IBM Institute for Business Value

Transportation and economic development

Why smarter transport is good for jobs and growth

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Foreword

I am thrilled to share the following paper, "Transportation and economic development," and commend IBM for its leadership in examining the role of smart technologies in job creation and economic growth. This report is an appropriate follow-on to the federally commissioned Intelligent Transportation Systems (ITS) Market Data Analysis published this year by ITS America and IHS Global Insight, which was the first systematic attempt to estimate the contribution and impact of ITS on the U.S. and North American economies. This paper goes a step further, examining how innovation is helping address challenges like congestion and highway fatalities, and providing recommendations to policymakers and state and local governments so they can help put ITS to work solving problems across the transportation network.

The ITS Market Data Analysis suggests the ITS technology sector is outpacing other industries in job creation and revenue growth. It validates what we have known for some time – that despite tough economic times, the transportation technology industry is healthy, is growing and supports jobs across the country that pay 75 percent more than the national average wage. This is a sector where the U.S. is poised to lead the way in innovation, which in turn can help bring about economic recovery.

In this economically turbulent time and with congestion, pollution and fuel costs increasing, building more roads and bridges is often impractical. The evolution of ITS technology is providing cities and states with a toolbox of cost-effective solutions to get more out of their existing infrastructure while building a safer, smarter and more efficient multimodal transportation network for the future.

This paper provides an important contribution to our understanding of the economic impacts of ITS and how the deployment of smarter transportation solutions can improve safety, enhance mobility, safeguard the environment, and strengthen job creation and economic growth in our communities.

Scott Belcher
President & CEO
Intelligent Transportation Society of America

By Mary Keeling and Gerard M. Mooney

High unemployment, languid economic growth and growing urbanization make transport's role in driving growth more important than ever. Problems relating to congestion, the environment and safety, as well as opportunities presented by growing data and smarter consumers, must be addressed to help support job creation and growth. The intelligent transportation systems (ITS) industry is helping build transport systems that address these issues. To sustain momentum, governments need to accelerate the development of common standards for ITS solutions and open data, the industry needs to collaborate across industry boundaries and cities need to continue building smarter transport networks.

The role of transport in driving jobs and growth is more important than ever

Transport contributes directly to economic activity and employment through bus, rail, road, air and maritime services. It also has a large indirect impact via all the other sectors and activities in the economy that depend on and use these various modes of transport to move people and goods around, nationally and internationally, in an efficient and safe manner.[1] In the current economic environment, three interrelated factors are placing even greater weight on the role of transport in driving jobs and growth:

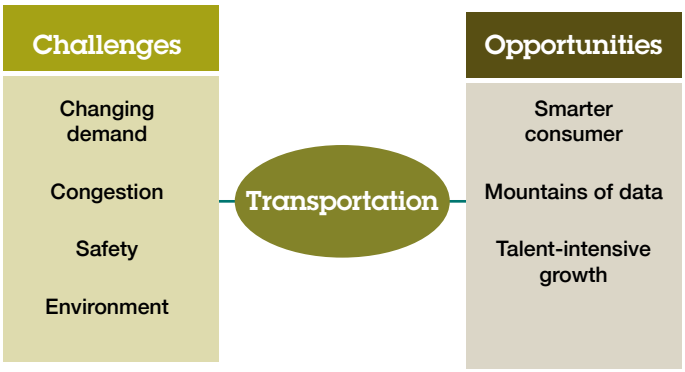
- The rate of urbanization globally has been rising and, in 2008, for the first time in human history, the proportion of the worlds' population based in urban areas was greater than 50 percent. In the United States, 82 percent of the total population is based in urban areas, and this is set to rise to 90 percent by 2050. Cities need to help ensure that their transportation networks can support this high and increasing level of human and economic activity based in cities.[2]
- The financial environment for cities and federal, state and local governments is challenging. Many states are amid their most severe fiscal crisis since the Great Depression. The largest collapse in state revenues on record combined with languid economic growth are constraining the use of traditional fiscal instruments to support job creation, as well as creating affordability and funding issues for large infrastructure investments.[3]

"Our transportation facilities are the artery for economic growth…..proper management and maintenance of these facilities is imperative."

Abbas Mohaddes, President and CEO, Iteris Inc.

- Because of the importance of transport in supporting job creation, it can help address the pressing structural problem of unemployment in many advanced economies. In the United States, long-term unemployment in particular is at crisis levels unprecedented in the post-war period.[4]

Yet, at a time when transport has never been more important in supporting growth and job creation, transportation systems in the United States and globally are facing several key challenges. There are also technological and socioeconomic trends that are creating new opportunities for transport providers (Figure 1). If unaddressed, these challenges and opportunities will inhibit the ability of transport to support job creation and growth.



Source: IBM Institute for Business Value Center for Economic Analysis.

Figure 1: **Transport challenges and opportunities.**

Today's transport challenges create an urgent need for action

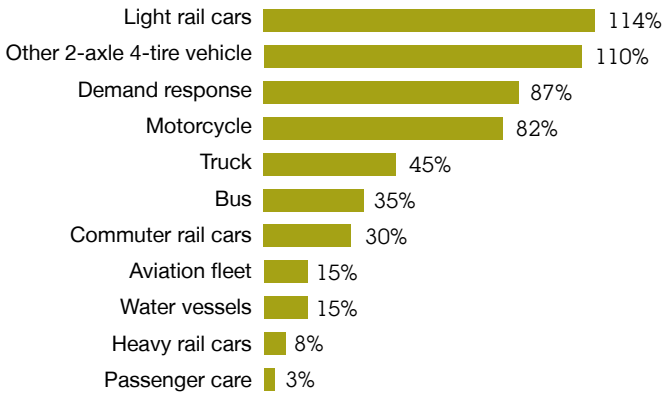
Demographic changes and more vehicles are placing new demands on existing networks.

Many transportation systems are facing rising demand driven by increased urbanization of populations. Over the past decade, the biggest migration of Americans has been to cities with between 100,000 and 1 million residents.[5] Many of these cities are less than prepared to deal with this influx of individuals and, as a result, are struggling to manage these busier transport networks. But not all cities are facing the same challenge. Chicago and Detroit, for example, are actually experiencing population declines, and cities with populations greater than 10 million suffered a 10 percent rate of outmigration over the last decade.[6] This declining demand exacerbates existing revenue problems. Whether populations are increasing or declining creates a challenge for transportation providers in terms of maintaining an efficient and productive transport system in the face of population changes.

In tandem, over the last 20 years, there has been substantial growth across all transport modes and, therefore, more vehicles and vessels using the transport network (see Figure 2). All these additional vehicles and vessels competing for limited capacity on the transport network create a challenge for transport providers trying to efficiently manage the network and balance demand and capacity.

"Austin is known for its live music; its beautiful parks and outdoor spaces; its vibrant, creative and high-tech industries; and—with a rapidly growing population—its traffic congestion. Bus and rail ridership are increasing, and we will need to make further investments in our transit network to keep pace with population growth and to remain an attractive option for the driver of the single occupancy vehicle."

Linda S. Watson, President and CEO, Capital Metropolitan Transportation Authority



Source: Research and Innovative Technology Administration, Bureau of Transportation Statistics.

Figure 2: **Growth in number of aircraft, vehicles, vessels and other conveyances (1990-2008).**

Congestion is a growing problem that incurs significant costs.

Congestion pressures faced by cities are worsening over time and cannot be ignored – traffic congestion in the 100 biggest metropolitan areas in the United States increased by 11 percent last year.[7] Congestion costs time and money – approximately US$101 billion and about 4.8 billion wasted hours last year in the United States.[8] It also negatively impacts quality of life by decreasing personal and business productivity, lowering air quality, creating noise pollution, adversely impacting health, as well as leading to the waste of nearly 1.9 billion gallons of fuel each year.[9] A large portion of congestion is not caused by limited highway capacity – 60 percent of all freeway congestion is caused by incidents such as wrecks and debris on the road.[10] So, reducing these types of incidents could help reduce the incidence of congestion and the negative costs associated with it.

"The numbers quantify what is intuitively evident – the extent and cost of congestion in cities of all sizes continue to significantly increase. The congestion numbers also demonstrate that we will not build our way out of the urban mobility problems that have developed."

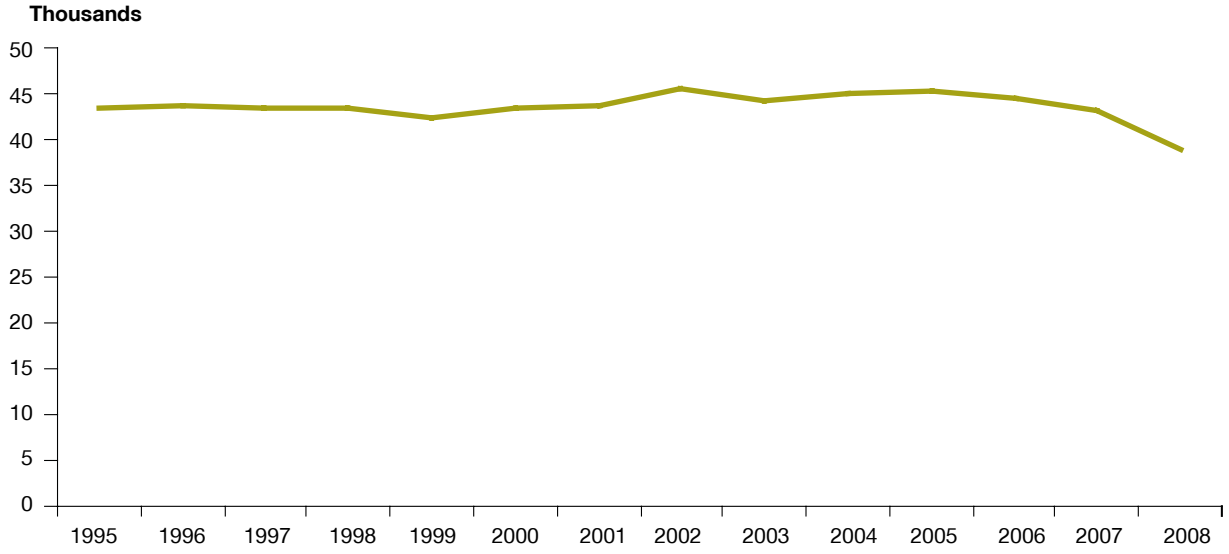
Dennis Christiansen, Agency Director, Texas Transportation Institute

Accidents in the transport network take thousands of lives and cost billions of dollars each year.

There are more than 10 million motor vehicle accidents in the United States every year.[11] In the United States, accidents are the leading cause of death among those aged 25 to 34 and cause almost 40,000 fatalities a year – equivalent to two jumbo jets crashing every week![12] This figure has remained virtually unchanged over the last 20 years (Figure 3). In terms of injuries from vehicle crashes, more than 2.3 million adults are treated every year in emergency departments.[13] These events impose about US$41 billion in medical and work loss costs every year.[14] As 20 percent of all freeway crashes are "secondary," occurring because the roadway is blocked by an earlier incident, reducing congestion caused by accidents could potentially reduce these costs.[15]

"Motor vehicle crashes and the resulting injuries and fatalities impose a huge cost on society. The often-overlooked economic impact of crashes is over US$230 billion annually."

Jill Ingrassia, Managing Director, Government Relations & Traffic Safety Advocacy, AAA



Source: The 2011 Statistical Abstract. Transportation: Motor Vehicle Accidents and Fatalities. Table 1102. Motor Vehicle Accidents—Number and Deaths: 1980 to 2008. US Census Bureau.

Figure 3: **Number of fatalities from motor vehicle accidents.**

Pressure is growing – nationally and internationally – to reduce emissions and the negative environmental impact of transport.

As transportation greenhouse gases (GHG) account for 29 percent of total U.S. GHG and over 5 percent of total global GHG emissions, it is not surprising the transport industry has been subject to increasing levels of environmental regulations.[16] For example, steps were outlined by U.S. President Obama in May 2010 on the adoption of the first-ever GHG regulations for heavy-duty engines and vehicles, as well as the development of further light-duty vehicle GHG regulations. In August 2011, a regulation was signed relating to Greenhouse Gas Emissions Standards and Fuel Efficiency Standards for Medium- and Heavy-Duty Engines and Vehicles.[17]

The increase in regulation is not just happening at the national level. In recent decades, there has been a proliferation of multilateral environmental agreements. Global regulation is likely to continue and to extend to new areas.[18] Environmental pressure is also being driven by changing attitudes among consumers and cities as exemplified by movements such as "Car Free America" and efforts in Arlington County, Virginia, and other urban areas that promote the use of transportation modes other than single-occupancy vehicles.[19]

"Surface transportation is entering one of the most significant transition periods in our nation's, perhaps world's, history. For over 100 years, we have relied on the internal combustion engine, fueled by gasoline, to serve our individual transportation needs… Electrification (both EV and PHEV) increasingly opens the door to safer, smarter, more efficient transportation."

Dana Christensen, Deputy Laboratory Director for Science and Technology, National Renewable Energy Laboratory

Technology and socioeconomic trends are creating new opportunities

Transportation system providers can leverage technology to get closer to smarter citizens and give them access to their transport network.

Transport system providers are facing smarter citizens as technology fundamentally changes the way they interact, obtain information and purchase goods and services. While 30.2 percent of the world's population are online, that proportion is even higher in North America at 78.3 percent, representing an increase of 151 percent in North America between 2000 and 2011.[20] Ninety-one percent of the U.S. population has a mobile phone account, and Smartphone penetration of the U.S. mobile phone market will overtake feature phone penetration by the end of 2011.[21] There are over 425,000 iPhone apps and over 15 billion downloads – and this growth occurred in just four years.[22] What all of these statistics serve to illustrate is the growing familiarity that consumers have with technology. What it means for transportation system providers is that they are now facing consumers who are not just more informed, enabled and demanding, but who also increasingly expect technology to be embedded in the services they use.

"Many of the current fare payment systems are like coin operated telephones in a smart-phone world. They have not kept pace with payment methods used in other industries."

Keith T. Parker, President and CEO, VIA Metropolitan Transit

Transportation providers have more data and information at their disposal than ever before.

From 2008 to 2009, the amount of digital information increased 62 percent to 0.8 zetabytes – and in 2010, it was estimated to have increased to 1.2 zetabytes.[23] A recent study put this into perspective by estimating this amount equals 75 billion fully loaded 16GB Apple iPads or 707 trillion copies of the 2,000 page U.S. Patient Protection and Affordable Care Act.[24]

"In just a few short years, the challenge has shifted from 'if we only had the data' to 'how can we drive better intelligence from the data.'"

Bryan Mistele, President and CEO, Inrix Inc.

In 2009, more than 40 million portable GPS devices were sold worldwide, and 52 percent of those sales were in the United States.[25] In transport, the amount data has also been growing. Several years of fast growth have led to well over 200 million "turn-by-turn navigation" systems in use worldwide, 20 percent of which are factory installed and aftermarket in-dash navigation systems.[26] About 10 percent of the world's new cars in 2010 had factory-installed telematics – that is expected to increase to 62 percent by 2016.[27] Many cities are also sitting on potential treasure troves of data from individual tickets, journeys and usage of public transport to data in road charging or toll schemes. Transportation providers and agencies have a vast amount of information at their disposal from across their entire transport network. This represents a valuable opportunity to gain greater insight into the network, make better and more informed decisions, take appropriate action and help improve the quality of the transport services.

"Data, when appropriately mined and analyzed, gives transportation providers the means to be proactive and predictive in ways never even considered previously, resulting in improved investments and much improved customer interaction."

Ken Philmus, Senior VP, Transportation Solutions Group, Affiliated Computer Services, Inc.

Transport services can become a differentiator for cities to attract and retain the talent necessary to drive growth.
Talent is becoming more and more important in driving economic growth in cities and regions. And while the number of mobile highly educated individuals is set to rise over the next 20 years, cities will face intensifying competition to attract and retain this talent.[28] Transport services could become a significant differentiator, as they have a critical influence on the attractiveness and liveability of a location. For cities and regions that can attract this mobile talent, the resulting wealth can be spread out across the economy. More growth means more jobs – not only for higher-skilled but also for lower-skilled individuals. In addition, transportation enhancement can be leveraged by cities experiencing falling population numbers to stimulate recovery, jobs and growth and stem further population declines.

To help drive growth and job creation, transport providers must address the challenges and opportunities before them. In answering the question of "how" transport providers can deal with these pressures and opportunities, we now outline how "smarter," more intelligent transport systems can help.

"Without effectively deploying intelligent transportation systems, acceptable urban mobility will not be maintained, and the impacts on economic competitiveness and quality of life will be substantial."

Dennis Christiansen, Agency Director, Texas Transportation Institute

"Economic growth will not be possible without increasing the efficiency and capacity of our highway systems. ITS has proven to be one of the quickest and most cost-effective ways to accomplish these objectives."

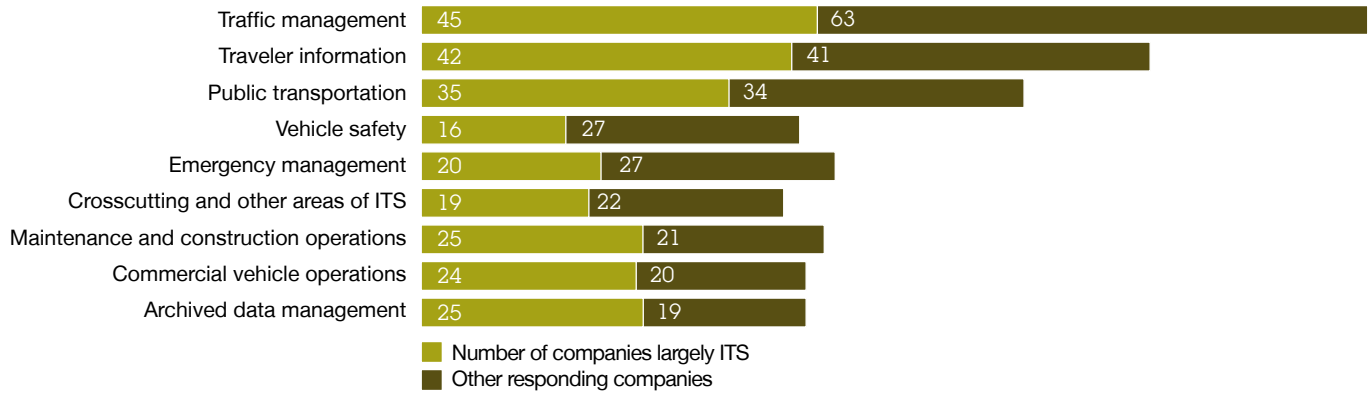
Abbas Mohaddes, President and CEO, Iteris Inc.

Smarter transport helps drive jobs and growth through ITS solutions, jobs and revenue

The ITS value chain spans 15 major industry groupings and accounts for 13 percent of total industry output. In the U.S. economy, this market includes both ITS-driven companies and also more diversified companies (Figure 4), illustrating the breadth of the ITS industry outside of transport. The ITS industry enhances the potential of transport to drive growth and jobs through two key channels. First, it is developing innovative solutions that help transportation providers effectively deal with the challenges and opportunities they face and build smarter, more intelligent transportation systems. Second, the industry itself makes a major contribution to economic activity and jobs through its revenue and employment.

ITS helps drive growth through innovative solutions that enable smarter transport systems.

Smarter transport systems are instrumented, interconnected and intelligent. The right type of data is collected, managed and integrated across different parts of the transport system, fleet or a single vehicle in a way that allows modern information technology and advanced analytics to be used for further insight. This insight can form the basis for more effective decision making and responses. For example, a smart system can support more efficient and effective use of limited



Source: Sizing the U.S. and North American Intelligent Transportation Systems Market: Market Data Analysis of ITS Revenues and Employment. The Intelligent Transportation Society of America. August 2011.

Figure 4: **ITS areas of activity: ITS and other companies.**

resources by allowing providers to "visualize" the transportation system, quickly identify the source of problems and rectify them, as well as by helping them be better prepared for responses to infrequent events. The ITS industry is helping build smarter transport systems that enable data gathering and analysis and more effective responses to issues such as congestion, safety and environmental efficiency.

For example, ITS solutions are relaying real-time traffic information via handheld devices and on-board traffic information advisory systems to help drivers avoid congestion and reroute. ITS solutions that provide information relating to carpools and parking can help increase vehicle occupancy and reduce the number of vehicles and their time on the road. Making better information available for travelers can help facilitate a modal shift by giving them the ability to perhaps mix and match different modes or spread the load on the system through the timing of trips.

"We can stay here, stuck in traffic, or we can invest in transportation and ITS technology that have the potential to transform how we travel. Whether it's a commercial hauler seeking a route for his on-time delivery or a parent trying to make it from the office to her child's soccer game, this technology can lower business costs, improve quality of life, ease traffic congestion and make us safer."

Kirk Steudle, Director, Michigan Department of Transportation

In terms of safety, on-board collision avoidance systems can detect vehicles or other obstacles and alert drivers of looming threats – and eventually could impose brakes. Other solutions, such as vehicle-to-vehicle communication systems, enable vehicles to be fully "aware" of dynamic information of neighboring vehicles, helping them keep a safe distance and facilitating faster responses to traffic incidents. Such innovative solutions can make a real difference in helping reduce the existing safety problems across the transport network.

Intelligent vehicle technologies will ultimately enable autonomous driving and cars that don't crash. Not only will these vehicles revolutionize personal mobility, they also promise to dramatically decrease fuel consumption and emissions, greatly enhance traffic safety and provide significantly more value for consumers."

Nady Boules, Director, Electrical & Controls Integration Lab, General Motors Global Research & Development

The industry is also developing solutions to address environmental pressures. GPS-based eco-routing, one of the first applications currently in use, helps drivers choose a route with minimal environmental footprints and environmentally-relevant real-time transportation data. Having been promoted in the U.S. Department of Transportation's Applications for the Environment: Real-Time Information Synthesis' (AERIS) program, this application empowers vehicles to mitigate their environmental impact.[29]

"…..the connected vehicle system holds the promise of reducing congestion, improving transport time and doing it in a safer fashion."

Dana Christensen, Deputy Laboratory Director for Science and Technology, National Renewable Energy Laboratory

Solutions are also being created that help transportation system providers capitalize on opportunities to gain information and insight. Embedded and road-side sensors, along with information exchanged wirelessly, could provide more information to transportation agencies. And advanced analytics solutions could gather and help provide insights on which to act. Many organizations are overwhelmed by vast amounts of data and struggle to effectively use it to achieve business results – more than two thirds of organizations report that their organizations have more data than they know how to use effectively.[30] Analytics can help mitigate the mounting complexity resulting from the data deluge and facilitate more informed decision making.

"A significant commitment to safety is needed to fund better data collection systems, road and vehicle improvements, and performance-based counter-measures that can have the greatest impact on saving lives and reducing crashes. Transportation technology solutions play a role in all of these areas."

Jill Ingrassia, Managing Director, Government Relations & Traffic Safety Advocacy, AAA

Embedding technology in the transportation system, such as through integrated fare processing or smart cards, facilitates the "smarter" services that "smarter" consumers increasingly demand. Leveraging technology to enhance travelers' experiences through smart and more accurate traffic signs and smartphone mobility apps, for example, could help cities improve transport services and perhaps attract talent.

"ITS systems can now provide for detailed traffic and revenue analysis that truly informs decision making based in great detail on the 'voices of the consumers' and how they actually use our transportation systems."

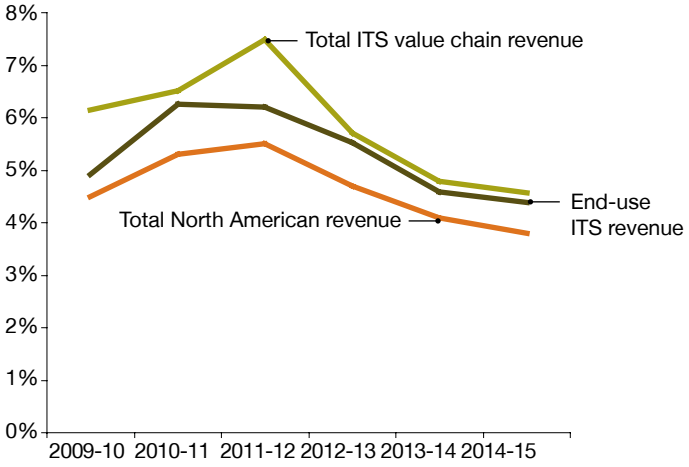
Ken Philmus, Senior VP, Transportation Solutions Group, Affiliated Computer Services, Inc.

ITS can thus help providers effectively deal with many of the pressures – and opportunities – they face and generate further spillover benefits for users of the systems. This, in turn, helps foster efficiency savings and benefits for citizens and businesses across the economy. And statistics point to the continued development of innovative solutions – ITS-related patents increased by 17 percent between 2007 and 2008 when overall patent applications in the United States were static.[31]

"Our efforts with transportation agencies worldwide are driving better intelligence from these vast data stores in ways that help them plan, build, manage and measure the performance of our road networks for a fraction of the cost."

Bryan Mistele, President and CEO, Inrix Inc.

Smarter transport can directly impact economic activity through the revenue and jobs generated by the industry. The ITS end-use products and services market was US$52 billion in 2009 – larger in revenue size than motion picture and video production (US$48 billion), computers (US$44 billion), direct mail advertising (US$44 billion) or Internet advertising (US$23 billion).[32] Continued growth is projected through 2015 with the North American ITS market size expected to increase to US$73 billion (consisting of US$67 billion for the United States and an additional US$6 billion for the rest of North America). This amounts to a compound annual growth rate of 5.8 percent per annum over the 2009-2015 period.[33] In addition, as is evident from Figure 5, the annual growth rates for ITS are higher than the average growth for total North American revenue.



Source: Sizing the U.S. and North American Intelligent Transportation Systems Market: Market Data Analysis of ITS Revenues and Employment. The Intelligent Transportation Society of America. August 2011.

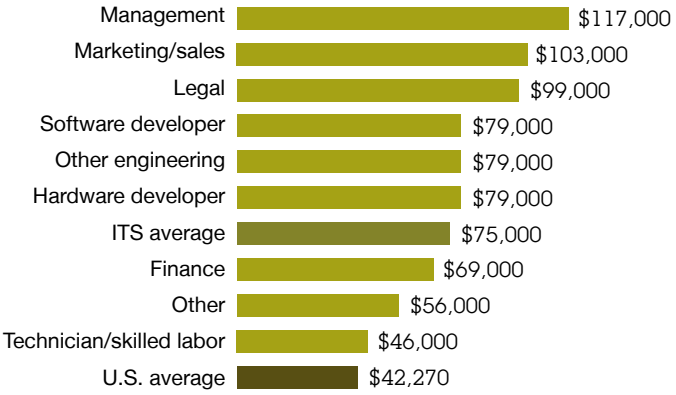
Figure 5: **Growth of North American ITS market versus total economy.**

The ITS industry also directly affects the economy through number and quality of jobs and wages for those jobs. ITS industry employment in 2011 is estimated at over 513,000, with 306,000 in enabling services and components and 207,000 in end-use intelligent transport. This is a 4 percent increase of over 19,000 since 2009 – impressive growth considering an economic environment in which aggregate employment levels in the United States increased by just 4,000 over the same period.[34]

The ITS U.S. and North American employment outlook is also positive. By 2015, the ITS value chain is projected to contribute over 564,000 jobs – an increase of 14 percent over 2009 levels. Growth in employment in the ITS industry is also higher than other sectors and the economy overall.[35] ITS jobs typically command annual salaries above the national average as they require specialized skills. ITS average salaries are more than US$32,000 above the national average of US$42,270. More than half of the U.S. ITS jobs categorized by occupation had salaries of US$69,000 or more (see Figure 6). These high-paying earners have a positive impact on the economy via the goods and services they purchase and those employed to provide them.

"ITS technologies offer cost-effective ways to address congestion and generate good-paying jobs. We plan to expand our workforce to respond to this demand…. As an ITS company, we are working every day to improve surface transportation in order to assist in America's growth."

Abbas Mohaddes, President and CEO, Iteris Inc.



Source: Sizing the U.S. and North American Intelligent Transportation Systems Market: Market Data Analysis of ITS Revenues and Employment. The Intelligent Transportation Society of America. August 2011.

Figure 6: **Average salary of ITS jobs in the United States in US$, 2009.**

"The recent ITS Market Data Analysis was an eye opener to the opportunities and challenges that this US$48 billion dollar industry faces. With the potential estimated growth in both revenues and job creation in the United States and North America, there clearly needs to be a broader focus on how Intelligent Transportation Systems (ITS) impacts the overall health of our economy."

David St. Amant, President & Chief Operating Officer, Econolite Group Inc.

What should governments, cities and the ITS industry do to sustain and enhance the benefits from ITS?

The evidence outlined in this paper clearly demonstrates the numerous benefits smarter and more intelligent transportation systems can offer. Governments, cities and the ITS industry all have key roles to play in leveraging the significant potential of transport to foster jobs and growth.

Governments need to accelerate the development of common standards for ITS solutions and open data.

The development of intelligent solutions is necessary but not sufficient alone to build smarter transport systems and realize the full positive impact from these solutions. Governments can also play a critical role in supporting the deployment of these solutions by accelerating the development of common standards for ITS solutions and open data to make it easier for solution providers to work with cities, get the data necessary and make it attractive to scale.

- The U.S. Department of Transportation should continue efforts to harmonize standards internationally to support the interoperability of solutions. This will help ensure that ITS firms in the United States are not at a competitive disadvantage internationally, as well as help cities and transport providers across the United States take advantage of ITS solutions being developed internationally. Priority should thus be given to funding support for existing agreements with the European Union, Japan and Canada for standards harmonization internationally, as well as expanding agreements with other territories such as Australia and New Zealand.

- Easy access to standardized data is also necessary, as the lack of standards for open data currently creates a barrier to scaling and deploying existing solutions. For example, to plug into scheduling optimization solutions, mobility providers need to have access to data such as timetables. Different formats and types of data will inhibit the scaling of these solutions. Government can assist by providing guidelines for the structure and format of data to facilitate more standardized open data.
- As part of any efforts to move toward more open data, government also has to help ensure that the privacy concerns of consumers are addressed. For example, the United Kingdom recommends that privacy protection be embedded in any program related to open data and recommends leveraging the expertise of technologically trained experts to decide whether particular datasets should be released or not.[36]

Cities need to continue to deploy smarter transport solutions and build a smarter transport network.

- Cities also have a crucial role to play in supporting deployment of solutions addressing issues such as congestion and safety. They should take advantage of both new and existing smarter transport solutions and embed them across the transport network.
  - Stockholm and London, which have successfully deployed intelligent road pricing, demonstrate the tangible benefits – such as reduced carbon dioxide emissions and less traffic – that can be realized from tackling congestion and provide a model for many cities around the world.[37]
  - Long Island Railroad integrated smarter transport solutions with existing assets – in this case for an intelligent asset management system for maintenance – to build a safer, more reliable smarter rail system.[38]
- Cities should also continue to plan integrated, smarter transport systems that are feasible given prevailing economic conditions and demand, prioritizing investments in line with their smarter transportation strategy.
  - Singapore developed a master plan in 2008 that details a roadmap to a fully integrated transport system by 2020.[39] Building on the existing integrated ticketing system, which covers public transport, congestion pricing and car parking, enabled the city to introduce an integrated fare structure based on distance traveled.[40]

The ITS industry needs to collaborate across industry boundaries and pro-actively work with cities.

- The diversified structure of the ITS industry – covering ITS and non-ITS companies – means its companies need to partner outside their own industry boundaries to develop new and innovative ITS solutions. For example, auto manufacturing, computer systems design and data processing activities are all related to ITS activities. Looking at the full spectrum of ITS activities could bring new collaborative opportunities, further spurring innovation.
  - Collaboration and cooperation across industry boundaries were integral to the development and deployment of "OnStar," a subscription-based communications system that provides services such as automatic crash response, navigation and stolen vehicle assistance.[41] Onstar was formed in 1995 as a collaboration between General Motors, Electronic Data Systems and Hughes Electronics Corporation.[42] The provision of OnStar services also requires cooperation between the company and cellular providers, as the system requires a two-way cellular link between the onboard equipment and the OnStar service.[43]

- Companies in the ITS industry also need to proactively work with cities, transport providers and vehicle manufacturers to develop new solutions, as well as deploy existing ones.
  - The city of Rio is working with IBM and other partners to develop a smarter transport strategy and deploy ITS solutions to help the city prepare for hosting the FIFA World Cup and the Olympics. This is part of a broader strategy to build an integrated operations center that will also help monitor and improve public safety and emergency response in the city.[44]

With transport playing a more important role than ever in driving job creation and economic growth, significant changes are required in how transport is managed and improved. ITS solutions need to be at the core of these changes. Governments, cities and the ITS industry can all help support wise investments that can make transport systems and services smarter. However, they need to respond and act NOW to help drive economic development and job creation – the opportunity is there for the taking.

This study was written by the Center for Economic Analysis, which is part of the IBM Institute for Business Value. You can also browse a full catalog of our research at:

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Gerard M. Mooney is currently General Manager, Global Smarter Cities. His team is responsible for delivering the set of initiatives that now form the center of IBM's successful Smarter Planet offerings and that are playing a leading role in the transformation and modernization of governments and cities around the world in core functions like Intelligent Transportation, Public Safety, Advanced Water Management, Smart Grids and Green Buildings, as well as traditional government services. Since joining IBM in 2000, Gerry has held a series of increasingly responsible positions in venture capital, strategy, technology, operations and sales. Most recently, he was General Manager, Global Government and Education and, prior to that, Gerry was IBM's Vice President, Corporate Strategy with worldwide responsibility for IBM's Emerging Business Opportunities program. He has also had responsibility for IBM's Venture Capital organization. Gerry serves as a member of the Board of Directors of the Intelligent Transportation Society of America (ITS America). He holds an MBA from Yale University, an MS in Accounting from Georgetown University and a BA in Philosophy from Mount Saint Mary's College. Gerry can be reached at *mooneyg@us.ibm.com*.

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