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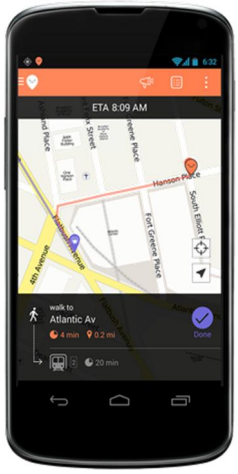
COLLABORATIVE MOBILITY



COLLABORATIVE MOBILITY TEAM

Ryan Adams - *Keolis Transit America*

Jackie Bruce - *MTA New York City Transit Authority*

Nadine Lee - *Denver Regional Transportation District*

Maureen Lichtner - *Southeastern Pennsylvania Transportation Authority*

Nathan Macek - *WSP | Parsons Brinckerhoff*

Lloyd Sullivan - *Orange County Transportation Authority*

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INTRODUCTION

In recent years, a variety of innovative transportation services and system designs have emerged in response to transportation demands not currently met by traditional transit operations. As an industry, traditional transit systems must evolve and embrace these innovative approaches and collaborate with key partners to enhance the passenger's trip.

> *Mobility, redefined, aka Collaborative Mobility: The maximization of "people* throughput*" through partnership and collaboration on innovative public transportation solutions involving technology, non-traditional service providers, private business and other agencies.*

Due to changing demographics, environmental pressures, fiscal constraints, and the fast-paced innovation of the technology sector, transit leaders face many new options while striving to meet customer needs, requiring them to navigate uncharted obstacles to creative mobility solutions. These new challenges, however, give transit executives an exciting opportunity to lead the expansion of mobility in ways that agencies have never before contemplated. Transit leaders find themselves in a unique position to embrace, lead and facilitate the creation of comprehensive mobility systems that optimize the services of multiple agencies, service providers, and technology companies.

The Collaborative Mobility project examines the opportunities to integrate existing and emerging transportation services to maximize mobility, and discusses the collaboration required to do so. Our research explored solutions that transit leaders have successfully employed to maximize public mobility. These included targeted transit services, capital investments, and technological innovation, providing insight into how successful collaboration and partnerships supported these achievements.

This paper summarizes key findings resulting from interviews with transportation leaders who have studied and implemented collaborative strategies through innovative approaches to mobility. More specifically, our research:

- Develops a new vision for mobility, the "Total Journey Experience," based on a diverse array of perspectives
- Identifies emerging technologies to provide a total journey experience through flexible, on-demand services that provide seamless connectivity and access to traditional transit services
- Explores challenges and obstacles that might limit the ability of an agency to pursue such opportunities, including government accountability, organizational structure, and procurement practices
- Provides leadership strategies designed to empower transit executives seeking a new vision for system expansion, such as creating and promoting an innovative culture within the agency, mitigating risk through the use of pilot programs, and pursuing innovative partnerships with non-traditional providers.

CONTEXT

Many factors have shaped the environment of public transit over the years. The most publicized causes are population growth and urbanization trends, infrastructure and fiscal constraints, environmental concerns, and innovations in technology.

Population Growth and Urbanization Trends

The rapid growth of urban areas has resulted from two primary factors: natural population growth and increased migration into urban areas. This is further compounded by the geographic growth of cities. There is

a clear trend in the United States of the movement of people back to urban centers, reversing the decades-long trend of settling in the suburbs. Numerous factors are contributing to this re-urbanization, many of which are generational.

Infrastructure and Fiscal Constraints

With aging infrastructure and growing stress on transportation system capacity, the projected population growth and urbanization trends will intensify the urgency of the issues with which public transit has struggled. The financial resources needed to maintain the infrastructure in a state of good repair and to increase capacity are not keeping pace with demand. In fact, they are sorely lagging behind. This has been an ongoing story for public transit, and relief is not in sight.

Environmental Concerns

Since Congress established the Clean Air Act in 1963, great progress has been made toward improving air quality. Most air toxins come from manmade sources, including mobile sources such as motor vehicles. Public transit has played a key role in improving air quality from both improved vehicle performance and the reduction of solo car travel. Promoting car-free lifestyles and reducing single-occupant car travel continues to be a goal. Speed, cost, reliability, and cleanliness are attributes of public transit services that can attract riders and promote these goals.

Innovations in Technology

Technology innovations are driving cultural changes in every industry. They have revolutionized the way people live, and they have shaped customers' expectations. Customers want everything faster, and they want up-to-date information at their fingertips. Public transit has not been spared and continues to make progress toward availing its customers with real-time information.

Shifting Customer Needs

Among the factors shaping the future of public transportation, none has had a more significant influence than the recent changes in customer needs. Generational changes, such as the aging of the Baby Boomers and the coming of age of the Millennials, are key drivers in the shifts in customer needs. Baby Boomers are living longer, healthier and more active lives. They are also working longer. In fact, the labor force participation rate for people 55 and older is near its highest level in several decades, up by approximately 33 percent since 1990. Baby Boomers are also intent on maintaining their independence as they stop driving. They expect efficient transportation services and require ease of access. To achieve this independence, many Boomers who once opted for a life in the suburbs while raising their families are now moving back to urban areas.

As of 2015, Millennials (individuals born between the early 1980s and 2000) represent the largest generation in the work force. They are less likely to own a car or drive one regularly. Statistics show that fewer, in comparison to those of prior generations, have a driver's license. Further, many of them choose to live in walkable areas with flexible and personalized transportation options. They are truly the multimodal generation. In addition, they are technology-savvy and demand mobile, real-time information and services at their fingertips. They are shaping the future of transportation infrastructure needs.

The industry has noted the tendency of Millennials to drive less, but that does not mean that they will settle for low quality transit options. In fact, while the Millennials may have most aggressively demanded more and better transit options, their pleas have only amplified the need for transit agencies to improve the quality of service for all people.

The transportation industry has historically organized customer travel demand by purpose of travel. More recently, transportation demands have become more individual and personal, indicating that the industry needs to provide more flexibility for customized travel patterns. In other words, current trends point to lifestyle, rather than purpose of travel, as a better way to look at the customers' mobility needs.

These catalysts require us to rethink our transportation landscape. The industry must confront and address the associated challenges to maintain traditional transit as a significant and important component of the mobility solution. As leaders, we must embark on a paradigm shift in public transit, focused on maximizing mobility and accessibility for the customer. Our research explored strategies that achieve this transition, which we refer to as the concept of Collaborative Mobility.

The inevitable new paradigm is collaborative mobility.

THE VISION

In order to develop a comprehensive vision for the new mobility landscape, our research team interviewed over 30 leaders from a wide range of organizations (Figure 1) to get broad perspectives on the opportunities, challenges, and strategies for delivering more comprehensive transit solutions. The organizations that participated in our interviews represented the following categories:

- U.S. public transit agencies that are considering innovative approaches to collaborative mobility
- Mobility consultants and research organizations that study opportunities for and results of mobility partnerships
- Technology firms and new mobility providers that provide tools and services designed to enhance the customer's journey
- International public transport organizations and mobility consultants that currently employ principles of collaborative mobility and offered visionary goals and best practices for U.S. transit agencies to pursue

Figure 1. Organizations Interviewed for Collaborative Mobility Study

The interviews revealed several common themes and challenged misconceptions about the motivations and roles of new mobility providers. The project team noted that public transit and technology companies appear to have similar goals when it comes to transportation. The differences lie mostly in the respective approaches to solutions, the application of new technologies, and finding ways to work together to achieve the common goals. It is imperative for both groups to learn from each other and adapt our approaches in this evolving market.

Overwhelmingly, our mobility experts contend that collaborating with new mobility providers through innovative partnerships (aka Collaborative Mobility) is essential to the future of traditional transit. Through our research, we have concluded that these partnerships do not have to conflict with the goals of public transportation providers. Rather, these partnerships can support and create efficiencies that make public transit more effective, thus maximizing mobility and accessibility for the customer.

The vision for our mobility future is the "Total Journey Experience," a concept introduced by the Singapore Land Transport Authority (LTA) in its 2008 Land Transport Master Plan and further discussed with project team members in an interview with Chik Cheong Choi, Deputy Director, Knowledge Management of the LTA Academy. This vision can be described as follows:

> *This vision for our mobility future is a total journey experience that provides seamless* connectivity *for the customer through multiple providers and technology. Providing single platform trip planning, payment, and real-time communications to the customers gives them the convenience and confidence in using public transportation.*

Our findings challenge the industry to view the Total Journey Experience as our collective goal, and the pursuit of Collaborative Mobility is how we will achieve this vision. Collaborative Mobility presents a leadership opportunity for public transit.

TRANSIT AND THE NEW MOBILITY MARKET

Several of the organizations interviewed shared a perspective that the new mobility market requires public transportation agencies to think innovatively about how to deliver service to the customer. Governmental organizations are not accustomed to working in a complex, competitive, and high-speed environment. Because of government's inability to adapt quickly to change, new players in the market are viewed more as threats, or competition, than as potential partners. These misperceptions cause tension between the public and private sectors in the delivery of transportation services.

Some transit agencies have embraced these trends while others do not even acknowledge their presence. The uncertain nature of these new trends can cause resistance and skepticism – all standard behaviors associated with change. Even so, interviewees encouraged U.S. transit officials to recognize the new paradigm and lead the change.

Working with external parties to enhance the transportation system is essential. New mobility providers should not be viewed as competition but rather as a complement to traditional public transit. Collaborative Mobility is an opportunity for transit agencies to develop partnerships and have more of a say in how the connection will be accomplished. Incorporating multiple transit providers and consolidating fare payment technology in one convenient card for all providers would make the trip more attractive to the customer. This is what it means to provide the Total Journey Experience.

Some agencies are already implementing this strategy. The Singapore Land Transport Authority, for example, is developing well-constructed transfer environments, which include ample parking space for bicycles and other private transportation, as well as offering transfer discounts between bus and Metro. Their goal is to increase transportation mobility.

Dallas Area Rapid Transit (DART) has placed a link to Uber on its transit app, making it convenient for the customers to complete the last leg of their trip. DART has also provided space for Zipcar as well as "pool" cars at its train stations near business complexes, again to help riders complete the connection between the end-of-line and their destination. Foothill Transit participates with other area operators to provide a single fare payment card, even though each company has its own fare structure. These are examples of agencies that are using collaborative mobility to promote the total journey experience.

Transportation providers need to give customers the tools they need to complete their journeys as conveniently as possible.

Who will be the integrator in the new mobility market?

In the mid-1990s, the hotel industry experienced the influx of aggregator sites such as Travelocity and Expedia. Instead of leading the industry through the evolution of hotel booking through the internet, hotels were forced to be integrated into the new aggregator booking systems and ultimately saw their direct interface with the customer diminish. Aggregators push the hotels to provide services for lower prices and take commission from the hotels. As a result, hotels lost an estimated 50 percent of their historical revenues to the aggregators. They lost their power and are relegated to just providing a bed. In essence, they became vendors in the supply chain. Travelocity and Expedia were the integrators; the hotels became the integrated.

Responsiveness to customers will ensure the long-term success of public transit, and partnerships with alternative providers will only enhance the delivery of service to the community. Service availability and technology are what allow customers to make educated decisions about how they choose to travel.

A Defining Moment

Public transit is at a defining moment, at which the future of the industry will be shaped. The Total Journey Experience is the unifying vision that will guide the development of mobility services from this point forward. Collaborative Mobility will achieve the customer's total journey experience through the following objectives:

- *Obsession with the Customer and Laser Focus on Customers' Needs* –This entails decision-making that arises from a customer-based strategy. This approach moves away from an exclusively operational focus to a customer needs-based focus.
- *Innovative Collaboration* – Collaboration with other modes and providers results in modal capacity being provided by many suppliers. Public agencies should establish partnerships to meet the customers' holistic needs.
- *Technology* – Transit agencies should seek the application of technology in the planning, design, and delivery of transit services.
- *Integration* – Integration across services and modes will benefit the customer as well as the agencies. Successful integration leads to a more effective and efficient use of limited resources.
- *Seamless Service* – Under the new paradigm, it will no longer be sufficient to view our geographical boundaries as the limit of our responsibility to the customer. Viewed through the filter of the total journey experience, we are members of a far broader network that encompasses multiple service delivery providers across geographic boundaries. Providing seamless service will efficiently and effectively connect our customers.

Becoming a Leader in the New Mobility Market

Through our research it has become clear that the private sector will create the change and the public sector will shape the change. Most interviewees expressed a desire and a need for public agencies to take active leadership roles in shaping the future of mobility for their communities. They articulated a concern that those who do not recognize or acknowledge these market trends will get left behind and ultimately lose authority and control over their services.

Oleksii Korniichuk of Arthur D. Little, a management consulting firm, characterized this dynamic as follows: "There are two types of players in the new mobility market: Those who will integrate, and those who will be integrated."

"There are two types of players in the New Mobility Market: Those who will integrate, and those who will be integrated."

- Oleksii Korniichuk
Arthur D. Little

There are many compelling reasons for transit agencies to become integrators of the new mobility market. As a steward of the public, government serves the public interest. While this motivation does not necessarily conflict with the profit motive of a private company, government can shape the output of new mobility providers to better serve the public. Because the public agency speaks for the customers, it is able to guide the new

mobility market to provide equitable, accessible, and convenient service to a region. By taking a leadership role, public agencies ensure inclusion in guiding and shaping the outcome of new mobility partnerships.

Public agencies have historically served as the mobility leaders in the region. Because of this precedent, they are valuable resources in shaping the future of mobility. Transit agencies have the ability to engage all regional players' participation in the development of mobility strategies that align with local land use and transportation plans. They should retain their positions as mobility leaders in their region by becoming integrators of the new mobility market.

Integrators try to become the single face to the customer, managing all services and products, and serving as a handler, or middle-man, in the business. Non-integrators become faceless vendors or providers in the supply chain. The market is showing that customers are less concerned with who the transport service provider is, as long as the service meets their needs (i.e. safe, clean, reliable, efficient, courteous, etc.).

The integrators will ultimately own the customer. If public transit authorities choose not to lead this charge, their roles will evolve into serving simply as a vendor in the mobility supply chain. They will lose the interface with the customer. (See side bar on page 6:"Who will be the integrator in the New Mobility Market?")

Competitors or Partners?

In the near term, public transit will continue to dominate the mass transit market with the fixed route service functioning as the backbone of the network. However, private technology firms will simultaneously grow, improve, and gain market share due to their adaptability and responsiveness to demand (i.e. the customers). Although technology firms are not currently equipped to provide their services on scale with that of public transportation, Dr. Susan Shaheen of University of California-Berkeley's Transportation Sustainability Research Center cautioned that these companies have demonstrated the potential to generate a tremendous level of investment in the future. Ride-sourcing companies have focused on social and recreational trips, but their popularity and market value could allow them to eventually expand to commuter trips on a large scale.

"Public transit isn't going anywhere. Government will continue to fund it, but private options aren't going away either. How do we create a system that aligns the priorities for all parties?"

- Josh Cohen
Director of Strategy and Partnerships, TransLoc

Micro-transit has emerged into the market through services like Leap, Bridj, and UberPool. These ride-sharing models are akin to the dollar van operations that took root in New York City during a transit strike in 1980. Today, the dollar vans operate mostly in underserved, low income areas of the city. Some of them are regulated, and all provide much needed service, extending the reach of public transportation. Unlike the dollar vans, however, micro-transit companies created a two-tiered system that is quite controversial. Without dialogue between micro-transit and public transit providers, it is difficult to determine how best to equitably provide access to service for an entire community.

Many officials in the transportation industry see new mobility providers as competition. However, Chief Executive Officer Gary Thomas from DART sees technology as a way to serve parts of the community that are more difficult to serve with fixed route transit, thereby expanding DART's reach. He acknowledged that DART never regarded the cab industry as their competition, citing the relatively small number of transit boardings at Dallas-Fort Worth Airport in comparison to the number of cab trips. In this case, public transit simply offers an option for the traveling public.

"TransLoc's mission is to take transit from a last choice for some to a first choice for all. How do we solve the mobility problem via technology of mobility management? It's not as simple as incremental decisions, but a holistic approach to integrate solutions."

- Josh Cohen
Director of Strategy and Partnerships, TransLoc

Tech firms do not necessarily see themselves in the same market as transit. They are software or technology companies, not service providers. They have entered the market to provide more options for transit agencies to solve problems. Their presence demands restructuring of the procurement models that agencies have used in the past in order to allow them to compete for transit work. This brings more competition to the industry, a benefit to the public agencies, but requires more attention on the part of the agencies to manage additional specialized vendors.

Technology interviewees expressed an earnest desire to work with public transit to improve mobility. Tech firms wish to innovate to the benefit of the public, giving people freedom and flexibility in transportation. They are not bound by the same rules that tie the hands of government agencies. The opportunity lies in finding the symbiotic relationship between the government and private industry.

TransLoc, a purveyor of real-time bus information and trip planning software, demonstrates the alignment of motives between new mobility providers and traditional transit. As the company's Director of Strategy and Partnerships Josh Cohen stated, "TransLoc's mission is to take transit from a last choice for some to a first choice for all. How do we solve the mobility problem via technology of mobility management? It's not as simple as incremental decisions, but a holistic approach to integrate solutions." TransLoc believes this approach is consistent with the direction the industry is headed. They want to structure their business in a way to make transit succeed. They see value in working together for the benefit of the customer and the agency.

CASE STUDIES

We can organize Collaborative Mobility opportunities into four major categories that facilitate the passengers' total journey experience.

- Traditional approaches
- Service/operation innovation
- Last mile services
- Technology and information integration

Traditional Approaches

Traditionally, public transit agencies have long sought to provide new and enhanced services to facilitate the mobility of the riding public. These solutions have been focused on:

- Service expansion such as new routes or stations
- Expanded service hours or frequencies
- Facilitating connections between transit services (e.g. bus to rail, rail to ferry, etc.)

While these approaches are important methods of serving the traveling public, this study is focused on the emerging examples of how agencies are facilitating the total journey experience that are reflected in the other three categories – Service/Operation Innovation, Last Mile Services, and Technology and Information integration.

Service/Operation Innovation

Changes in the planning and operation of service to facilitate greater mobility are exemplified by the following:

- Some agencies in Europe, which outsource their public transportation operations, have structured their contracts in a manner that shifts revenue risk to the contractor. In Lyon, France the transit operator is contractually obligated to generate a certain annual revenue goal. If that level is not achieved, the operator is required to make up the difference. Anything above that level augments the contractor's profit margin. This structure incentivizes contractors to increase the market share of transit, which inherently maximizes mobility.
- Stockholm has used new technology to monitor service and manage headways to limit vehicle bunching.
- Via is a shared-ride transit provider operating in Manhattan. Customers request service by using the firm's smart phone application, which includes the customer's origin, destination, and payment information. Via has developed proprietary software to optimally dispatch deviated fixed-route transit services in real-time, based on customer requests. Because much of the route optimization and dispatch function is automated, a skeletal crew of only one or two persons is needed to supervise the service. In the future this technology could be applied by public transit agencies to simplify dispatch and management of complementary paratransit services.

Formidable Players in the New Mobility Market

Moovit generates less than $1 million USD per year. However, in the market, Moovit is valued at approximately $500 million USD. Other technology firms like Uber and AirBnB share similar statistics in that the companies own few assets but have high market value. A natural next step for companies like Moovit and Uber is to move into booking and payment systems. By doing so, they could charge a fee to the transit agency for each ticket sold through mobile applications.

The Lyon and Stockholm examples are profiled in further detail below.

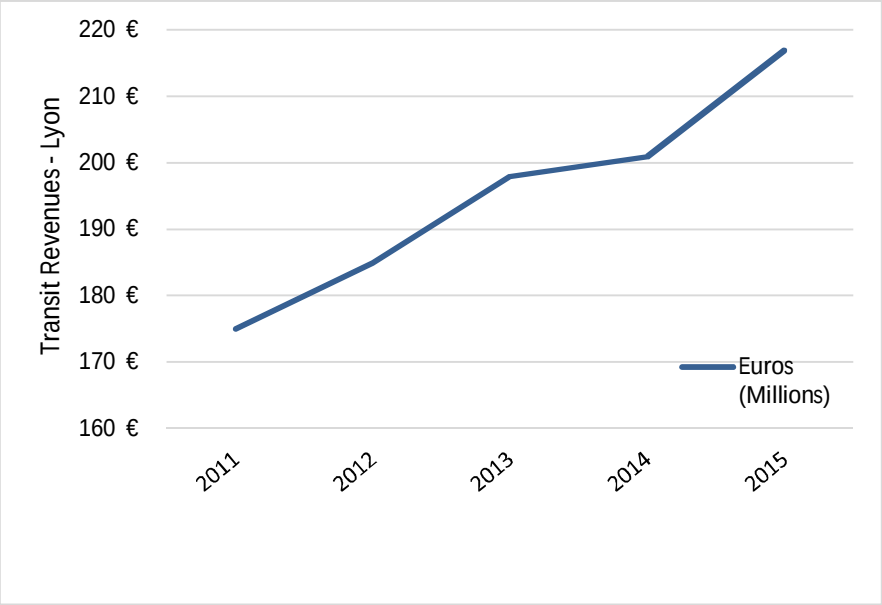
Lyon, France: Transferring Risk to the Contractor

In Lyon, the agency transfers revenue risk to the private contractor (Keolis). This inherently maximizes mobility, as the contractor is incentivized to increase market share in order to achieve their own profitability goals.

Through a series of initiatives, transit revenues related to this particular contract have increased by approximately 24 percent over the last five years, as summarized in Figure 2. These initiatives include:

- Promotional activities and information sharing
- Fraud reduction
- Maximizing revenues related to the public agency's network expansion initiatives
- Reorganization and optimization of bus routes

Figure 2. Growth in Lyon, France Transit Market Following Revenue Risk Transfer



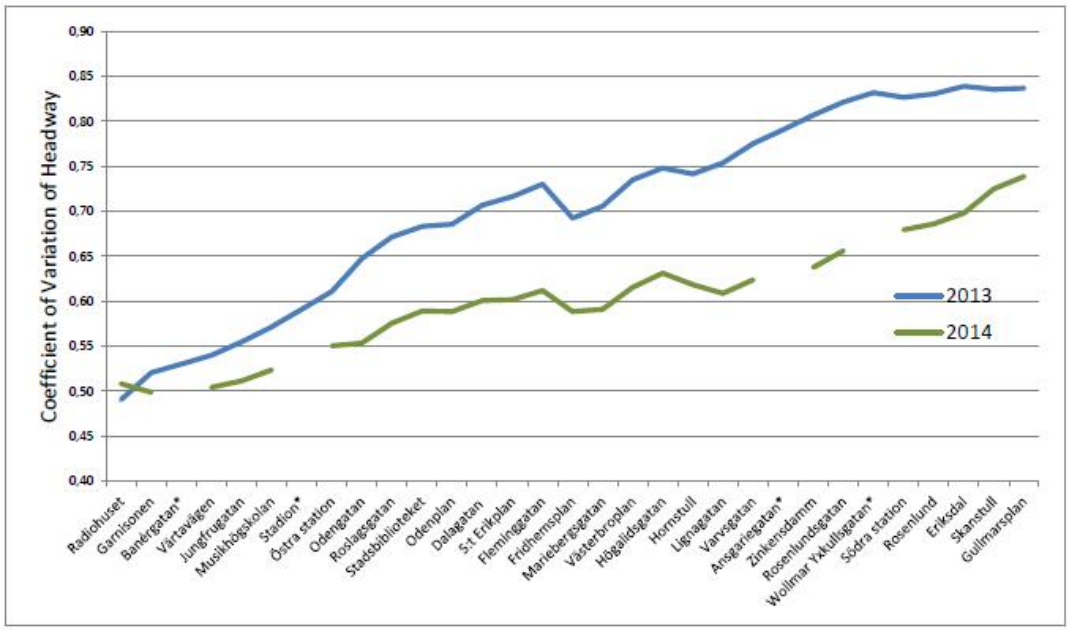
Stockholm: Improving Service Efficiency

In Stockholm, a collaborative pilot program between the public agency Storstockholms Lokaltrafik (SL), private operator (Keolis), the local traffic authority, and the Royal Institute of Technology (KTH) was conducted to improve service efficiency. The project involved a real-time, headway-based holding strategy, which resulted in:

- Higher speeds (a gain of 7 percent), resulting in a 10 percent decrease in passenger in-vehicle times
- Shorter cycle time (8 minutes less)
- 25 percent reduction in passenger waiting time based on less bunching and improved headway regularity
- Approximately half of the regularity improvements were due to the headway-based holding

Figure 3 summarizes the change headway variation on one Stockholm bus route between 2013 (in blue) and 2014 (in green), documented by Cats, et al., in the report "Evaluation of RETT4 Pilot Study – Empirical and simulation analysis of bus and passenger time savings." As the bus proceeds along its route, headway variation typically increases, but new tools have helped the transit operator better manage headways. Headway variability is calculated as the ratio between the standard deviation and the mean headway. It shows a clear improvement in overall regularity with a 15 percent reduction in headway variability.

Figure 3. Change in Stockholm, Sweden Headway Variation from 2013 to 2014



Last Mile Services

This category extends passenger mobility by coupling with other service providers to reach "last mile" locations, which are beyond the reach of traditional bus or rail transit services. It includes bikeshare, carshare, and transportation networking company services.

- Transportation networking companies like Uber and Lyft provide an app-based method of hailing a car and paying for service. Like many "last mile" options, they provide a new way of extending transit's reach.
- Bikeshare systems provide a public network of bicycles for use by annual members and short-term users to travel from point to point within a service area. Bikeshare systems often focus stations in central business districts and adjacent neighborhoods, but sometimes blanket an entire city or metropolitan area. Services were pioneered in North America in Boston, Montreal, and Washington, D.C. in the mid- to late- 2000s and have since spread to hundreds of other cities. Programs depend on wireless communications and information technologies to secure and release bikes for use only by authorized customers. Many cities have located bikeshare stations at or near rail stations in adjacent areas one-quarter to one mile away from rail. This facilitates bike travel to and from the rail stations. Bikeshare use is often highest at stations near rail stations, as biking is a natural way to access transit.
- Carsharing provides a short-term car rental for personal use. Cars are typically parked on streets or in garages accessible to commercial and residential areas. Customers are generally members of the carshare service, paying an annual fee and usage charges that vary based on time and distance traveled. Like bikeshare, carsharing has been enabled by wireless and information technologies that make it possible for carshare companies to secure and release vehicles remotely, without the counter

agent typical of traditional car rental agencies. Traditional carsharing companies like Zipcar require cars to be returned to their checkout location, while other companies, like Daimler's Car2Go, permit users to pick-up and drop-off vehicles at any legal parking space within the service district. This second generation carsharing augments transit service by providing access from Point A to Point B, without requiring any backtracking to return to Point A. Portland, San Francisco, Washington, and Chicago pioneered reserved carshare parking at transit stations during the 2000s, which has become a fixture of the urban landscape.

Established public transit agencies with limited resources for first/last mile services should consider reaching out to bike share or car share to allow room for these types of vehicles to be parked at train stations and transit hubs, as well as installing bike racks on buses or designated areas on trains, making public transit more attractive for those who need that last mile connection. Partnering with industrial parks to establish van pool connections with train times during business hours would benefit these businesses as well. Many agencies have installed bike racks on the fronts of their vehicles. New York City Transit (NYCT) has recognized the need for these bike racks and is beginning to place them on the front of their vehicles. Eastern Contra Costa Transit Authority, Tri Delta Transit, has made space available on the vehicles for either bicycles or strollers in a designated area.

Technology and Information Integration

A number of services use new technologies to provide trip planning, fare payment, and other services to customers via mobile devices. These applications provide information and flexibility for passengers to more effectively use transit.

- Fare Payment: In Chicago, the mobile payment and ticketing company GlobeSherpa has developed the region's first integrated fare payment system for all three major transit service providers, the Chicago Transit Authority (CTA) bus and rail, Pace suburban bus, and Metra commuter rail. Users can demonstrate fare payment to bus drivers and train conductors by showing a secure screen image on their mobile phones, or activate fare gates at el stations using phones' near field communications technologies. This facilitates transit use by simplifying the steps required to pay for each service.
- Trip Planning: In the Raleigh-Durham-Chapel Hill Research Triangle, the tech firm TransLoc is providing single platform trip planning across all eight transit operators in the region. The system includes live information regarding the location of buses, so users can learn not only when the next bus is scheduled to arrive, but also the physical location of that bus in real-time.

SEPTA Partners with TMAs and DOTs

The Southeastern Pennsylvania Transportation Authority (SEPTA) continually partners with local and state agencies to improve mobility and accessibility. Transportation Management Associations (TMAs) provide the first/last mile to many business complexes throughout the Greater Philadelphia area. The connections are coordinated with SEPTA's backbone rail and bus services.

SEPTA also maintains regular communications with state and local Departments of Transportation (DOTs) to orchestrate detours and service impacts to minimize disruption to operations resulting from scheduled road work projects. The results of these communications ensure that customers receive correct schedule information.

These efforts help increase the customers' confidence when taking public transit.

- Real-time Information: Globally, Moovit is a single app that aims to provide seamless connectivity—including real-time arrival and departure information, schedules, maps, and service alerts—for transit agencies around the world. The company also analyzes location information reported by app users to inform trip planning based on real-time data.
- Passenger-focused Technology Solutions: In the Silicon Valley, the Santa Clara Valley Transportation Authority (VTA) is using new in-vehicle technologies such as low-energy Bluetooth beacons and mobile communications to develop new services in-house to improve the customer experience. These tools will provide remote access to information such as whether the next bus has room for a bicycle or wheelchair and whether the bus is on time. VTA is also developing a tablet-based kiosk to provide trip information to customers without smartphones and for customers to request a bus stop from a shelter. Other technologies will provide detailed step-by-step instructions aimed at helping visually-impaired persons find bus stops. As VTA demonstrates, creative public transit agencies are capable of leading the development of cutting-edge passenger-focused technology solutions.

Providing real-time data to the customer enhances their experience. Allowing the customer to have information at their fingertips telling them whether their ride is on time or running late, and how crowded the vehicle is, all improves their level of confidence in public transit.

Mobile/Data Opportunities

Mobile technology can be used to improve communications, provide convenience, and expand opportunities to attract new riders. In addition, data collected from mobile applications can help the agencies target improvements and strategically plan communications with the customer. Empirical data suggests a very high penetration of mobile device use across all demographic categories. This debunks the myth that mobile applications will only serve Millennials, tech junkies, and affluent populations. Given this tremendous market exposure, transit agencies should consider the value public transit could gain through the development of mobile software platforms, in partnership with tech firms.

A technology platform can be adapted for use beyond a payment system. It can even be used to collect data to help the agency improve service. The Collaborative Mobility team spoke to Nat Parker, CEO of GlobeSherpa, to learn about his company's efforts to provide flexibility within a software platform to address an agency's needs. For example, GlobeSherpa is using technology to help the Los Angeles Department of Transportation (LADOT) correlate ticket validation with specific stops and vehicles. This data will allow LADOT to analyze hotspots of activity, trip type, passenger type, and time data to show where, when, and how people are moving. Using this data, LADOT could target top retail

Real Time Data and Understanding the Customer

Agencies such as Santa Clara Valley Transportation Authority (VTA) and SEPTA have "hackathons" to allow interested programmers access to their trip data in order to create apps that will help the customer navigate the transit system.

Companies like GlobeSherpa provide software that can integrate fare payment through multiple agencies and also allow agencies to study customer travel patterns.

Smart Cities such as Nanjing, China have even used data they collect to improve air quality. Nanjing has experimented with a dynamic fare pricing model that encourages public transit use when air quality is poor.

or merchant partners for the purposes of advertising within their app. San Francisco Municipal Transportation Agency (Muni) uses its mobile ticketing application to allow users to rate their rides. GlobeSherpa has also developed apps that can aggregate data from multiple feeds to provide the most accurate information for the customer. Working with technology companies can provide endless opportunities to interface with the customer for the benefit of both the customer and the agency.

CHALLENGES

Our research has cited several examples of successful innovation and collaboration demonstrated within the transit industry. Those successful agencies were able to overcome some common challenges seen within the industry. Unfortunately, that is not the norm.

Through our extensive research with transit agencies across the country, we've heard how challenging it is for many of them to engage in collaborative partnerships with the numerous innovative startup companies.

"Current mobility systems adapt poorly to changing demands, are weak in combining single steps of the travel chain into an integrated offering, find it difficult to learn from other systems, and shun an open competitive environment. Collaboration on solutions is rare. Rewards for investors are rather meager."

- Future of Urban Mobility 2.0

The Future of Urban Mobility 2.0 report, published by Arthur D. Little and the International Association of Public Transport (UITP), stated the challenges succinctly:
"Current mobility systems adapt poorly to changing demands, are weak in combining single steps of the travel chain into an integrated offering, find it difficult to learn from other systems, and shun an open competitive environment. Collaboration on solutions is rare. Rewards for investors are rather meager."

There are legitimate reasons that explain public transit's inability to adapt to change. It helps to think in terms of public transit agencies being the marathon runners. They are efficient, predictable, long-term planners who take a very methodical approach to solving problems and as a result are typically slow to bring new ideas to market. By contrast, the innovative mobility startups are sprinters who are fast, agile, and flexible.

Risk Aversion

Public transit, by its nature, has to manage risk. Public agencies are accountable to the taxpayers and are often governed by a Board of elected officials. As such, the threshold with agencies is that everything always has to work; failure is unacceptable. This attitude is not always good for the industry or the community. Ideally, public transit agencies should be encouraged to create an environment where it is safe to test new solutions, see if they work out, and, if not, learn from them and try something else. The lack of innovation from public transit agencies is the reason we have seen the recent proliferation of private transportation options from startups that are leveraging technology and data to address customer demands. In order to maintain a strong presence in this new mobility market, public transit agencies need a way to respond to the numerous innovative transportation modes that threaten to overwhelm them.

Creating a Bimodal Agency

There is an internal struggle occurring in transit agencies as they attempt to meet the demands of two distinctly different business needs: the need to provide stable and reliable performance and the need for flexibility and agility to deliver innovative results. Creating a bimodal structure could be a vital tool to address these challenges. Using a bimodal structure allows an agency to adopt two distinct approaches to meet its goals. One mode is focused on being agile and flexible; the other is centered on efficiency, predictability, and a step-by-step approach to solving problems.

In a presentation to Orange County Transportation Authority, Gartner, the world's leading information technology research and advisory company, shared their extensive research on the concept of operating a bimodal agency. The firm's research has shown that a Mode One team likes to plan in advance. It prizes predictability, reliability, coherence and consistency; less important is the ability to leverage uncertainty and speed to create advantage. The Mode One mindset is to do things linearly, step by step. Stage-gated approval processes are viewed as the way to ensure quality. As in a marathon, the Mode One team adopts a slow but steady pace to win the race.

In contrast, according to Gartner, a Mode Two team believes that when operating amid uncertainty, you don't have to be slow to achieve high quality and to be secure. The Mode Two mindset recognizes that the agency often cannot know exactly what it wants, so a complete set of requirements may be moot. To achieve outcomes, a Mode Two team relies on short feedback loops rather than heavy oversight, while recognizing that without discipline, the benefits of agility and speed are lost. The Mode Two team is in a sprint rather than a marathon, with speed and agility counting more than a sustained, methodical pace.

To be successful, a bimodal agency must find people with a Mode Two mindset, adopt a non-linear development approach, and find relationship managers who act as innovation managers. A high performing team cannot consist solely of disruptive innovators and thinkers; you have to intersperse it with highly talented and steady performers. One of the most difficult challenges is having an executive team that embraces uncertainty and relinquishes the need for predefined plans to achieve a big goal.

Los Angeles Metro Chief Executive Officer, Phillip Washington embraces this concept. In our interview we learned about Mr. Washington's plans to create the Office of Extraordinary Innovation (OEI) to champion new ideas and improve mobility in Los Angeles County. The purpose of the OEI is three-fold:

- Allow innovative staff access to the Metro decision makers;
- Support Metro departments in piloting new and experimental programs and policies; and,
- Shepherd new ideas from entrepreneurs, established private sector entities, academia and private citizens.

Transitioning to a bimodal agency is a critical step for an agency to compete effectively with the numerous technology-driven innovative mobility startups. It could make the difference between agencies being the integrator versus being integrated. If public transit agencies don't act, external providers will fill the void. As external disruptions mount, they are increasingly driven by unlikely players. Who would have guessed the rapid growth of Uber, which has quickly become a fifty billion dollar company and a significant disruptor within the transportation industry?

Procurement Opportunities

Another major barrier to successful collaboration is current government procurement rules. Procurement policies tend to stifle vendor innovation by being overly prescriptive. In other cases, the public transit agencies

must award projects to a single vendor, a practice that tends to discourage proposals from some of the innovative, best-of-breed companies who may be good in one area, but weak in others. Public agencies need to be able to test new ideas in a safe environment to allow them to experiment with innovative ideas, something they are not encouraged to do at present.

Changing the way agencies do business with smaller vendors could provide benefits to both the agency and the customer. Technology companies often focus their products in one specialty area, but when agencies combine too many requirements into a single request for proposal, it limits the ability of the specialized technology firm to propose. This is not conducive to free market competition.

Larger companies who currently have a monopoly on the market may not be able to deliver certain components of the contract as well as a niche technology firm, but due to their breadth and established connections, they are often awarded the contract. In addition, larger companies can make it difficult to share data with third parties if they use proprietary means to collect that data. This further restricts the ability of a transit agency to work with other vendors and the resulting lack of competition is not in the best interest of the public.

In addition, procurement requirements should be written in the context of the services provided. For example, specifications for rolling stock may be much more rigid due to safety and efficiency requirements, but in contrast, software or technology procurements may need to incorporate intermediate milestones to test new concepts under development. They also need to have rigorous performance measures written to support the expectations for outcomes. As with rolling stock, the agency has the ability to craft contract provisions to require a pilot (vehicle or beta version of software) to test before moving forward with a full contract, option, or extension.

In our research, we learned of great successes when public transit agencies have modified their procurement rules to address these issues. Josh Cohen, Director of Strategy and Partnerships with TransLoc, spoke at length about the impacts to innovation that rigid government procurement policies create. TransLoc started in 2005 with the goal to improve communications to transit passengers. The founders had a vision to be able to show buses actually moving along their routes. An opportunity for collaboration was created in 2011 when Triangle Transit envisioned a regional real-time information interface with the goal of allowing riders to track real-time information from eight different providers seamlessly using one application.

Fortunately, Triangle Transit had the foresight to separate several key components of their procurement where many agencies would have just combined them. Instead of putting the on-bus portion of the software with the rider-facing tools, they separated the two to see whether they could have a better outcome. The result was two different requests for proposals, one for the Automatic Vehicle Location (AVL) and back-end tools, and another for the rider-facing tools. They recognized that the skill-sets required to be good at AVL are different than the skills required to provide optimal service to riders. One vendor provided the on-bus hardware, and TransLoc provided the passenger-facing hardware. Triangle Transit was able to get the AVL that met their needs, as well as a robust passenger solution. If the requests for proposals had been combined, neither of the winning vendors would likely have bid. In this case, the challenges of having different solutions outweighed the cost of handling separate vendors.

Role of Regulation

Regulation has become synonymous with safety. Although regulation certainly has a role in improving safety, it also impedes technological advances and stifles innovation. Unfortunately, a disproportionate amount of the discussion related to the new mobility players has been centered on regulatory concerns and the implied risks

to the customers. Regulation will play a role in shaping the new environment, but the public transit industry is mistaken if they think regulation will impede the growth of these new companies. Instead, the focus of public transit should be on how to increase collaboration, with the understanding that regulation will be addressed along the way.

Government agencies have attempted to stop new mobility providers under the auspices of regulatory authority. Competing businesses such as taxi companies have protested the lack of regulation on these businesses as well. When met with obstacles, startups simply adjust their business models and continue on. The level of consumption of these services is testament to their wild popularity and the fact that they are producing something customers demand. Instead of expending the resources to try to stop services that customers really want, the Collaborative Mobility team sees opportunities to partner with these companies to grow the transit market.

Not all companies play by different rules. Via is an alternative mobility provider that is fully licensed and regulated by New York's Taxi and Limousine Commission. Via voluntarily took this approach as a conciliatory effort to demonstrate their willingness to work with public agencies to advance the public interest. Via's service model began as a pilot and expanded incrementally to become a much larger service area. Via service does not match fixed route transit. Instead, it operates an on-demand, dynamic, and flexible service to best serve the customers. Via follows the same rules as the taxi companies.

Sometimes concerns or misunderstandings over regulations can stop collaboration with third party providers. In the case of Uber, we hear over and over again about their unfair advantage because they don't play by the rules. The rules being that they aren't as regulated as traditional modes, such as taxis or limousines. These issues raise concerns for the transit agencies when it comes to exploring possible partnerships.

The problem is that the rapid growth of Uber shows that the customers don't seem to care about public transit's bureaucratic concerns. In fact, as of March of 2015, the number of Uber vehicles in New York overtook the number of medallion cabs, and in San Francisco, Uber's gross revenues eclipsed the taxi market by a 3.5 to 1 ratio and continues to grow at a rate of 200 percent per year. If public transit agencies don't start thinking more like technology companies, the numerous innovative transportation modes will simply overwhelm them.

The rapid growth of Uber shows that the customers don't seem to care about public transit's bureaucratic concerns.

TriMet and VTA are both good examples of the benefits of transit agencies thinking more like technology companies. TriMet Chief Executive Officer Neil McFarlane discussed the benefits of adopting a private sector mentality and creating an entrepreneurial agency.

TriMet pioneered the open data concept. In 2005, TriMet partnered with Google as the first transit agency to release schedule and arrival data to the public. TriMet partnered with Google again in 2015 to provide riders real-time transit information from Google's Bluetooth low-energy beacons. The beacons have since been deployed across the Portland area MAX light rail transit stations and are currently operational on 87 station platforms.

To further encourage collaboration, TriMet attempts to reduce the risk to the vendors in their procurements, particularly on new and innovative ones, by not being too prescriptive in their scopes of work and allowing the innovative companies to leverage their knowledge. Not only does it encourage more bids, but it typically lowers the cost. TriMet also accepts unsolicited proposals to encourage innovative companies to collaborate and share their ideas. Mr. McFarlane emphasized the importance of encouraging experimentation. It has to be acceptable to fail in the pursuit of excellence as long as you are prepared to address any fallout.

VTA Chief Information Officer Gary Miskell described the immense value they gained by partnering with Silicon Valley to bring new technologies into VTA. VTA embarked on a mission to rethink each phase of a customer's touch point and how they could use technology to improve it. This resulted in an improved open-sourced trip planner that leverages real-time data and incorporates multiple transit modes. VTA enhanced their mobile services by deploying Bluetooth beacons to increase the information provided to their customers. VTA is also experimenting with using forty foot express buses to deliver on-demand services using a subscription based flexible model, as well as true on-demand services for short-haul service within a geo-fenced service area. Mr. Miskell summed it up by stating, "VTA looks more like a startup now."

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The Power of Data

Despite all the challenges public transit agencies face, they are actually in an enviable position and hold more power than they think. The data that they collect has a high market value to innovative private companies. The ability to know the "who, what, where and when" of potential customers opens up a host of opportunities. However, in some cases there seems to be an unwillingness to share this data, particularly between different mobility players with different business models.

What is interesting is that some of the more successful players are enhancing, and could eventually replace, traditional transit data with crowd-sourced data. This is particularly evident with Moovit. Moovit offers real-time public transit information across multiple transit modes. Moovit pings users about how crowded their bus or train is, which is shared to riders further down the route. Users can also share information about accidents or delays, or provide information about the vehicle itself such as whether it has Wi-Fi or is wheelchair accessible. If you doubt the power of crowd-source data, consider that Moovit already has more than 20 million users worldwide and collects over 10 million user-generated reports

"The amount of information Transit Agencies have at their disposal gives them a huge opportunity to be leaders. They know how things really happen around the city, from a mobility perspective. They shouldn't be so humble. Step up and be BOLD."

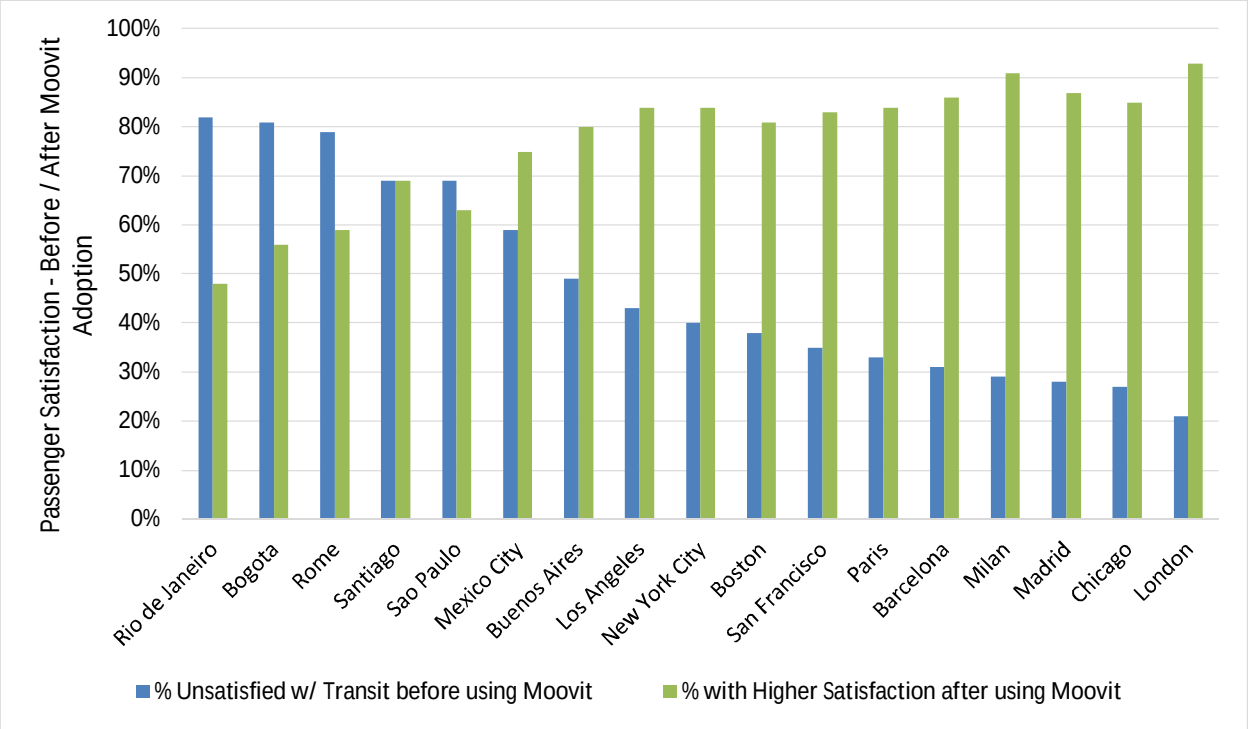
- Alex Torres
Vice President, Global Product Marketing, Moovit

each day. Their latest figures show that they exist in 600 cities and 55 countries, and they are growing at approximately one million users per month.

Moovit: Improving the transit experience through crowd-sourced service data

As Figure 4 illustrates, crowd-sourced data has improved passengers' public transit experience by proving better on-time arrival information. The graph summarizes the percentage of passengers from selected cities who were unsatisfied with transit before using Moovit and the percentage who expressed greater satisfaction with transit in each city after using Moovit.

Figure 4. Passenger Satisfaction Before and After Adoption of Moovit



Crowd-sourced data could easily replace the need for public transportation agencies to release real-time data collected through automatic vehicle locator systems. Crowd-sourcing is real-time, and the aggregated data in effect allows upstream users to understand what to expect for the trip ahead.

Uber, Moovit, and others are positioning to become the integrator. As these companies monetize, it is possible that they will become the central point for purchasing your entire trip, end to end. The potential impact on the transit agencies is similar to the impact that companies like Expedia and Travelocity have had on the travel industry. There is no longer a need to contact a hotel to book or pay for your room. That entire industry was integrated into the online travel agency model. As a result, hotels lost a significant percent of their revenue, and more importantly their customer touch point.

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The Collaborative Mobility project team was provided unprecedented access to many of the key players within the innovative mobility arena. Throughout our interviews we discovered a common theme. All expressed a strong desire to partner with public transit agencies to delivery new and improved mobility solutions.

We asked Silicon Valley executive Alex Torres, Vice President, Global Product Marketing for Moovit, what advice he would give to transit CEOs regarding the new vision for mobility. What he said was encouraging: "The amount of information transit agencies have at their disposal gives them a huge opportunity to be leaders. They know how things really happen around the city, from a mobility perspective. They shouldn't be so humble. Step up and be BOLD."

LEADERSHIP STRATEGIES

Achieving the Total Journey Experience will be met with numerous challenges. Transit leaders must therefore develop strategies, prioritized in order of impact, to overcome the hurdles described in this report.

Considering the reported challenges faced by transit agencies as they've pursued collaborative mobility, the largest hurdle is risk aversion. Embarking on new partnerships and relying on non-traditional service providers tends to raise the risk antennae over concerns about:

- Risk
- Organizational structure
- Procurement rules
- Regulations and safety
- Open data

While these concerns must all be addressed and taken very seriously, let's consider the impact of risk-averse behavior on our ability to react to a quickly evolving transit market. Fear slows us down considerably. It was therefore not surprising that, when we asked our research participants for leadership strategies, most responses related to *speed*.

Action Plan: A Renewed Focus on Speed

Speed is a familiar measure for those of us in the transit business. In fact, we measure ourselves in terms of speed every day (e.g. System Speeds, Passengers per Mile, Productivity, etc.).

DART's Uber Partnership

Dallas Area Rapid Transit is one example of a transit agency enhancing its last mile connectivity by partnering with the transportation networking company Uber.

Users of its GoPass app can evaluate trip planning options, including connections between transit and Uber—right in the app.

This facilitates travel in and around Dallas by integrating a last mile option into customer's planning tools.

In the future, GoPass users will be able to book the Uber car right in the GoPass app.

Other transit agencies, such as MARTA in Atlanta, are also developing relationships with Uber and other last mile providers.

Some regions also include Uber and Lyft as options in their Guaranteed Ride Home programs, which provide carpoolers and regular transit passengers free rides home in the event of family emergencies or unexpected late hours at work.

Our findings show that we must now look internally with a renewed focus on speed. Specifically, we must challenge ourselves to increase our *speed to market*, as this is the very skill giving the new mobility providers an ever-increasing advantage over traditional transit modes.

The following topics outline strategies provided by our research participants, and they all contribute to an improved "speed to market" as we pursue collaborative mobility partnerships. While these strategies originated from varying perspectives (transit executives, technology leadership, consultants, and research organizations), they were echoed across industry lines and across competencies. Each strategy relates to the others, and they have a major focus on innovation, risk mitigation, and collaborative partnerships. The proposed action plan to increase our "Speed to Market" is outlined below.

Vision	Goal	Strategies
Total Journey experience	Increase Speed to Market and Engage in Collaborative Mobility	• Create a culture of innovation by encouraging disruption • Provide outlets for creativity, while minimizing risk, through regular pilot programs • Embrace the return on investment (ROI) on high levels of talent • Relentlessly pursue partnerships outside of traditional transit, including the customer • Sell these new approaches to stakeholders by relating them to existing practices • Lead the pursuit of collaborative mobility

Create a Culture of Innovation: Encourage Disruption

The term we hear often when discussing the innovative mobility players is "disruption" because these new technologies and approaches are constantly challenging status quo. Disruption is often the result of a creative idea that gains momentum, frequently due to customer interest. Often times, it causes angst at the onset because we're forced to change not only our standard operating procedures, but also our mindsets.

Even so, our findings contend that this type of disruption is positive, as it forces our industry to advance along with technology, and often results in more efficient and effective approaches. For this reason, we asked the question: How can traditional transit organizations be a little more disruptive in their business strategies?

Overwhelmingly, we heard that the disruption, by way of creativity and innovation, has to come from our employees. However, in a traditionally risk-averse industry, how do we encourage our employees to bring forward their innovative ideas? The strategies we uncovered focused on one key element - *making it safe to be creative*. The following items are two "quick wins" that can be implemented to begin making this cultural change:

- Evaluate employees on their innovative and creative thinking, and tie financial incentives to it.
- Ensure that innovative successes *and failures* are rewarded. Instead of saying "failure is not an option," we should say: "Failure is absolutely an option, as long as it occurs in the pursuit of progress. We

should try to break things along the way, debate the reasons for failure, and charge forward with a renewed sense of purpose." Intermittent failures allow us to improve processes and get us to excellence much faster than trying to make it perfect the first time around.

Once these strategies are implemented, leaders can engage in a quick sanity check. When meeting with key managers, or while present in your managers' meetings, observe staff's willingness to speak up. If everyone around the table is nodding in agreement, look out! It may mean that it still isn't safe to express different opinions and new ideas.

Outlets for Creativity: Pilot Programs

Our research participants acknowledged that new business practices are always accompanied by new risks, which must be controlled. To address this concern, one strategy employed across multiple industries is the regular use of pilot programs. Many organizations are testing innovative ideas through the use of regular pilot programs. Pilot programs allow organizations to test new business practices, resulting in the following benefits:

- Lowers risk, as they are performed in a controlled environment
- Easier to sell to stakeholders, as the commitment levels are much lower – again, limiting risk
- Motivates the employee. Employees have to believe that their ideas can and will make a positive impact on the organization. This practice also supports the culture-change strategy of encouraging disruption.

In fact, both inside and outside of the industry, innovation departments are emerging as a breeding ground for demonstrating a proof of concept. These departments are designed to conceptualize and manage potential new business practices and orchestrate the resulting pilot programs in a controlled environment.

- LA Metro is establishing a "Department of Extraordinary Innovation."
- In addition, VTA in the Silicon Valley has established an Innovation Center, holding regular "hackathons" and developing new operating approaches and technologies.

Establishing innovation departments to manage pilot programs may be a good way to build a Mode Two team, as referenced in the Challenges section of this report.

Innovation in other Industries

Public transit isn't the only industry pursuing innovation departments. In fact, our research found that the finance sector (another traditional, highly regulated industry) is hiring more and more people for "innovation" positions. The purpose of this employee group is to challenge status quo and experiment, through pilot programs, with new ways of doing business in a controlled environment. These low-risk pilots, once tested and proven, ultimately may result in companywide initiatives. This not only lowers risk, but gives the employee regular opportunities to make a meaningful impact on the business as a whole.

Strengthen Your Team: ROI on Talent

Achieving success with these strategies requires the right talent. It was stated by some of our research participants, and most clearly from the technology industry, that we must pay a premium for talent if we want to make significant progress. We were advised that, for key positions that require innovative thinking, we should stop looking for $100,000 talent and instead go after $200,000 talent. At the same time, a less-frequently discussed strategy disclosed to us from inside a public transit agency was that we must quickly identify the employees that stifle innovation and consider the ROI on severance packages for those who are not willing to change. This strategy was deemed to be equally important.

Relentless Pursuit of New Partnerships: Collaborative Mobility

To achieve the Total Journey Experience, we have to ensure that we're pursuing partnerships outside of our organizations. Our research suggests that the earlier a transit organization brings alternative perspectives into the discussion, the faster we can identify the critical factors to making successful change. We must relentlessly pursue innovative partnerships and make sure the right players have a seat at the table, including:

- Other agencies (DOT, Utilities, Housing Authorities, etc.)
- Politicians and elected officials
- Technology companies (Lyft, Uber, Via, Moovit, etc.)
- Private contractors (Keolis, Transdev, MV, First, etc.)
- Translators (someone who can bridge any gaps in understanding… technologically, operationally, or from a public policy perspective)
- The Board – make them part of the discussion, creative thinking, and decision-making in order to gain early buy-in
- THE CUSTOMER

It was acknowledged, on multiple occasions in our research, that the customer is sometimes overlooked in this equation. Decisions are often made based on operational considerations, such as fleet availability or where influential stakeholders want routes to go. However, our findings show that we must intensify our focus on the customer.

The new mobility customer wants us to share in their digital world. Real-time, relevant information is precisely why these new transit technologies are growing so rapidly – they're giving the customer exactly what they want. Collaborative mobility brings technology and the customer into the discussion with public transit, encouraging all parties to work together to create the total journey experience, rather than each operating independently.

Bringing the right players to the table, including the customer, allows us to achieve our collaborative mobility goals.

Selling the Concept: Make it Familiar

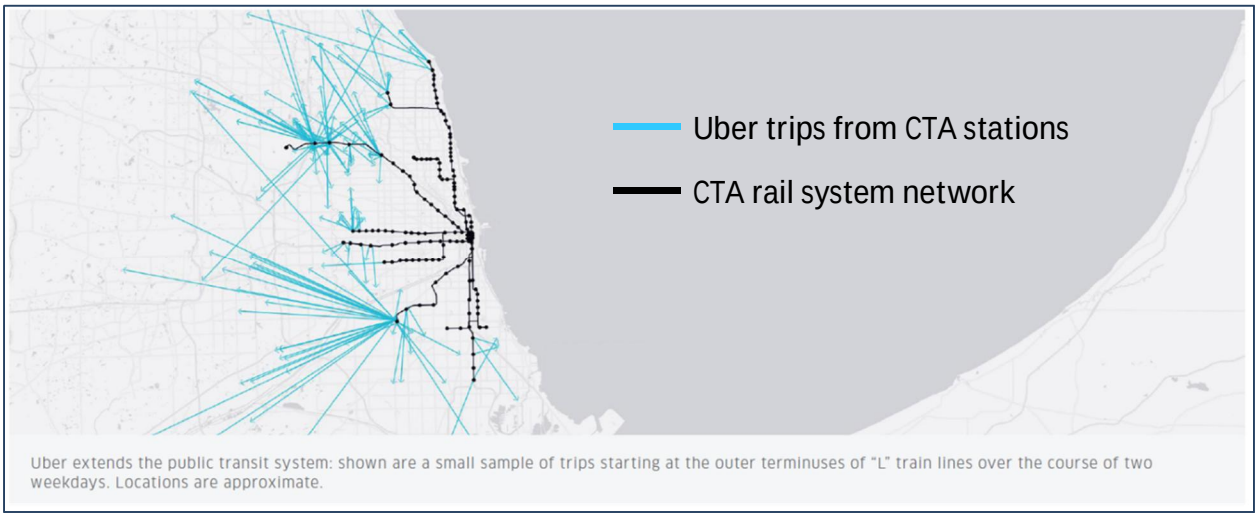
While these new approaches may seem frightening in a traditionally risk-averse industry, we must acknowledge that many agencies are already doing things that did not seem ordinary just a few years ago, such as partnering with taxi companies for supplemental paratransit service. The precedent of engaging in such partnerships begs the question, "Why not?"

For example, what if we viewed supplemental taxi service, now a familiar approach, in the same light as a new feeder service collaboration with Uber or Lyft? Would we have the same concerns about safety and service quality? Have some of these concerns been addressed already under another operating scenario?

Demonstrating the similarities between previous practices and newly-imagined innovation may increase the speed at which risk strategies are developed and accepted by our stakeholders.

Whether we can promote these new innovative ideas quickly or not, the reality is that the integration is already happening. Our research suggests that partnering with these new mobility providers isn't really a question of "if," but "when." Partnering with other organizations to feed our transit networks could extend mobility in ways previously unimaginable.

Figure 5. Heat Map of Uber Trips from CTA Rail Stations around Chicago, Illinois



In Figure 5, the blue lines represent Uber trips from Chicago Transit Authority (CTA) rail stations to final destinations. Imagine if we embraced these new technologies as collaborators rather than viewing them as competitors. The potential for additional feeder services without significant capital investment is an exciting prospect, and could likely result in transit maps with even more blue lines!

Embrace The Opportunity: Lead the Charge!

As transit leaders, we have huge opportunities to maximize mobility. However, there is one last and critical reality we must acknowledge. These new technologies and mobility players *are not the competition*. They should be viewed as complementary accelerators of our vision for the total journey experience. Leading these collaborative partnerships will allow us to increase the market share of public transit, improve mobility and accessibility for the customer, and stay relevant in this rapidly-evolving mobility environment.

Our findings challenge industry leaders to:

- Acknowledge that the new mobility market, driven by changing customer expectations for mobility, is on an inevitable path to delivering a Total Journey Experience, provided by more than just the traditional transit modes and requiring an intense focus on the customer.
- Confront challenges, such as risk-averse behaviors and opposition, by increasing our speed to market through innovation and culture change.
- Develop collaborative relationships, including peer organizations that have already embarked on Collaborative Mobility concepts, in order to accelerate our transition to the Total Journey Experience.

Together, we can promote the role of traditional public transit by securing our spots as leaders in this movement.

BE BOLD!

The emergence of these new mobility and technology players present a “make or break” moment for traditional transit, and we learned the cautionary concept of the “integrator versus the integrated”. We contend that this is a significant opportunity for transit leaders. We learned that these new mobility players are not only hungry for rapid growth, but also for our participation and leadership in this total journey movement!

We must offer our leadership and mobility expertise to these new collaborators. Most importantly, we shouldn’t step up out of a fear of being left behind, but rather because we’re driven by a compulsion to turn unrealized potential into results. The future of public transit is counting on us!

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RESOURCES

Evaluation of RETT4 Pilot Study – Empirical and simulation analysis of bus and passenger time savings. Cats, Oshyani, and West, Department of Transport Science KTH Royal Institute of Technology, Stockholm, Sweden, 2015

Future of Urban Mobility Study, Arthur D. Little, 2011

Future of Urban Mobility Study 2.0, Arthur D. Little and UITP, January 2014

Land Transport Master Plan 2013, Singapore Land Transport Authority, 2013

Land Transport Master Plan 2008, Singapore Land Transport Authority, 2008

Public Transport Trends Report 2015, UITP, June 2015

Smart Mobility 2030: ITS Strategic Plan for Singapore, Land Transport Authority and Intelligent Transport Society Singapore, 2014

Strategic Directions and Ecosystems to Address China's Urban Mobility Challenges, Arthur D. Little, November 2014