



Transit Management: Information Dissemination

ITS Benefits, Costs, and Lessons Learned: 2017 Update Report

Transit Management Information Dissemination

- In-Vehicle Systems
- In-Terminal/Wayside
- Internet/Wireless/Phone

- Operations & Fleet Management
- Transportation Demand Management
- Safety and Security

Highlights

- Real-time transit traveler information can increase choice ridership by 40 to 70 percent.
- Providing transit travel times and departure information on highways can lead to a 1.6 to 7.9 percent mode shift from automobile to transit.
- TransitScreen multimodal mass transit information display boards provide onlookers with the ease of comparing options from various modes of transportation.



Introduction

This factsheet is based on past evaluation data contained in the ITS Knowledge Resources database at: www.itskrs.its.dot.gov. The database is maintained by the U.S. DOT's ITS JPO Evaluation Program to support informed decision making regarding ITS investments by tracking the effectiveness of deployed ITS. The factsheet presents benefits, costs and lessons learned from past evaluations of ITS projects.

In 2014, Americans took 10.8 billion trips on public transportation, which is the highest annual public transit ridership number in 58 years [1]. Even as gas prices have fallen in recent years, public transit ridership has remained strong as other concurrent trends have caused more people to ditch their personal vehicles and turn to public transit. Transit agencies are continually working to improve service reliability by providing customers with accurate service updates. As real-time information provides riders with increased predictability, less aggravation, and shorter wait times, agencies investing in real-time information systems increase rider satisfaction, and in turn help boost ridership.

Modern digital technology applications are changing the way we think about signage and information dissemination for the public transportation industry. The proliferation of mobile devices and real-time information have led to a shift over the past several years in the way transit agencies disseminate traveler information to their existing (and potential) passengers. Increased adoption of the General Transit Feed Specification (GTFS) by transit agencies has led to the development of transit traveler information mobile applications by third party developers in many cities, not just by the transit agencies themselves. Transit agencies continue to develop their own trip planning tools that are hosted on their agency webpages, but these trip planners only typically cover walking and transit directions. Map tools, such as Bing Maps and Google Maps, allow for a comparison between walking, transit and driving modes, but are still largely single-modal in nature.

Initiatives such as the U.S. DOT's Integrated Corridor Management (ICM) program and the Mobility on Demand (MOD) program seek to remove the modal silos and provide multimodal traveler information en-route in addition to pre-trip information as travel conditions change.

Real-time information provides riders with increased predictability, less aggravation, and shorter wait times.

Benefits

Increasing the pool of potential customers can be seen as a major benefit of improved information dissemination by the transit industry. The use of mobile trip information allows both visitors and infrequent system users to feel more confident in their ability to navigate that city's transit systems, as well as expose individuals to transit options they may not have previously been aware of.

A controlled behavioral experiment was conducted by Hillsborough Regional Transit Authority (HART) to evaluate the benefits of providing real-time information to transit riders. To measure behavior, feeling, and satisfaction changes, a survey was implemented for participants. After a period of three months, those with access to real-time information were found to have shorter perceived wait times than those without access to the real-time information. Regarding behavioral changes, 64 percent of real-time information users reported that they spent less time waiting at the bus stop and 39 percent reported that they make HART bus trips more often with access to the information (2017-01130). In another initiative, Dublin City Council (DCC) partnered with IBM Research to track bus journey information utilizing GPS data and made bus location information available to the public via the agency's website. By releasing updated journey information every minute, passengers were able to find the quickest route to their destination via the dublinked website. Results showed that the buses were saving time at targeted junctions, reducing journey time variability and having positive effects for passengers as well (2014-00969).

As can be seen in Figure 1, the use of traveler information tools such as trip planners and station parking information encourages individuals who have never tried transit options to take them at least once and encourages existing riders to use the transit system more frequently.

Providing passengers with real-time arrival information has also improved customer satisfaction with system performance. A survey of users of London's Countdown system (wayside real-time arrival information for buses) demonstrated that despite a decrease in on-time arrivals, 64 percent of customers perceived that on-time performance had improved after the installation of the system. Perceived waiting times also decreased from nearly 12 minutes to less than 9 minutes. This customer satisfaction is largely attributed to high system availability, as well as more than 75 percent of posted arrival times being accurate within two minutes of actual arrivals (2011-00737).

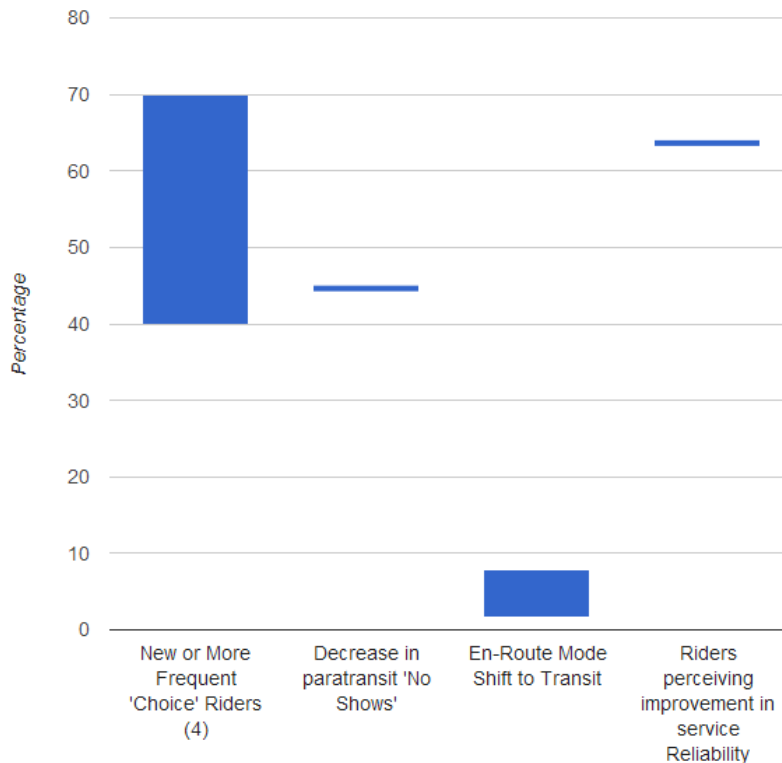


Figure 1: Benefits of Providing Transit Traveler Information (Source: ITS Knowledge Resources).

The online versions of the factsheets feature interactive graphs that contain all the data points included in the ranges. Here, each metric has a number after the text, representing the number of data points used to create the range; no number means only there was only one data point.

Shown in Figure 1, providing real-time traveler information about transit arrival times allowed agencies to attract new 'Choice' riders or have existing Choice riders opt to take transit more frequently, resulting in 40-70 percent increases in trips taken by Choice riders. Washoe County Transportation attributed a 45 percent decrease in paratransit 'No Shows' in part, to having real-time vehicle information obtainable by passengers over the phone. A pilot test showed that providing en-route transit information on highways in the San Francisco Bay area provided a 1.6 to 7.9 percent mode shift to transit, depending on the displayed minutes of travel time that could be saved by switching modes.

Costs

The costs for transit information dissemination vary widely based on the amount and type of existing equipment that can be utilized for the system. Real-time arrival systems are dependent on the vehicle fleet being AVL equipped and the methods of disseminating that information (DMS, mobile applications, websites, etc.) varies by agency. As mentioned earlier, with the development of the GTFS, there is minimal work needed by the agency to have transit information available through an application programming interface (API) for mobile and web application developers. This provides benefits to the agency through easier dissemination of traveler information without the development costs.

Transit traveler information dissemination systems that include websites range between \$700,000 and \$1.5 million in capital costs. Annual operations and maintenance costs range from \$93,000 to \$225,000 per year ([2009-00194](#), [2008-00152](#), [2008-00151](#)). Individual signs at stations can be approximately \$6,000, while on-board message signs can be \$4,000 per vehicle ([2008-00148](#)). A parking management guidance system in Chicago cost approximately \$1 million to implement ([2009-00183](#)).

Lessons Learned

Wayfinding technologies are increasingly capable of providing real-time and relevant transit information at both pre-trip and en-route. Deploying advanced wayfinding technologies in transit agencies present communications, legal, institutional, and technical challenges. The transit industry tends to deploy customized solutions to meet each specific agency's needs. However, there are many lessons learned from other projects that can be generally applicable to the development and deployment of transit information dissemination systems. Below is a sample of lessons learned ([2015-00727](#)):

- Evaluation is fundamental to gauge effectiveness. Understanding how customers use advanced wayfinding technologies is vital to achieve optimal effectiveness and plan future activities.
- Some customers may be extremely tech-savvy while others may not have access or the ability to use advanced devices like smartphones, know your audience.
- For maximum flexibility with future transit information products and services, transit agencies should seek to retain complete ownership of data. Vendors may specify ownership of proprietary algorithms or processing techniques.
- Agencies will have concerns with automatic extraction programs that can misinterpret or misrepresent information and leave agencies liable for incorrect information distributed by developers. Thus, many agencies now publish official feeds of information to developers who must agree to a "terms of use" agreement to obtain the data.
- Many agencies have intricate naming systems for their transit routes, which may differ from published route information. When selecting or developing an ITS real-time information system, agencies and vendors must be aware of this.
- Rigorous field testing is invaluable to see how software behaves in an operational setting where unforeseen conditions or glitches may affect data delivery, particularly with systems that use real-time data where inaccurate data or poor performance can lead to customer frustration.
- Providing web-based wayfinding information is increasingly complex, and it can be difficult for agencies to keep up with the evolving technologies and standards. As a result, some agencies are taking a hands-off approach, releasing their data, and allowing the market to deal with advancing applications.

Case Study – TransitScreen

TransitScreen was born as part of a civic technology project at Mobility Lab in Arlington, Virginia. Based on the idea of a multi-modal mass transit board, the concept uses digital screens that connect to a software platform that cities or businesses can use to help people navigate urban environments by informing them about the “what, when, and where” of transportation options. Using the information available, onlookers can compare train times, to bus arrival times, to current Uber surge prices. The information displays are most commonly used in places such as public buildings, coffee shops, high-rise apartment buildings, and on walkways near subway stations and bus stops.

TransitScreens can help eliminate a number of common annoyances to travelers, such as arriving at an empty bike-share station or having an unexpected 15 minutes wait at a bus stop or train station. These information displays not only support travelers with ready access to smartphone apps, but they are useful to others without mobile electronics. As a startup system, TransitScreens were deployed to support travelers with trip planning during the Washington Metropolitan Area Transit Authority’s (WMATA) year-long SafeTrack rehabilitation project. TransitScreen was able to provide real-time updates of expected delays across the system and inform customers of expected shutdowns and areas with limited access.



Results from a customer satisfaction study that evaluated six TransitScreen displays installed in commercial building lobbies in Toronto found that 85 percent of tenants found the TransitScreen information useful or extremely useful, and 86 percent found it easy to use [2]. Other studies indicate that TransitScreens effectively influence traveler behavior. In a study of 12 residential lobbies in San Francisco, it was discovered that TransitScreen contributed to a five percent decrease in drive-alone commuters [2]. In another surprising story regarding traveler behavior impacts, a coffee shop at a Seattle Children’s Hospital reported a 33 percent increase in sales following the installation of TransitScreen. Researchers indicated that people were more likely to treat themselves to a coffee or snack when able to quantify their spare time [2].

TransitScreen service is active in every major city in the United States, Canada, and select European cities. The company estimated

that by the end of 2016, they would have screens and displays installed in 5,000 locations in 40 cities across 10 countries and in 10 languages.

References

[1] Miller, Virginia. *Transit News Press Release*, “Record 10.8 Billion Trips Taken On U.S. Public Transportation In 2014.” American Public Transportation Association. March 2015.

http://www.apta.com/mediacenter/pressreleases/2015/pages/150309_ridership.aspx

[2] *TransitScreen* blog: “Changing Urban Transportation with Real-Time Screens.” April 20, 2016.

<https://transitscreen.com/blog/changing-urban-transportation-with-real-time-screens/>

All other data referenced is available through the ITS Knowledge Resources Database, which can be found at

<http://www.itsknowledgeresources.its.dot.gov/>.

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