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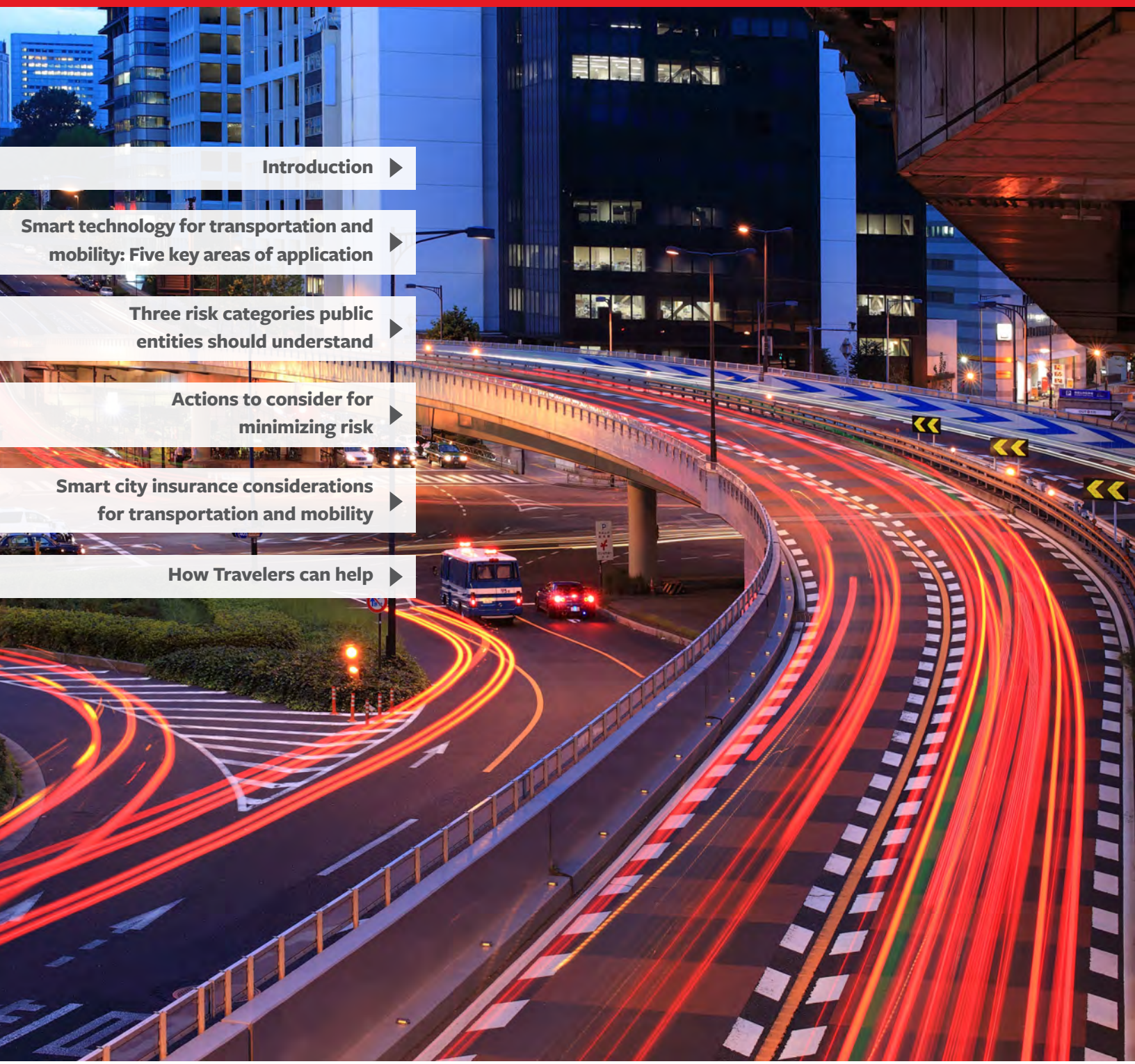

Transportation and mobility for the smart city

INSIGHTS FOR PUBLIC ENTITIES ON MANAGING THE RISKS OF SMART TECHNOLOGY FOR TRANSPORTATION AND MOBILITY

How does a smart city prepare for transportation risks?

The concept of a smart city has been around for many years. However, the definition of a smart city is as diverse as the number of people you ask. Mayors define it according to its effect on public policy. City managers take a more operational viewpoint. Municipal information technology (IT) departments would define it by yet another measure, most likely in terms of system resources, bandwidth and digital throughput.

We at Travelers view smart cities as something different. Something bigger. The smart city uses technology to bring its businesses and citizens all the potential benefits of connected urban mobility. From wireless sensors embedded in street signs and streetlights, to more effective computer-controlled traffic and parking management, municipal technology has the potential to increase the city's livability and quality of life.

However, with new technologies comes a new set of potential risks that must be managed. In this publication, we focus on an area that touches almost every citizen and visitor – transportation. We hope you enjoy this issue, and we look forward to bringing you more useful content as you continue to leverage technology to enhance the livability of the city you call home.

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Introduction

A city's transportation system is like the circulatory system in a human body. Through a network of roads and rails, it brings citizens and visitors with life-giving revenue into the city where they can live, work and play. Likewise, it must also remove waste and other things that can threaten the city's health if left unattended.

Nearly every operation in the city depends on transportation infrastructure in some way. EMTs rely on clear streets to respond to emergencies. Businesses need reliable rail and bus service to bring employees to work and safely back home again. Moreover, cities themselves must minimize overall system congestion to attract more business and increase their tax base. That's why it is so important that leaders do all they can to make sure the urban transportation systems run as smoothly and reliably as possible.

However, municipal operations have become so complex over the decades that civic leaders can no longer afford to rely on the traditional urban control models to keep their iron and concrete arteries clear. To address this challenge, several forward-thinking cities have harnessed the power of the Internet of Things (IoT). This growing network of Internet-connected devices utilizes technology embedded into everyday objects to communicate their status and operating attributes to every other connected device on the network, including the city's transportation control center. This machine-to-machine (M2M) communication allows connected devices to make pre-programmed decisions in real time, resulting in decreased congestion, better overall system efficiency and enhanced quality of life.

This new era in urban connectivity also brings its own set of risks that officials must manage. The more data flowing through a city's transportation network, the greater the potential for a costly liability claim, should that data be stolen or misused. Likewise, an unexpected system failure could result in a personal injury or property damage lawsuit. This white paper will explore the ways cities are employing this technology, the potential risks they face and actions to consider to minimize those risks as they maximize all the benefits that the twenty-first century smart city has to offer.

Smart technology for transportation and mobility:
Five key areas of application

The Smart Cities Council defines a smart city as one that has digital technology embedded across all city functions. The U.S. Department of Transportation characterizes smart cities as those which information and communication technology (ICT) facilitate improved insight into, and control over the various systems that affect the lives of residents. According to information technology strategist, Jack Gold, a smart city has "better managed infrastructure that is variable, based on input of data and adjustments of the results to best utilize resources or improve safety."

Regardless how we classify a smart city, the implication for its transportation system is clear. By capitalizing on embedded M2M connectivity, cities can elevate service levels of their entire transportation backbone, allowing them to run faster, smoother and more reliably than ever before.

While not every solution we illustrate below will be appropriate for all urban problems, most civic leaders and decision-makers will benefit from a broad understanding of common municipal problems and how other cities have leveraged technology to solve them. As always, technology leaders must perform their own due diligence to make sure any technological solution they consider will effectively meet their needs.

Application 1: Smart traffic management

One of the biggest downsides of urban and suburban life is heavy traffic. It delays people from arriving at their destinations on time, wastes expensive fuel and even takes a toll on human health. Studies show that sitting in traffic can raise cholesterol, increase anxiety, elevate blood sugar levels and increase the risk of depression. Because traffic is a major factor people consider when choosing a hometown or base of operation, it behooves city leaders to relieve urban gridlock as much as possible.

The city of Farmington Hills, Mich., helps alleviate traffic tie-ups with smart street light technology from Illuminating Concepts' Intellistreets system. Each light pole contains sensors and a programmable embedded microprocessor that monitors traffic flow. Embedded LED (light emitting diode) lights display street names and programmable driver messages such as Amber Alerts, advertisements or directions to upcoming city events that are likely to cause congestion. In addition to reducing traffic problems, the smart sensors also automatically dim streetlights based on available daylight, resulting in electrical cost savings for the city.

Amsterdam, one of the busiest cities in the Netherlands, tried to manage congestion only within the city limits, but the control measures they implemented locally often conflicted with those at the provincial and national levels. Today, they use TrafficLink's SCM system, a regional solution for intelligent traffic management. National and municipal controllers can now jointly view and manage traffic from a single screen. This allows them to implement system-wide measures that will maximize throughput for all drivers on Dutch highways nationwide. Since the system has gone live, vehicle loss hours have dropped by 10 percent.

Five years ago, **the city of Santander, Spain,** planted 12,500 electronic sensors in strategic locations in the city's downtown district. Traffic data is fed to a central bank of computers from poles, buildings, walls, street lamps, parking lots and even moving vehicles such as police cars and taxicabs. Not only can city officials optimize traffic flow, but they can also adjust the amount of energy they consume, and even fine-tune the number of trash pickups they need to schedule. Santander has also published an open application programming interface (API) that allows independent programmers to develop mobile apps to relay this data to citizens on their smart phones. The net result is the ability to streamline urban traffic flow, and respond to problems even before they occur.

Whichever solution city officials choose to implement, they must make sure that it is future-proof to a certain degree. Because these technologies are so new, there is no agreed upon standard by which all machines can electronically communicate. Developers and administrators should anticipate impending M2M communication standards so that all systems and sensors can connect to one another and share data in a frictionless way.

With systems like these in place, Amsterdam and Santander have removed all doubt about the effectiveness of smart traffic management. By minimizing aggravation due to gridlock, smart cities are becoming more attractive places to visit, shop and potentially relocate.

Application 2: Smart parking management

Parking is a big revenue generator for modern cities – yet this $25 billion industry has not undergone any significant innovation in decades. That needs to change if cities intend to streamline transportation and compete for more business in the twenty-first century. As Ford Motor Company executive chairman, Bill Ford, said at the 2011 Intelligent Transportation World Congress, "The global gridlock crisis will stifle economic growth and our ability to deliver food and healthcare...[and] our quality of life will be significantly compromised."

The citizens of Norwalk, Conn., are enjoying a smart parking app for their mobile phones that provides the location of available parking spaces. Wireless sensors embedded in each parking space connect to a central cloud server, where data is pushed to the parker app on drivers' smart phones. Sensors by San Mateo-based StreetLine, Inc. feed parking data to the cloud where parking solutions provider, T2 Systems, processes real-time availability data and broadcasts it to drivers' smart-phone apps. Norwalk Parking Authority chairman, Julius Hayward, says, "By staying at the forefront of technology, the Norwalk Parking Authority is improving the parking experience for our customers."

Colleges and universities are notorious for their overabundance of student vehicles, and lack of parking places available to them.

At the University of Mississippi in Oxford, commuter parking lots are positioned long distances away from buildings where classes are held, causing many students to arrive consistently late. With the new PassportParking app, students are now able to locate, reserve and pay for parking before they leave their homes. The app also notifies drivers when their parking time is nearing expiration, thereby decreasing parking fines as well as frustration. The solution has worked so well on the Ole Miss campus that the city of Oxford has decided to adopt it as well. "When we can bring a solution across a city as well as its university's campus, it's very exciting," said Nathan Berry, vice president of sales at Passport. "We're looking forward to introducing this parking solution to the city of Oxford and the University of Mississippi."

The city of Boston is investing $6 million to replace legacy parking meters with new smart-parking meters. Embedded chips in these new meters will maintain a constant high-speed connection with the Boston Transportation Department. The city of Boston will also implement dynamic pricing, a new feature that adjusts parking prices based on supply and demand at any given hour of the day. The new meters will both relieve congestion and increase municipal revenue by detecting parking demand based on sensors embedded in meters and public parking lots. As supply of available parking decreases, the price increases, and vice-versa. Smart meters allow the city to meet parking demand without raising prices citywide. The downside, of course, is price variability. Drivers could pay as little as $1.25 or as much as $7 per hour to park in Boston's central business district.

Cities that expect economic growth must address their parking problems. By minimizing the frustration drivers feel when looking for parking places, cities can transform their central business districts into attractive areas where people enjoy spending their time – and money.

Application 3: Smart public transportation management

The hallmark of a smart public transportation system is connectivity. What is connected? Everything.

In decades past, cities managed their bus and train systems with department-level technology solutions. The metro rail system could coordinate train operations, but did not allow for visibility of or coordination with buses, trolleys or other forms of public transportation. Time has proven the inadequacy of such technological silos, and cities can no longer meet regional transportation requirements with software unable to communicate beyond departmental borders. However, next-generation technology solutions enable civic leaders to keep all their transportation systems moving safely and efficiently.

The Utah Transit Authority (UTA) provides bus service to 2 million residents throughout the vast foot of the Wasatch mountain range. The rugged terrain often results in spotty service and dropped connections while buses are in motion. In 2014, UTA upgraded the onboard wifi capability of all their buses, enabling passengers to connect to the Internet via Sierra Wireless' onboard mobile gateways (oMGs).

The enhanced M2M communication sensors automatically detect and select the best wireless network available during the trip, while adhering to all mobile firewall policies. Passengers can now schedule and pay their fares electronically over a secure, continuous mobile connection throughout the entire 1,600-square mile service area.

The city of Medellin, Columbia, won the 2012 Sustainable Transport Award by the Institute for Transport and Development Policy. Multinational technology integrator, Indra, outfitted the city with system-wide transit control that unites rail, bus and trolley systems under one single control platform. This simplified system allows the city to manage all vehicles, while placing special emphasis on interchanges where different lines meet. The system also integrates with social media, allowing riders to get up-to-the-moment timetable information through Facebook and Twitter. In 2012, integrated system-wide visibility resulted in an 18 percent decrease in accidents, and a 37 percent decrease in time waiting for assistance.

No smart public transit system would be complete without a smart ticketing solution. If cities are to move toward fully integrated, multi-modal transport services, they need a unified ticketing option that every municipal transportation mode will accept. London currently uses Oyster Card, the widely popular smart solution for public transit ticketing. British transport minister, Baroness Kramer, understands the benefits, "Smart ticketing is revolutionizing travel and is an important part of the transport investment which will help to build a stronger economy and fairer society. I am very pleased that it is gaining real momentum." System-wide smart ticketing will allow passengers to reserve their transit seats with confidence that they are getting the best price quickly and easily.

Integrating all modes of smart transportation technology under a single control system, cities can boost mass transit revenue, increase ridership and decrease the headaches associated with public transportation. Cities that can implement these enhancements successfully will propel themselves onto a growth trajectory that will attract new business and increase tax revenue.

Application 4: Smart transportation pricing and payment systems

Maximum transportation throughput is vital to a city's future growth prospects. City planners and engineers constantly analyze existing operations for possible ways to offer their riders a faster and more reliable experience. While the public sector has historically lagged behind private industry in the area of mobile payment systems, some have streamlined pricing and payment operations into efficient, converged acceptance networks. By taking the friction out of transportation revenue capture, civic leaders can increase operating revenues while making their cities more pleasant places to navigate. Consider the following:

San Francisco's SFMTA has recently announced a partnership with Ridescout (formerly GlobeSherpa), a leading provider of secure mobile payment software, to create a platform for MUNI customers. Riders can purchase, store and use their tickets straight from their mobile devices, and pay for them with a stored debit/credit card, or even PayPal.

New Zealand-based Semble has recently launched an integrated mobile wallet system for their riders. Through a mobile app and a user's secure SIM card, Semble offers secure virtual debit cards that can be used on any transit mode that accepts contactless payments.

In Spain, the Gemalto system enables near field communication (NFC) access to various transit modes in metro Madrid. Users download a Samsung-developed smart phone app and use it to securely register payment cards. The QR-coded digital tickets never leave riders' smart phones, so there is no fear of them being lost or damaged.

The HopOn system in Israel works with beacons placed inside more than 2,000 public vehicles. Through the HopOn mobile app, riders can connect to the HopOn cloud, tap in their desired route, receive digital tickets and be charged for fares immediately.

While all of these systems are effective for fare capture within their respective cities, they are all proprietary solutions and carry with them the accompanying baggage of complexity, inflexibility and dependence on a single solution. They also require the transit authority to operate and maintain the system themselves, essentially requiring them to become their own bankers. Atlanta payment-solutions developer, First Data, hopes to change that by introducing open standards to the global transit payment space. By outsourcing transit payment processing to qualified third parties, transit authorities can focus on what they do best – providing top-quality transportation services to their residents and visitors.

5

Application 5: Smart mobility-on-demand systems

Just as the Internet delivers information on demand, smart cities are experimenting with mobility on demand in the form of vehicle sharing. Many cities have installed systems that allow their customers to share bikes, cars and even driverless pods that deliver people within a short walk of their destinations in the city. These services offer customers the convenience of a private (or semi-private) vehicle, but without the high cost of fuel, insurance, taxes, maintenance or repair.

The city of Houston, Texas, helps its residents take short trips around town with B Cycle, the city's bicycle sharing program. Members can reserve a bike online, pick it up at any B Cycle station with a credit card or a B Cycle card and return it to any B Cycle station in the downtown Houston area. An onboard computer tracks how long a member used the bike, and even displays distance travelled and calories burned. The first hour is free to members, and every additional half hour costs a mere $2. The city often sets up ad hoc stations near downtown events to encourage attendees to consider biking instead of driving.

The city of Grenoble, France, has taken car sharing to a new level. French Energy Authority, EDF, has collaborated with Toyota to produce and deploy i-Road, a three-wheeled electric car for customers to drive on the last leg of their journey into and out of the city. Drivers reserve and pick up an i-Road using any smart mobile device, drive to their destination and then park it at any of the 120 designated charging stations throughout the city so it is ready for the next driver. The system is clean, simple and, at only 19 euros (roughly $20 USD) for 4 hours, very affordable.

As efficient as the i-Road is, it still requires a human driver. In **Masdar, Abu Dhabi**, drivers are no longer required. The city has implemented 2getthere's electric-powered personal rapid transit (PRT) system. Customers simply tap their destination into the vehicle's onboard touch screen map, and the driverless vehicle carries them to their destination in air-conditioned comfort. The pod is guided by a wireless link to the system computer along an invisible trail of magnets embedded every two meters into the roadways. The system combines the private aspect of car travel with the social advantages of a centrally optimized public transportation system, completely avoiding traffic congestion and parking issues.

These smart mobility services are certainly profitable, and they can provide benefits to the cities they serve. By offering electric vehicles instead of fossil-fuel burning cars, cities can reduce smog-forming nitrogen oxides. If/when driverless solutions become the norm, personal productivity may increase because mobile employees will be able to focus their attention squarely on their work instead of on the road.

Three risk categories
public entities should understand

Smart city transportation technology is gaining momentum in the global marketplace. Civic leaders are finding ways to decrease congestion while increasing revenue and quality of life for the citizens they serve. However, as the amount of data flowing through transportation computer networks continues to rise, so do the potential risks.

At Travelers, we understand that knowledge sharing is essential to becoming a truly smart city. That is why we want every elected or appointed official, city manager and municipal chief information officer (CIO) to understand these risks and minimize them as much as possible.

Cyber

Cyber risk is often defined as the risk of financial loss, operations interruption or reputational damage due to an organization's failure to properly secure the data held within its information systems. It can occur as a result of a cyber-criminal attack, an ineffective IT policy, a failure of IT security software or even a disgruntled employee.

Cyber risk is a growing concern for organizations across all sectors, and with good reason. The Identity Theft Resource Center shows an alarming trend in the rate of data breaches. A record-high 783 organizations reported data breaches in 2014, a 27.5 percent increase from the previous year. The economic damage from such data breaches can be catastrophic. The 2014 Ponemon Institute cybercrime study shows the total annualized cost of cybercrime to range from a low of $500,000 to a high of $61 million, with a mean annualized cost of $7.6 million.

ILLUSTRATIVE RISK SCENARIOS

Traffic systems denial. A hacker launches a distributed denial-of-service attack on a city's connected traffic management system. The attack prevents installed sensors from relaying real-time traffic data to the city's central traffic management computers, and it freezes traffic lights at several critical city intersections. The city incurs significant expense to restore the traffic lights and sensors to their original proper working condition.

Busing breach. A city installs new smart ticketing software for its city bus system. A programming error in the software allows cyber thieves to steal personal information, including customer names and credit card numbers. The stolen data is sold on the black market, and the city is sued for failing to protect citizens' personal information from unauthorized users.

Viral parking. A severe virus infects a city server. As a result, the city's new smart parking meters are not able to accept payment for an extended period, resulting in significant business income loss.

Bike sharing bonanza. A city installs a bike sharing system that allows citizens to use bikes for a low hourly fee, payable by credit card. Hackers penetrate the payment system and reroute the credit card payments to their own accounts. The attack goes unnoticed for an extended period. The city receives multiple claims from citizens as well as negative press following the breach, prompting the hiring of a public relations firm to repair its image with residents and visitors.

Property and collateral damage

Effective urban transportation grids move people, goods and equipment rapidly throughout city centers. Because the speed of modern business is always increasing, city leaders must be ever more vigilant to reduce the risk of damaging public or private property should transportation technology fail to operate as expected.

Property damage risk refers to the risk of the destruction of tangible property owned by the public entity. Collateral damage, on the other hand, refers to property owned by third parties that may have been damaged as the result of a city's action, such as an unexpected system outage or malfunction. In either case, such property can include real property, personal property and automobiles. If a public entity's newly installed "smart technology" causes property damage due to a defect or a failure to function as intended, a lawsuit could result and the public entity could be at risk.

ILLUSTRATIVE RISK SCENARIOS

Cargo encounter. An error in software used to manage city traffic lights results in a 4-way green light condition at a busy intersection. A city bus collides with a computer company's truck, destroying a shipment of high value electronic parts. The shipping company sues the city alleging a variety of damages, including the value of the cargo.

Retail inferno. A city builds a light electric vehicle sharing station near a large retail chain store. Faulty electrical connections cause several vehicles to catch fire during a rainstorm. The fire spreads to the retail outlet, damaging store fixtures and rendering inventory unsellable.

Termination retaliation. A city's IT department employee is terminated from his job after heated disagreements with his superiors. This employee has system administration privileges, and has intimate knowledge of city information-security password policies. Prior to leaving the building, he elevates his security credentials to manager level and sets them to never expire. The disgruntled employee later logs on to the city's computer system from a remote location, pushes an emergency master shut-off button and brings down the entire municipal grid. His actions crash computers and impact traffic management systems, resulting in motor vehicle accidents as traffic lights go dark, and damaging the braking systems on buses and trains. Investigators confiscate the employee's home computer where they find a directory labeled "payback."

Bodily injury

For the first time in more than fifty years, America's urban areas have grown faster than their surrounding suburbs. A 2015 study shows that urban centers grew by 0.5 percent compared with 0.1 percent of areas three or more miles from central business districts. However, this encouraging economic news comes with a downside for risk managers. The greater the concentration of people living and working within city centers, the greater the chance of someone becoming injured should urban transportation technology fail.

To minimize the risk of being held liable for bodily injury, city leaders and risk managers should frequently evaluate their transportation networks to ensure equipment is properly maintained, and that employees adhere to published safety policies.

ILLUSTRATIVE RISK SCENARIOS

Crosswalk disconnect. To help the visually impaired, a city integrates a crosswalk beeping system with traffic signals at several key intersections. A hacker breaks into the city's traffic management system and disrupts the established sequence of signals. The system signals at the wrong time, sending a visually impaired man into oncoming traffic, resulting in him being seriously injured.

Smart meter downfall. A city installs a new system of smart parking meters in its core downtown area. A man parks next to one of the new meters and exits his vehicle in a wheelchair. As the man stretches toward the meter to pay for two hours of parking time, he falls out of the wheelchair and is injured. The city is sued for not ensuring safe access to the new meters for those with a disability.

Parking lot mugging. A city installs automatic, motion-sensor lights in a new public parking lot adjacent to a local sports facility. The lights fail to turn on properly, and two women are robbed and injured in the dark parking lot late one evening. Both women sue the city for failing to provide sufficient lighting in the parking lot.

Actions to consider for minimizing risk

Emerging smart technology offers public entities and their citizens exciting new possibilities for transportation and mobility. As they learn more about these opportunities, however, they should consider the potential for new cyber, property-damage and bodily-injury risks. Through careful consideration, public entities can manage their exposure.

It is important to note that the burden of evaluating risk-mitigation measures falls on designated city officials, and not every action will be appropriate for each city's unique needs. As civic leaders continue to integrate "smart" technology into traffic, parking, public transportation and related functions, they should consider the following actions to help minimize their exposure to key risks:

Conduct risk assessment

For each system under consideration, conduct a risk assessment to identify the likelihood of cyber-security threats (both deliberate and accidental), and their potential impact. After prioritizing the risks, identify cyber-security technology necessary to address the risks, while documenting any identifiable gaps in potential solutions.

Evaluate solution providers

Evaluate the credentials and qualifications of any contractor or solution provider under consideration. Verify technical expertise, industry certifications and appropriate security endorsements. Confirm they are staffed appropriately to provide an acceptable level of customer technical support on a 24/7/365 basis. Verify that hardware and equipment comply with industry design and performance standards, and software is developed with sound security-coding practices.

Balance contract language

Many companies outsource the management and control of all/some of their information systems, networks or data storage to cloud-based service providers. City management is required to sign their contract, which is sometimes one-sided in favor of the outsourcing company. City legal counsel should review all contracts, with changes made as necessary to protect city interests.

Vet cloud providers

Because of their in-house expertise, cloud service providers may provide a higher level of security than cities can implement on their own. Many also offer remote backup and disaster recovery services as well. However, even cloud providers are not immune to hacking and data breaches. Civic officials should specify security and encryption standards in writing and have the right to verify that their cloud providers adhere to those requirements. This is particularly important for cloud providers that co-locate city data with that of their other customers in a multi-tenant public cloud.

Automate security monitoring

Regardless of whether a city operates all of its computing assets in-house or outsources them to a third party, automated monitoring is crucial to keep transportation systems running 24/7. Management dashboards should include a security section where IT leaders can quickly pinpoint any unusual network activity in real time. All critical infrastructure components, including the network, power, storage, content and applications should be monitored constantly.

Comply with security standards

If city online service offerings include payment acceptance, confirm that information security complies with the payment card industry data security standard (PCI DSS). Install and administer approved firewall software to protect credit card names and numbers. Protect stored data with multiple layers of secure firmware, hardware and software. Encrypt any cardholder data transmitted across open, public networks. Track and monitor all access to credit card data, complete with real-time alerts to warn administrators in the event of an attack.

Enforce smart IT department policies

Change default passwords on all devices and require the use of strong passwords. This may require updating devices to move away from four-digit personal identification numbers (PINs). Rotate employee-assigned security keys to ensure that terminated employees' IT privileges can be decommissioned at appropriate times. Modify the privacy and security settings of the device to comply with your security policies. Establish appropriate "bring your own device" (BYOD) policies, and put measures in place to verify employee compliance.

Maintain sensors

Sensors embedded in street signs, light posts and parking lots should be properly installed and maintained. Maintenance teams should adhere to written sensor testing policies, and schedule routine tests to ensure sensors are functioning properly. Maintain a cache of replacement parts, and train maintenance personnel on proper repair procedures.

Educate maintenance personnel

While smart city technology is clearly the future of urban life, the technology is still quite new. As a result, there is a shortage of trained maintenance workers available when systems need repair. Cities should ensure adequate funds in the municipal budget to train personnel on maintenance and repair.

Invest in backup power systems

Like all computer-based systems, smart transportation requires electricity to operate. Cities should have battery backup and uninterruptible power sources (UPS) in place in case the city's main power grid fails. Administrators and maintenance personnel should establish operation plans, and practice implementing them with scheduled drills to ensure key personnel know how to react to a power loss.

Establish low-tech contingency plans

In the event of a system-wide outage or large-scale attack, many (perhaps all) automated systems and M2M communication could come to a halt, taking the entire transportation grid offline. Cities should have contingency plans in place for operating their transportation systems without computer automation.

Establish safety policies for hybrid transportation environments

As cities continue to invest in smart transportation alternatives, they must plan for an effective hybrid transportation environment – one in which smart transportation systems use the same roadways and railways with legacy systems currently in operation. City safety teams should be knowledgeable of the concurrent operation of both systems to make sure they do not interfere with each other.

Smart city insurance considerations for transportation and mobility

Public entities face unique challenges as they integrate smart technology for mobility and transportation. Cities are boldly taking the initiative to operate their transportation grids with computer automation, machine-to-machine communication and the Internet of Things (IoT). Never before has so much innovation been available to provide safe and efficient transportation.

However, smart technology also brings risk to public entities. Because the technology is so new, it is difficult to predict all of the ways in which cities could find themselves liable should their transportation systems fail to operate as expected. While this risk cannot be eliminated, it can and must be managed.

To help decrease exposure, public entities should investigate their insurance options for the categories of risk described in this issue of Public Sector Risk Advisor. The following table recounts the risks illustrated above, the actions to consider for minimizing those risks, and the relevant insurance coverage to protect against potential liability.

Risk class	Illustrative risk scenarios	Relevant insurance coverage to evaluate with an agent or broker
Cyber	• Traffic systems denial • Busing breach • Viral parking • Bike sharing bonanza	**Information security insurance** provides coverage for critical cyber risks. Coverage options vary, but most include network and information security liability. Companies can also opt for many first-party expense reimbursement coverages including data restoration, business interruption, computer and funds transfer fraud, crisis management and security-breach notification expenses.
Property and collateral damage	• Cargo encounter • Retail inferno • Termination retaliation	**Property insurance** provides coverage for buildings, business personal property and loss of business income and extra expense. **Auto liability insurance** provides coverage for bodily injury and property damage caused by a covered auto. **Auto physical damage insurance** provides coverage for physical damage to owned autos, including coverage for audio and radar detection equipment (if part of normal inventory of the vehicle), airbags and customized equipment attached to an emergency vehicle or public transportation auto.
Bodily injury	• Crosswalk disconnect • Smart meter downfall • Parking lot mugging	**General liability insurance** provides coverage for loss arising from bodily injury to third parties for which the insured is legally liable.

Each city's transportation requirements are unique, so few insurance policies are standard and not all risks may be insurable. It is important to contact your independent insurance agent or broker to discuss your city's unique insurance needs.

How Travelers can help

Since 1991, Travelers Public Sector Services has focused exclusively on public entities. We understand the unique challenges municipalities and counties face every day. Whether you are evaluating smart parking solutions, automated public transportation or even end-to-end mobility-on-demand systems, you can trust Travelers to provide sound advice and effective insurance solutions to help public entities manage the risks inherent to tomorrow's emerging civic technology.

Embedded systems have revolutionized transportation for the cities that have adopted them, and it will undoubtedly continue to bring even more benefits as the technology matures. Travelers' experience and innovation can help as you bring the benefits of smart technology to your citizens and visitors. For more information, contact your independent insurance agent.

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BPSWH.0003 New 5-16