.

While none of the listed vision elements directly addressed aging and disadvantaged population groups, many applications that were proposed as part of the 12 vision elements would also benefit the two focus population groups. The final proposals of all seven finalists were reviewed to learn if and how the finalists proposed Smart City applications that would benefit the aging and disadvantaged population groups. For example, the winning application from the City of Columbus discussed how unbanked and underbanked (e.g., cash-based customers) have a difficult time with mobility options. The solution was proposed to create a chip-based prepaid card that can be used with vendors such as Uber, Lyft, and Car2Go. The City of Columbus also plans to partner with the Central Ohio Agency on Aging and proposed a significant project for repurposing Barcelona’s mobile application ‘App&Town’. The application includes a proprietary turn-by-turn navigation that is intuitive to groups with reduced mobility including aging, cognitively impaired, and visually impaired.

ITE’s role as an association with membership at all levels of the transportation profession (i.e., local and federal government, private sector, academia), along with its mission to represent transportation interests beyond engineering alone place it in a unique position of participating in the Smart Communities conversation, nationally and internationally. Specifically, within the realm of aging and disadvantaged users, ITE’s competitive advantages can allow it to drive the conversation with a variety of interest groups and practitioners. The ITE International Board of Direction identified Smart Communities as a priority initiative area for 2017. As articulated in the President’s and Executive Director’s messages in the February issue of ITE Journal, ITE’s goal is to develop a strong and sustainable Smart Communities program during 2017. Thus, ITE offers a great vehicle to promote the inclusion of the disadvantaged and aging populations in the Smart Cities initiatives moving forward.
The following recommendations are made to the ITE leadership for achieving the goals of this paper:

- Establish a technical working group or standing committee within the Smart Communities Task Force focused on developing solutions for aging and disabled populations.
- Identify a broad sector of stakeholder interests and organizations that can contribute to generating solutions and resources. Examples of such groups include transportation associations, transportation network companies, and the public health profession.
- Establish a series of touch points and dialogue opportunities with strategic partners and ITE members to better understand the mobility challenges that ITE can best address.
- Hold one of more peer exchanges at the end of the information discovery process, to synthesize the gathered information and distill a limited set of strategic action items for ITE.
- Consider the establishment of an on-demand resource portal aimed at gathering practice-ready resources which promote equitable mobility for aging and disadvantaged populations. This can either be a standalone resource or can exist as part of a larger Smart Communities toolkit.
- Coordinate closely with ITE’s existing Task Forces and Technical Councils, including the Complete Streets and TSMO Councils, as well as the Vision Zero and Transportation and Health Task Forces.
PROJECT PROBLEM STATEMENT

The project team’s problem statement is as follows:

“How can the transportation profession utilize the ‘Smart Cities’ initiative to improve mobility for aging and disadvantaged populations?”

Thus far, the primary emphases of Smart Communities initiatives have been on technology, data, and applications. In contrast to these efforts, this paper will emphasize how the mobility experience of two stakeholder groups can be enhanced by the Smart Communities initiatives.

BACKGROUND

Growth of the US Transportation System

The US transportation system is going through significant change spurred on by technological advances, demographic changes, and population growth, among other factors. These changes are influencing the way individuals and businesses think about and use our transportation system. This change in paradigm has spawned new initiatives to create “smart cities” that can integrate data, applications, and technology to more efficiently serve the mobility of people and goods.

Some of the starkest of these demographic shifts are evidenced in the next two figures. Figure 2 shows historical and projected population changes and Figure 3 shows the large shift in population age expected by 2020. Methods focused around increased roadway capacity simply will not work to solve the transportation challenges related to population increases. The U.S. transportation infrastructure constructed during most of the 20th century is strongly focused around a model favoring single-occupant personal automobile travel. Increasing congestion, environmental and health concerns, and changing land use patterns will preclude this structure as a viable option in the 21st century. Furthermore, many individuals, through choice or economic necessity, no longer own their own
automobiles. Additionally, the transportation system needs to accommodate an aging population that is larger than ever experienced.

Traditional thoughts about mobility led to performance measures (e.g., level of service) that focused on reducing congestion and increasing travel speeds for automobiles, while more modern thoughts have shifted to consider other quality of life factors as alternate ways to increase mobility. Emerging concepts such as Transportation-as-a-Service (Taas) or Mobility-as-a-Service (Maas), focus on a shift away from personally owned vehicles to solutions that are consumed as a service. This is best achieved by allowing the user to access a variety of transportation choices (automobiles, transit, taxi/ride-sharing, bike-sharing, etc.) and providers through one portal.

Challenges around this shift include the ability to provide services to disadvantaged populations. Systems that are affordable, accessible, and sustainable for all population groups are needed.

**Focus Populations**

**AGING**

As of 2015, about 10% of the population in the US is over 70 years old. Table 1 shows the population by different generation groups.

Life expectancy in the United States has increased: in 1900 the average life expectancy was 47 years of age; in 2000 the average life expectancy was 77 years of age and by 2030 the average life expectancy is expected to be 83.3 years for women and 79.5 years for men. Among the reasons for the dramatic increase in longevity from 1900 to 2000 was better medicine, sanitation, healthcare, education and nutrition. The Social Security calculator for life expectancy bases its calculation on a man turning age 65 today living until age 84.3 and on a woman turning age 65 today living until age 86.6.

Since January 1, 2011, baby boomers have been turning age 65 at the rate of 10,000 people per day (Pianin, 2017). This phenomenon will continue through December 31, 2029 (Pew Research Center, 2010). Baby boomers were ecstatic to be able to drive and own cars when they turned age 16, typically live in the suburbs, and are very mobile. They want and expect to age in the same place. Unfortunately, the natural aging process may be one of the complications that hinders that goal. As we age, our physical strength and flexibility diminishes (we are more likely to fall), as does our vision, hearing, and cognitive ability. Other complications to mobility include the

<table>
<thead>
<tr>
<th>Age Group</th>
<th>Years Born</th>
<th>Population</th>
<th>Age in 2015</th>
</tr>
</thead>
<tbody>
<tr>
<td>Greatest Generation</td>
<td>1915 - 1927</td>
<td>3.79 M</td>
<td>88-100</td>
</tr>
<tr>
<td>Silent Generation</td>
<td>1928 - 1945</td>
<td>28.3 M</td>
<td>70-87</td>
</tr>
<tr>
<td>Baby Boomers</td>
<td>1946 - 1964</td>
<td>75.52 M</td>
<td>51-69</td>
</tr>
<tr>
<td>Generation X</td>
<td>1965 - 1980</td>
<td>65.72 M</td>
<td>35-50</td>
</tr>
<tr>
<td>Millennials (Generation Y)</td>
<td>1981 - 1998</td>
<td>79.41 M</td>
<td>17-34</td>
</tr>
<tr>
<td>Generation Z</td>
<td>1999 - 2015</td>
<td>73.61 M</td>
<td>0-16</td>
</tr>
</tbody>
</table>
lack of physical infrastructure: sidewalks, public transportation (particularly in the rural and suburban areas); and the proximity of services (food, medicine, doctors, etc.) to our homes due to zoning that does not permit mixed uses.

**DISADVANTAGED**

*Disabled Population*

Merriam-Webster defines disability as a physical, mental, cognitive, or developmental condition that impairs, interferes with, or limits a person's ability to engage in certain tasks or actions or participate in typical daily activities and interactions. The US Census Bureau reported in 2017 that nearly 1 in 5 people have a disability and more than half of them reported the disability as severe. People with a disability have a physical or mental impairment that affects one or more major life activities.

The US Census Bureau reports that there are 15.7 million people aged 65 and over who have at least 1 disability which represents 39% of this population group. Of this group, two-thirds had difficulty in walking or climbing stairs. The second most cited disability was difficulty with independent living, such as visiting a doctor’s office or shopping. The Census Bureau also reported the following statistics: about 8 million had difficulty seeing, of which 2 million who are blind; about 7.6 million had difficulty hearing and 5.6 million use a hearing aid; and about 30.6 million had difficulty walking or climbing stairs, or used a wheelchair, cane, crutches or walker.

These disabilities certainly impact mobility around the home, but without adequate access to transportation and physical accommodations of the transportation network, the disabled population has few transportation options, especially those that breed independence. Most disabled persons are reliant on vehicular travel, transit, or paratransit where it is available. Examples of struggles and obstacles those with disabilities encounter with the transportation system are:

- If the problem is the ability to walk, pedestrian crossing times at signalized intersections may be an issue as it takes longer to cross the road.
- If the problem is seeing, detection of relevant information (signs, signals, pavement markings, etc.) may be caused by a reduction in the visual field.
- If the problem is related to one's hearing, the person may not hear the pedestrian count down signal at a signalized intersection.
- If the disability is arthritis, a person may not be able to push the buttons on a cell phone to place a call for a taxi or Uber-type service.

The disabled population is another segment of the population that has been overlooked by the Smart Cities initiative. The disabled population would like to be treated just like everyone else - they want to blend in. Universal design is one initiative that is a step in that direction.

*Income / Poverty*

The US Census Bureau defines poverty for those living within the United States of America. In 2015, there were 43.1 million people living at or below the poverty line in the USA, which is 13.5% of the population. This number represents the first decline in the poverty population since the Great Recession of 2007-2009 set an all-time high for numbers. However, the percentage of the population at or below poverty has been steadily declining since 1959. Table 2 shows the poverty thresholds for 2015.
The unbanked are considered those without any type of bank account, estimated to comprise approximately two billion people worldwide, and approximately eight million (7%) households in the U.S. alone. The underbanked are considered those with access to a bank account, but who may regularly use sources such as payday loans or check cashing companies to process transactions. This population is estimated to comprise approximately 23 million (20%) U.S. households (Baxter & Rengarajan, 2017). A significant issue is that the unbanked and underbanked may have obstacles to entering the digital money realm (e.g., PayPal, mobile payments, etc.), on which many modern transportation service providers (e.g., Uber) rely. Another issue is that there is a shift of the millennial population toward unbanked and underbanked populations. The millennials are utilizing online service and mobile payments rather than the traditional antiquated banking methods. Without traditional banking access, some population areas are not provided equal access to the transportation system.

### Smart City Challenge

The US DOT Smart City Challenge was launched in December 2015 as a way to foster innovative ideas and charge cities with evaluating how data, applications, and technology could be utilized to better the lives of their citizens. The motivation for cities to participate in the challenge was a $40 million grant from the US DOT with an optional $10 million investment from Vulcan for automated vehicle programs.

Seventy-eight cities submitted vision statements in response to the Smart City Challenge. Figure 4 shows that several geographical areas in the US expressed interest.

With tremendous interest shown by the number of applications, the US DOT narrowed down the initial 78 applications (shown in red in Figure 4) to a final seven (shown in green in Figure 4) that were invited to create a technical application, a video summarizing the efforts, and a pitch to the US Secretary of Transportation as to why their city should be chosen. After the dust settled, Columbus was chosen as the winner and received the designation of “Smart City” and the grant money.

With this new initiative program, many transportation professionals and societies are trying to define their role within this emerging concept. There is an argument for multiple societies and skillsets to represent what composes a smart city.

---

**TABLE 2. POVERTY THRESHOLDS FOR 2010 BY SIZE OF FAMILY AND NUMBER OF RELATED CHILDREN UNDER 18 YEARS**

<table>
<thead>
<tr>
<th>Size of family unit</th>
<th>Weighted average poverty thresholds</th>
<th>Related children under 18 years</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>None</td>
<td>One</td>
</tr>
<tr>
<td>One person (unrelated individual)</td>
<td>$12,082</td>
<td>$12,331</td>
</tr>
<tr>
<td>Under 65 years</td>
<td>$12,331</td>
<td>$12,331</td>
</tr>
<tr>
<td>Two people</td>
<td>$15,391</td>
<td>$15,871</td>
</tr>
<tr>
<td>Household under 65 years</td>
<td>$15,652</td>
<td>$15,871</td>
</tr>
<tr>
<td>Household 65 years and over</td>
<td>$14,342</td>
<td>$14,326</td>
</tr>
<tr>
<td>Three people</td>
<td>$18,871</td>
<td>$18,540</td>
</tr>
<tr>
<td>Four people</td>
<td>$24,257</td>
<td>$24,447</td>
</tr>
<tr>
<td>Six people</td>
<td>$32,542</td>
<td>$33,909</td>
</tr>
<tr>
<td>Seven people</td>
<td>$36,998</td>
<td>$39,017</td>
</tr>
<tr>
<td>Eight people</td>
<td>$41,029</td>
<td>$43,037</td>
</tr>
<tr>
<td>Nine people or more</td>
<td>$49,177</td>
<td>$52,493</td>
</tr>
</tbody>
</table>

Source: U.S. Census Bureau
It is this project team’s goal to encourage ITE to emphasize its Smart Communities initiative on two population groups that have traditionally both been catered to and ignored: the aging and the disadvantaged.

ITE was actively involved in the lives of the current aging sect of the population as it played a significant role in the transportation boom. The transportation focus in this county was on one affordable car for every household, and the roads had to be designed with that in mind. Further, faster transportation with greater mobility was touted with the dawn of the interstate system. Unfortunately, this boom only focused on vehicular mobility and many urban neighborhoods were dissected and left to wither upon the promise of burgeoning suburbs. The Smart Cities initiatives offer ITE an avenue to advocate for better transportation options for the aging and disadvantaged populations. As a society, we have a responsibility to care for the needs of the entire population, especially the aging and disadvantaged groups. ITE could use the Smart Communities initiative as a vehicle to address the transportation needs of the aging and disadvantaged population.

Finalists’ Approach to Aging and Disadvantaged Populations

In the Smart City Challenge, US DOT asked applicants to respond to 12 specific vision elements in their proposals:

- **Vision Element #1: Urban Automation**
- **Vision Element #2: Connected Vehicles**
- **Vision Element #3: Intelligent, Sensor-Based Infrastructure**
- **Vision Element #4: Urban Analytics**
- **Vision Element #5: User-Focused Mobility Services and Choices**
- **Vision Element #6: Urban Delivery and Logistics**
- **Vision Element #7: Strategic Business Models and Partnering Opportunities**
- **Vision Element #8: Smart Grid, Roadway Electrification, and Electric Vehicles**
- **Vision Element #9: Connected, Involved Citizens**
- **Vision Element #10: Architecture and Standards**
- **Vision Element #11: Low-Cost, Efficient, Secure, and Resilient Information and Communications Technology**
- **Vision Element #12: Smart Land Use**
While none of the listed vision elements directly addressed aging and disadvantaged population groups, many applications that were proposed as part of the 12 vision elements would also benefit the two focus population groups. The final proposals of all seven finalists were reviewed to learn if and how the finalists proposed Smart City applications that would benefit the aging and disadvantaged population groups. A summary of the key findings is presented next.

**COLUMBUS**

Columbus, the winner of the Challenge, focused on the unbanked and underbanked by recognizing that cash-based customers have a difficult time with mobility options. The solution was proposed to create a chip-based prepaid card that can be used with vendors such as Uber, Lyft, and Car2Go.

Columbus identified the Central Ohio Agency on Aging as one of its partners, and a significant project was repurposing Barcelona’s mobile application ‘App&Town’. This Android mobile application allows users to plan and navigate their transit routes. The application includes a proprietary turn-by-turn navigation that is intuitive to groups with reduced mobility including elderly, cognitively impaired, and the visually impaired.

**PITTSBURGH**

Pittsburgh’s finalist application included several approaches to reaching disadvantaged and aging populations. It was one of a few applications that relied on providing a transportation concierge by integrating transportation scheduling into appointment scheduling. Pittsburgh called theirs a “Transportation Coordinator” and when a patient schedules an appointment, the health care provider would simultaneously schedule an accessible paratransit vehicle or provide information regarding fixed route transportation services. In the event that the patient’s primary transportation option failed them, the Transportation Coordinator could provide real time bus arrival information or serve as a dispatcher for local transportation provider such as a taxi or Transportation Network Company (TNC).

By deploying Bluetooth low-energy beacons and transceivers in the Oakland neighborhood and allowing users to register their profiles (e.g., type of physical limitations) via a smartphone app, Pittsburgh proposed to make the physical environment aware of users’ abilities and needs, and thus provide personalized services.

Finally, The SmartPGH Community Census proposed to gather data from residents in neighborhoods proximate to planned smart transportation infrastructure deployments, and in key City ladder-of-opportunity communities. Target communities included public housing and senior citizen housing residents. This ensured that data and a voice came from these communities.

Pittsburgh recognized that time savings, reliability, and safety improvements would enhance the lives of low- and moderate-income residents.

**DENVER**

In completing its application, the City of Denver recognized the challenge of dealing with population growth while improving liveability for disadvantaged groups. In pursuing a strategy to address this challenge, their focus was on establishing mobility freedom for all, improving connectivity, collaborating at every level, and leveraging USDOT, Vulcan Foundation, and private partner funds and services.

The key part of Denver’s application that would positively impact disadvantaged populations was their planned “Mobility on Demand Enterprise”. This enterprise comprised the following four elements:
• Comprehensive information and payment systems
• Improved access and service to underserved communities
• Mobility solutions designed for the ground up, and
• Sustainable funding models.

In developing this Enterprise, Denver’s first plan of attack was to develop a public outreach and feedback plan through a series of listening sessions. The City would establish a technical working group of stakeholder organizations, and gather input from residents in underserved neighborhoods. Finally, they would analyze data from their experimental First Mile/Last Mile project with Lyft to identify growth opportunities for the program.

The City would also rely extensively on public outreach and analytics. By placing interactive informational kiosks in underserved neighborhoods, the City would be able to regularly review user analytics from stakeholder use of information for various mobility services, and adjust programming accordingly. They would also push information for new mobility benefits and services through the neighborhood kiosks, with a planned goal of reaching at least 15% of these underserved populations through these new information and interactivity portals.

Finally, once initial data gathering and processing was underway, the City of Denver would focus on implementing a series of solutions to achieve their Mobility Enterprise. For example, the City would increase the number of transportation modes that could be paid for through a single app, as well as establish a one-card payment system for public transportation. They would continue investing in their First Mile/Last Mile subsidy project, and continue to provide information and revenue collection capabilities through the neighborhood kiosks. In particular, this will benefit those groups who don’t have reliable access to a bank account or means of digital payment, but who could still benefit greatly from being connected to the City’s network of transportation services.

AUSTIN

New transportation options, coupled with smarter land use decisions and housing policies, are needed to provide disadvantaged communities the ability to overcome income and transportation inequality. In outlying car-dependent areas, people lack good transportation options and often have no access to transit. Suburban poor are not well transit-connected, nor within reasonable walking or biking distance of jobs. Rezoning for mixed-use allows for people of all races, incomes and ages to live together. There is a need to connect key places and support denser, walkable, transit/mobility-oriented new development in areas with jobs and affordable homes.

In addition to the policy and zoning changes needed, opportunities to use technology should be explored as well. The collection of more robust data to make operating decisions and travel decisions in real time is needed so that sensor-equipped vehicles can warn drivers of vulnerable road users, such as pedestrians, bicyclists, and construction workers; video detection can be used for adaptive signal control; and buses can be used as probes in the traffic stream to provide information regarding travel times, schedule reliability, and passenger loadings.

Other types of technology are also recommended for exploration. These include: connected and automated vehicles; a customized mobility service package for all forms of transportation with a “one-pass and pay” through a single interface; and on-street wayfinding tools.
KANSAS CITY
Kansas City’s Smart Cities proposal focused on a wider application of technology and sensing to enhance transportation for all individuals. Three pillars of pursuit were emphasized. Pillar 1 emphasized ‘developing ladders of opportunity for Eastern Kansas City’, Pillar 2 emphasized use of ‘automated vehicles, connected vehicles, and electric vehicles’ to advance safety, mobility, accessibility, and clean transportation, and Pillar 3 explored ‘connected and empowered communities’ to better connect citizens spatially and virtually. In Pillar 1, several enhancements were proposed for Prospect Avenue, currently a corridor where crime is pervasive and safe public transportation alternatives are limited. While the proposal did not specifically discuss aging population transportation needs, some of the proposed technology implementations could benefit this population. For example, the use of technology and sensors to assist visually impaired pedestrians cross the street and transit improvements will also benefit elderly travelers. A visually impaired assistance system was proposed to provide travelers with interactive voice-enabled wayfinding assistance and virtual tours through smart kiosks and smartphone applications. Another example is the implementation of an audible alert system to inform travelers of real-time bus arrival schedules.

One unique attribute of Kansas City’s quest for becoming a Smart City is its leadership in the IEEE Smart Cities initiative. As a core IEEE Smart City, Kansas City has established a strong network of regional and national industry, academia, and government partners.

PORTLAND
The City of Portland placed some focus on the aging and disadvantaged populations. The proposed UB Mobile PDX Workforce Development Plan included the following elements:

- New training program procurement and development
- Existing training program enhancement
- Cohort training for groups of new or incumbent workers
- On-the-job training and paid internships/work experiences

The goal of this workforce development was to increase access to the technology field to those that may otherwise not have been afforded the opportunity. Portland also proposed to partner with Worksystems to prepare a program of workforce development to provide low-income and minority residents ladders of opportunity to stable, well-paying jobs in this growing field.

One of the goals of application was to make electric vehicles available at a low cost to community organizations and churches. The anticipated result would be a way for shared mobility jobs to community group members. This might mean that a shared electric vehicle owned by a church is used as a Lyft vehicle by a member on weekend evenings.

SAN FRANCISCO
While no specific discussions directed to the aging and disadvantaged populations, San Francisco has identified that their city is growing faster than the infrastructure necessary to support the various populations. This discrepancy is resulting in safety issues for vulnerable populations. In addition, the search for affordable housing continues to push people further away from the city, resulting in ever increasing congestion to access the downtown core.
The proposed solution is to grow the use of carpooling for regional and local commuters. This would be achieved by linking shared mobility with CAV (Connected Automated Vehicles) technology and transit. This linkage would improve mobility, equity, access, safety and affordability for various population groups.

The City has proposed to roll out this program through neighborhood pilots that include residents, businesses and stakeholders. The goal is to show the value of such programs and implement as an opportunity rather than a mandate. Through these pilots they want to show communities that vehicle ownership is less desirable and that time and money can be saved by participating. This program's strength would grow as more people join the effort and the cost to participate is reduced.

**ITE Smart Communities**

At the January meeting of the ITE International Board of Directors, a “Smart Communities Task Force” was identified as a priority initiative for 2017. As articulated in the President’s and Executive Director’s messages in the February issue of ITE Journal, ITE’s goal is to develop a strong and sustainable Smart Communities program during 2017.

It is an important distinction that ITE chose to use the term Smart Communities instead of Smart Cities. The communities moniker is increasing in use and is more inclusive of all population compilations; cities, towns, neighborhoods, and other municipalities can attach to this brand. Smart Cities implies, rightfully so, larger urban areas. However, cities typically have more resources to research and develop smart initiatives while other communities rely on the experience of others before their own implementations.

“Smart Communities gather, integrate, and analyze data to enable informed and data-driven decision making...Smart Communities are more than just the gadgets. The technology is a lot of fun, but the real game is finding ways to put these new tools to work in ways that improve our communities.”

- Shawn Leight, ITE President

As part of Smart Communities Initiative, it was proposed that during 2017 ITE would host Smart Community panel discussions at the spring and summer ITE District Meetings. The panel discussions would be led by the Transportation Systems Management and Operations (TSM&O) Council. The intention of these discussions was to provide attendees with the latest thinking on Smart Communities and provide the opportunity for dialogue and feedback on ITE’s role. As part of the effort, the TSM&O Council also recently initiated a member survey on Smart Communities that focused on determining member interests and ideas for future ITE activities.

Finally, at its summer meeting in Toronto, the ITE Board of Direction would review the information gathered and consider further actions to ensure that ITE is seen as a leader in the Smart Communities space and that ITE is providing its members with the knowledge and tools necessary to lead the smart communities effort.
ITE’S ROLE IN SMART COMMUNITIES

ITE’s role as an association with membership at all levels of the transportation profession (e.g., local and federal government, private sector, academia), along with its mission to represent transportation interests beyond engineering alone, place it in a unique position of participating in the Smart Communities conversation, nationally and internationally. Specifically within the realm of aging and disadvantaged users, ITE’s competitive advantages can allow it to drive the conversation with a variety of interest groups and practitioners. The following sections represent a comprehensive set of recommendations to this effect:

**Smart Communities Task Force**

The central hub for ITE efforts around the Smart Cities topic should come from the ongoing support of a Smart Communities Task Force. This builds upon ITE’s recent efforts collecting what members want from ITE for Smart Communities and continues to showcase ITE’s leadership. It will require ITE Headquarters staff to manage the task force, but it can be supported by volunteers across the country in the development of technical products and publications.

All technical councils should designate a liaison to the Smart Communities Task Force to ensure that all aspects of ITE are incorporated and have a voice in the future developments of a Smart Community. With this emerging technology realm, there is a lot of interest, particularly in the younger members of ITE. This is a great way for ITE to engage those younger members, get them to become lifetime members, and more importantly to become active in ITE. ITE leadership should tap into district and section interest while fully engaging student chapters.

Cities are currently looking for guidance on how to move forward with Smart Community initiatives. ITE can begin its efforts by facilitating conversations with prior Smart City applicants on the transportation aspects. Ensuring that the aging and disadvantaged populations needs are addressed is paramount to reinvent and reconnect cities to their residents. Then these lessons can be compiled and provided throughout membership to be an aid for smaller communities. Future partners should also be consulted to leverage their data, membership, and ability to solve mobility problems within these communities.

Emerging transportation technology and high-resolution data streams are at the core of the Smart City, and to a large extent, the Smart Communities movements. In pursuing a comprehensive Smart Communities Strategy, in particular one which integrates the needs of aging and disadvantaged populations, some of the specific technologies that ITE can push to have an influential role within include:

- **SPaT data and pedestrian safety:** The broadcast of Signal Phase and Timing (SPaT) data is of growing interest to public agencies around the country. The concept is that by broadcasting the current state of a traffic signal (e.g., green/red indications) over 5 GHz frequency bands, such information can be collected by DSRC-equipped vehicles in the vicinity of the intersection for safety and operational improvements. For example, if a vehicle is able to receive a message about a red light ahead, and the driver does not make an effort to stop the car manually, a crash avoidance system can take over and bring the car safely to a stop on its own. The broadcast of SPaT data has been recently buoyed by AASHTO’s issuance of a “SPaT Challenge”, whereby all state DOTs are asked to instrument at least 20 signalized intersections with SPaT broadcast capability by 2020. A focus on SPaT data in a Smart Community could also be used to benefit
aging and disadvantaged populations; for example, by also broadcasting the pedestrian walk/don’t walk state, vehicles could be equipped to be on heightened alert for non-motorized transportation users.

- **CV/AV data and improved access/mobility to aging and disadvantaged populations:** Connected and automated vehicles (CV/AV) technologies could also be leveraged as a focal area within Smart Communities to improve quality of life for aging and disadvantaged populations. For example, many aging individuals require a high frequency of access to medical services but lack the means to transport themselves. Automated vehicle technology could be leveraged to automatically shuttle these individuals to/from doctor appointments on an on-demand basis.

- **Connected Infrastructure to improve conditions in low-income neighborhoods:** Connected infrastructure applications have a variety of applications in the Smart Community space in ways that can impact the target audience. Many low-income neighborhoods suffer from poor infrastructure condition due to a lack of routine maintenance and the resources to manually monitor quality conditions (e.g., detect burnt-out traffic signals, broken streetlights, etc.). Smart technologies aimed at remote infrastructure monitoring can reduce the downtime of some of these vital infrastructure pieces, and can improve the quality of life in many low-income neighborhoods. In addition, many of the Smart City finalists proposed the use of “smart kiosks” in low-income neighborhoods that can be connected to real time transportation service information and serve as a point for those without smart phones and/or bank accounts to hail on-demand ride services.

Finally, the Smart Communities Task Force should take advantage of the unique opportunity to coordinate with the Canadian Smart Cities Challenge. Beginning in the Fall of 2017, Canada will begin a challenge and go through three rounds of awards as follows:

- one large prize of $50 million;
- two prizes of $10 million for mid-sized communities;
- one prize of $5 million for a small community; and
- one prize of $5 million available for an indigenous community.

ITE was not involved in the US Smart City Challenge and should be prepared to assist with the Canadian Smart City Challenge to emphasize the need to address these aging and disadvantaged populations. Further, having the ITE Annual Meeting jointly hosted by the Canadian District ITE will further solidify commitment to both the Smart Communities initiative and to the international districts.

**Core Audiences & Stakeholder Group**

In positioning ITE to identify gaps in Smart Community practices that can benefit disadvantaged populations, it is important to understand the stakeholders in this arena. Besides the target beneficiaries themselves, there are a number of national- and grassroots-level organizations who are working in the interests of these same people, which ITE can leverage for greater success.

**TRANSPORTATION ASSOCIATIONS**

ITE is a non-profit association of transportation professionals representing a wide spectrum of practitioners and perspectives. While its membership comprises representation at all levels of practice, it is particularly strong in the local public agency and private consulting spaces. This representation is advantageous for carrying out many of the recommended practices and stakeholder conversations necessary to achieve transportation equity for aging and disadvantaged populations, since many
solutions are implemented at the city level and through project relationships established between public agencies and private consultants. However, it would also be advantageous for ITE to reach out to partner associations in order to expand its influence and impact on using Smart Communities to improve aging and disadvantaged population equity on a larger scale.

In pursuit of this larger impact, ITE can establish and build on existing partnerships with the American Association of State Highway and Transportation Officials (AASHTO), the Transportation Research Board of the National Academies (TRB), and the Intelligent Transportation Society of America (ITSA), amongst others. AASHTO’s membership comprises individual state DOTs, who, in conjunction with FHWA, drive much of the policy-level decision-making that can influence local-level actions in this space. Many of their partner associations and working groups, such as the Vehicle-to-Infrastructure deployment coalition and the National Operations Center of Excellence, can play a pivotal role in resource sharing and collaboration on technical products that ITE may pursue. TRB, by contrast, has much closer working relationships with academic professionals, and can be used as a conduit for identifying needed research in the Smart Communities realm. Of particular value could be leveraging the National Cooperative Highway Research Program (NCHRP), a program focused on developing practice-ready resources that is funded by AASHTO and FHWA, and administered by TRB. ITSA could also be a valuable group to include in discussions since much of their membership consists of the very companies developing technology for use in Smart Communities.

TECHNOLOGY ASSOCIATIONS
In a similar vein to partnering with other transportation associations, it is important for ITE to engage technology vendors and other industry representatives on the transportation challenges faced by aging and disadvantaged populations. Many of these companies are already deeply involved in the Smart Communities movement, but may be focused on applications which are not targeted at, or perhaps don’t directly benefit, aging and disadvantaged populations. By calling attention to these users of the transportation system and their particular needs, technology development firms and industry associations can refine their products to greater equity, while also tapping into new customer bases and revenue/data sources.

Some examples of groups that ITE can engage in this realm include, but are not limited to, Local Motors a company focused on open-source and adaptable vehicle design, as well as EasyMile, a firm dedicating to advancing the concept of driverless shared vehicles. ITSA, while also a transportation association, draws much of its membership from technology and wireless communications firms, as does the Society of Automotive Engineers (SAE), and the Institute of Electrical and Electronics Engineers (IEEE).

TRANSPORTATION NETWORK COMPANIES
Transportation Network Companies (TNCs) are organizations which leverage large data sets and payment applications to provide enhanced mobility services. Their legal definition can vary by jurisdiction; for example, the California Public Utilities Commission has defined a TNC as “a company that uses an online-enabled platform to connect passengers with drivers using their personal, non-commercial, vehicles” (State of California, 2013). Similarly, Virginia defines a TNC as a company that “provides prearranged rides for compensation using a digital platform that connects passengers with drivers using a personal vehicle” (Virginia Department of Motor Vehicles, 2017).

Several of well-known TNCs operating in mid-2017 include Uber, Lyft, and Via. While their services have resulted in a fundamental transformation of the mentality surrounding public transportation and
ownership over the last 5-10 years, their market penetration has not always resulted in equitable experiences and benefits for aging and disadvantaged populations. While oftentimes these services are significantly less expensive than private taxi service, they are still more costly to utilize than traditional public transportation, which can result in continued mobility restrictions for areas not adequately served by inexpensive bus or rail service. Concerns over lack of accessible vehicles also continue to hinder some of these companies (Lazo, 2016).

Furthermore, the business model of many TNCs requires a digital entry into the service for consumers for both payment and use; this cost of entry is normally realized by the purchase of a smartphone capable of running the TNC’s mobile app, and linking to a bank account or credit card from within the app. For aging users of the transportation system, unfamiliarity with smartphones and mobile technologies may impede their ability or willingness, to adopt these services. For lower income users, the challenges are several fold; besides the fact that a new smartphone can cost upwards of $500, many unbanked or underbanked individuals do not have access to an account which can be linked with the TNC mobile app.

It is critical for ITE to reach out to TNCs with the goal of increasing community livability and broad equity through the use of technology; many of ITE’s members already work with TNCs through their own agencies, and similar to technology associations, can provide the TNCs with perspective on various groups of transportation users who may be currently underserved by the TNC business model.

PUBLIC HEALTH
The National Institute of Health (NIH) and the American Public Health Association (APHA) are two national public health organizations who have a long history of focusing on equity and disadvantaged populations. The NIH seeks to “enhance health, lengthen life and reduce illness and disability.” One of APHA’s functions is to provide “public education on how to improve community health”. These organizations know that technology and transportation are important parts of the solution, but they need a partner on the engineering/technical side to move forward.

The APHA, the Public Health Institute, and the California Department of Health created a document called “Health in All Policies: A Guide for State and Local Governments” (Public Health Institute, 2013). It identifies that different departments in state (or local) government need to be collaborating on policy, funding, and programming so that public health is accounted for during the decision-making process. At this point, there is limited participation at the state level in the Health in All Policies program.

ITE can partner with NIH, APHA, and other health-focused organizations to promote improved access to transportation for disadvantaged populations. For example, 2017 is APHA’s “Year of Climate Change and Health” (American Public Health Association, 2017). Through this program, APHA is exploring new ways in which public health data can be linked with environmental information to better target the needs of disadvantaged populations who may need faster access to healthcare in the face of natural disasters and other climate change-related events. Broader engagement with public health-focused organizations can also be achieved through ITE’s Transportation and Health Task Force, described in further detail below.

PLANNING AND DEVELOPMENT
Organizations like the American Planning Association (APA), National League of Cities (NLC), and the Urban Land Institute (ULI) are potential partners as they are closely involved in land use changes and creating thriving communities, both of which are impacted profoundly by good (or bad) access to equitable
transportation. They also recognize new technologies and transportation networks as a part of the solution. These organizations are a potential rich source of socioeconomic data that could be used for sharing with other groups.

Organizations like the American Metropolitan Planning Organization (AMPO) play a strong role in our transportation system development and are also an excellent source of data. Federal highway and transit statutes require the designation of MPOs and the MPOs are responsible for planning, programming, and coordinating federally funded projects. Leveraging regional-level entities such as MPOs could not only help ITE to achieve greater equity across a larger geographic area, but can also help to foster new local cooperation and data-sharing agreements to accelerate the development of Smart Communities.

**SPECIALIZED INTERESTS**

The United States Access Board and the American Association of Retired Persons (AARP) are groups that represent significant numbers of aging and disadvantaged populations. The US Access Board promotes the equality for people with disabilities by being a leader in accessible design and the development of design guidelines and standards for the built environment of transportation, communication, and information technology systems. AARP is another national organization dedicated to empowering Americans that are 50 years of age and older to choose how they live as they age. These groups can provide valuable insights on specific programs, action items, and needs in addition to providing grassroots support. Further, they have access to significant amounts of data that can be useful to a Smart Community.

While neither group is explicitly pursuing a strategy to benefit their constituents in the Smart Community space, both have expressed interest in identifying relevant solutions and technologies to achieve greater transportation equity, and could be willing partners with ITE.

**ACTION PLAN: STRATEGIES FOR IMPLEMENTATION**

Besides the initial outreach to various industry partners and stakeholder groups described above, ITE should initiate several different activities within the Smart Communities task force to specifically target aging and disadvantaged populations and the technical solutions necessary to improve their mobility. A high-level plan of these actions and strategies is outlined below.

Note that ITE does not necessarily need to pursue the development of an independent task force to create the action plan similar to what has been done for Smart Communities, Vision Zero, etc. While a task force could conceivably devote additional resources and attention to this effort, it is not in the best interests of ITE’s broader mission to expand its activities to this level, at least not initially. It is felt that action towards this goal can be achieved by working within the existing Smart Communities Task Force, perhaps using a standing committee or special working group designation to represent its goals.

**Foster partnerships and collaborations**

As previously mentioned, one of the most important steps for ITE to achieve greater mobility for aging and disadvantaged populations, within the Smart Communities framework, is to start conversations with outside organizations. ITE’s presence as a transportation professional association with nearly 15,000 global members gives it unique leverage to reach out to organizations working on both sides of the topic: those working to improve quality of life for aging and disadvantaged populations, and those working in
the Smart Community space. To date, these camps have not had a great deal of interaction and ITE’s involvement can provide the catalyst for these stakeholders to achieve mutually beneficial goals.

One of the first steps in this relationship development process will be to conduct listening sessions with the stakeholder groups and directly with ITE membership. The goal of these listening sessions is to gather additional background information on the different perspectives that ITE must consider in addressing the transportation needs of aging and disadvantaged populations, as well as what can be realistically achieved with current and near-future technological and Smart Community capabilities. The format of the listening sessions can be varied; events such as conferences provide excellent venues to have an open conversation with large numbers of individuals at once, or more targeted efforts such as individual phone calls, webinars, or even online surveys can be utilized. ITE membership can be queried in the same manner to get a sense of how practitioners are working (if at all) in this space currently, and perhaps identify some existing agency relationships that can be highlighted in future webinars and outreach media.

As a follow-up to the initial listening sessions, some type of forum must be established to keep the conversation going. It is recommended that the ITE Community website be leveraged for this purpose and more research must be done to determine if a separate Community space should be created for this purpose or if conversations can live within a broader Community space. As practitioners identify new information and resources through Smart Community and general technology developments that can benefit aging and disadvantaged populations, they can post to the Community space so that other members can quickly access the same resources. Alternatively, practitioners can ask about implementation strategies through the Community Space in case they are unsuccessful in finding resources on their own.

It is recommended that the listening sessions take place over a period of approximately three months or so, followed by three months of synthesis for the information obtained. During this overall six-month period, the ITE Community space can also be established and conversations can develop naturally. At the end of this period, ITE should begin scheduling webinars and outreach media around the message of improving mobility for aging and disadvantaged populations using the Smart Communities framework. Initial efforts can focus on introducing members to key concepts and the importance for action in a similar method as to what this white paper aims to accomplish. Later webinars can focus on highlighting any success stories that are able to be identified, such as a transportation agency working closely with a TNC to achieve the aforementioned mobility goals. Besides webinars, ITE has a host of other media outreach tools that can be leveraged. These include potential articles in the ITE Journal, the ITE Spotlite newsletter, ITE’s Transportation Podcast series, and the ITE website.

Finally, as somewhat of a culmination to the initial efforts, approximately 12 months after this initiative launches, ITE should aim to hold an in-person peer exchange with representative stakeholders from the list of groups mentioned in the previous section. This peer exchange can be scheduled to take place over a single day and can provide a forum for open dialogue around some of the challenges faced by the various stakeholders in achieving improved mobility for aging and disadvantaged populations, as well as develop a path forward for specific actions and events to be jointly held over the coming months and years. The listening sessions, webinars, and Community space can be used as background material to inform the development of questions and more targeted discussion topics during the peer exchange, and the resulting dialogue can be captured in a document to be shared with attendees, broader ITE
membership, and the ITE Board of Direction to provide some perspective on how to lay out medium- and long-term goals.

Besides creating opportunities to bring together stakeholders within ITE, it is important that the Institute maintain a presence in external associations focused on similar or related goals. An example of this would be ITE’s recent decision to join the Smart Cities Council, where it can provide information to other members on policies which can benefit aging and disadvantaged populations. Other examples of existing partnerships with which ITE can promote this message include the following:

- National Complete Streets Coalition, led by SmartGrowth America
- Active Transportation Equity Working Group
- Three-Star Coalition and the International Road Assessment Program (iRAP) - the organizations are focused on improving roadway safety and mobility in developing countries, especially those with significant numbers of low-income residents.
- On-demand resource portal for practitioners

Once the initial push is underway to highlight mobility challenges faced by aging and disadvantaged populations, work can begin on the creation of an on-demand resource portal to support this effort. The envisioned tool would be similar to ITE’s existing Safety Resources Toolbox, which was developed as part of the Vision Zero Task Force to be a collection of practice-ready resources for safety planning and programming.

While it is unlikely that sufficient resources and practices can be found in the near term solely to support the linkage between Smart Communities and aging and disadvantaged populations, these resources can be integrated into a larger resource portal for Smart Communities, perhaps using a unique tag or subsection of the portal to denote its usage.

**Coordination with existing ITE task forces**

ITE has two existing task forces that should be carefully coordinated on this topic area, and with the larger Smart Communities task force, to ensure that all resources and perspectives are being considered. Many of the issues faced by aging and disadvantaged populations are the same issues being worked on by these other task forces. For example, many low income individuals live in neighborhoods with poor pedestrian and bicycle infrastructure but rely on these modes of active transportation due to lack of an automobile or a close-by transit station. Higher exposure of pedestrians and bicyclists on these unsafe roadways can lead to an increase in crashes with automobiles that result in fatal or serious injuries. By working to address the underlying safety problem, there is an inherent benefit achieved for aging and disadvantaged populations, doubly so if new technology or data streams can be leveraged as part of the solution.

**ITE VISION ZERO TASK FORCE – VIDEO ANALYTICS PROJECT**

ITE has partnered through its Vision Zero Task Force with Microsoft, the University of Washington, the City of Bellevue, and others on developing a machine learning system that can automatically identify near-miss collision situations between automobiles and pedestrians and bicyclists. These near-miss situations are captured on existing closed-circuit camera (CCC) systems present at many intersections and can provide practitioners with another tool to evaluate the relative safety conditions at intersections around a city. With many aging and disadvantaged populations relying on walking and biking to a higher
degree than the general population, any reduction in these near-miss situations (which can easily turn into actual collisions) provide a substantial safety and quality of life improvement.

ITE's role in this project is to host existing CCC footage through its website for the purpose of tagging near-miss situations in order to train the machine learning algorithm. The Smart Communities Task Force can work more closely with the Vision Zero Task Force on this initiative, and encourage additional cities to submit their CCC footage for the purposes of testing and evaluation.

TRANSPORTATION & HEALTH TASK FORCE
ITE's Transportation & Health Task Force was formally launched in April 2017, and is charged with looking at many of the quality of life factors which can influence aging and disadvantaged populations who interact with transportation infrastructure. The Task Force is deeply engaged with professionals in the public health space, who have a long history of working with aging and disadvantaged populations. The unique insight to these challenges brought forward by task force members could be used to generate new mobility solutions and outside-the-box thinking for current transportation needs (e.g., increased telemedicine in lieu of expensive paratransit service).
LEIGHT’S LITE LIGHTS

We chose our team name utilizing repetition and creativity. Leight’s is possessive of the current ITE President Shawn Leight. LITE is the commonly used acronym for LeadershipITE. Lights was the team’s belief in our intelligence and forward-thinking nature to provide a bright future for ITE.

AUTHOR BIOS

PRAVEEN EDARA, PH.D., P.E., PTOE is James C. Dowell Professor in the Civil Engineering Department at the University of Missouri-Columbia (UMC). He also serves as the Director of Graduate Studies for the department. Prior to joining UMC, he worked as a research scientist for the Virginia Department of Transportation and as a research contractor for the Federal Highway Administration. Praveen currently teaches and conducts research in the areas of freeway traffic operations, intelligent transportation systems, and innovative intersection. He is a licensed professional engineer in Missouri and a certified professional traffic operations engineer. He is active in the Central Missouri Chapter of ITE.

JEFFREY J. KUPKO, P.E., PTOE has eleven years’ experience in transportation engineering and has been with Michael Baker International for approximately one year. Prior to his current employer, he was at Gibson-Thomas Engineering for five years and Herbert, Rowland & Grubic, Inc. for five years. He holds a bachelor of science degree in civil engineering from the University of Pittsburgh in 2005 and a master of science degree in transportation engineering also from the University of Pittsburgh in 2015. He was the conference co-chair for the 2016 MASITE-ITSPA Joint Conference in State College, PA and served as the social co-chair for the 2016 Mid-Colonial District Annual Conference.

STEVEN (STEVE) M. LAVRENZ, PH.D., E.I.T. is a technical programs specialist for the Institute of Transportation Engineers, working from ITE Headquarters in Washington, DC, USA. He has been with ITE since January 2016, where he also serves as the technical services manager for the National Operations Center of Excellence (NOCoE). Steve’s technical work for ITE focuses on context-sensitive street design, traffic safety, and pedestrian and bicycle infrastructure. He is also engaged in a number of policy and advocacy areas on behalf of ITE and NOCoE, particularly in safety and transportation systems management & operations (TSMO). In addition to his time at ITE and NOCoE, Steve is an adjunct professor at the Catholic University of America and holds board positions for the Washington, DC chapter of Young Professionals in Transportation (YPT), as well as the American Society of Civil Engineers’ Transportation & Development Institute Committee on Younger Members. Steve has bachelor and master of science degrees in civil engineering from Iowa State University, and a doctorate in civil engineering from Purdue University.
SCOTT LEE, P.E. is a founding member and CEO at IDAX, a data solutions provider for transportation professionals. He graduated with bachelor’s and master’s degrees in civil engineering from Montana State University. Scott spent nine years as a consulting engineer at Transpo Group in Kirkland, WA, USA before changing career tracks. He was prompted by the leadership opportunity, the fast changing world of data, and the potential to influence how data are acquired and presented to transportation professionals. Scott has served in leadership roles as a committee chair within the Washington ITE chapter as well as planning commissioner within his local community.

CYNTHIA (CINDY) M. PIONKE, P.E. has served in the public sector for more than 25 years. She has been the Director of Planning and Development for Knox County’s Department of Engineering and Public Works for the past 18 years. Previously she had worked at the Knoxville/Knox County Metropolitan Planning Commission for seven years. Cindy received her bachelor of science in civil engineering from the University of Tennessee and her master of engineering in civil engineering from the University of Texas at Arlington. Cindy is an active member at both the Section and District levels of ITE. Currently she leads the Members Services Committee at the District level.
REFERENCES


