The Personal Tech Tidal Wave

The Rising Use of Electronic Devices on Intercity Bus, Planes & Trains

2014 Update

Executive Summary

This report, the fifth in an annual series, explores the rising use of personal electronic devices among passengers on intercity buses, planes, and trains. This year's sample consisted of 7,034 passengers on 106 departures. The results show that:

1. The use of personal devices among passengers remains on an upward trajectory. Discount city-to-city buses services (such as Megabus) experienced the fastest increase in technology use. More than 59% of passengers on discount bus lines were "powered up"— an increase from 46.4% last year—a rate that outdistances Amtrak, conventional bus, and air travel by a wide margin.

2. Technology use on airlines remained virtually flat and continues to lag behind other modes, suggesting that the relaxation of the FAA policy on the use of personal electronic devices is having little effect. The new policy allows the use of certain devices during takeoffs and landings but appears to have been greeted unenthusiastically by flyers who are still unable to connect to Wi-Fi or 3G/4G systems, send text messages, or place phone calls.

3. Tablet/e-reader use once again has risen sharply on all modes observed. More than one-third of devices used on airplanes are now tablets or e-readers.

4. The ability to use devices continues to stimulate the demand for bus and train travel.

Figure 1
Share of Passengers using Personal Electronic Devices at Observed Points in Time
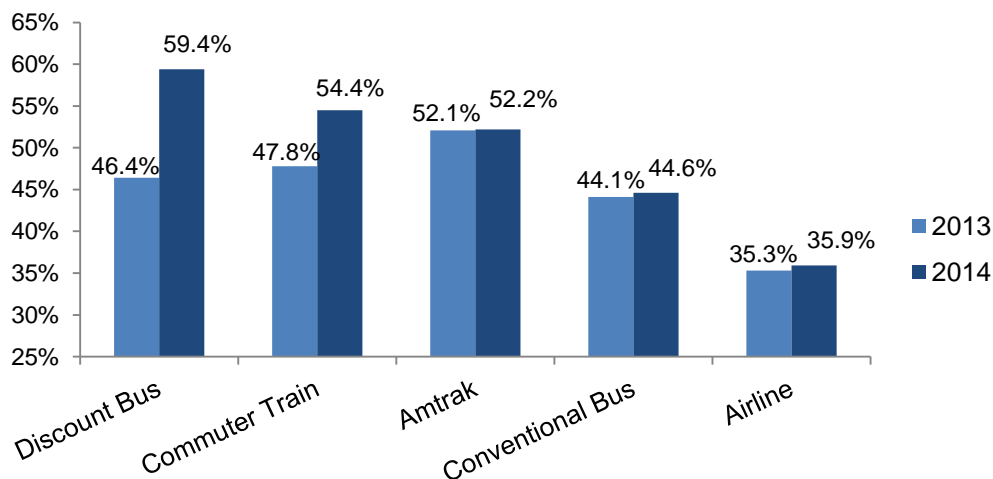
Introduction

Passengers on intercity trips continued to increase their reliance on personal electronic devices on buses, planes, and trains between 2013 and 2014. Although the trend toward rising technology use has slowed due to the near ubiquity of electronic devices, passengers continued to use them more frequently and more intensively. Electronic devices, whether used for business or pleasure, enable many travelers to do a variety of activities that were impossible only a few years ago, such as streaming videos on inexpensive hand-held devices and creating "mobile hotspots" to be used by friends.

This report, an updated version of our original *Personal Tech Tidal Wave* report released in June 2013, provides new evidence that the rise in technology is significantly affecting the way Americans decide how to move from place to place. The findings draw upon the Chaddick Institute's *Technology in Intercity Travel Study*, which began in late 2009. Since then, the study has expanded to encompass 32,000 unique passenger observations (in which no passenger is counted more than once on a given trip) on 516 bus, plane, and train trips throughout the United States. In addition, more than 10,000 observations have been made in Canada, Europe, and South America since the study began. No other dataset of this kind is known to exist.

The data is collected by field researchers who conduct visual surveys of fare-paying passengers on regularly scheduled trips. Team members pass through the aisles of rail coaches, buses, and airplanes and record data regarding passenger activity. To allow for greater consistency in comparisons between modes, the study considers only *weekday* departures. This year's data encompasses 108 departures between February 15 and June 15, 2014, including:

- 20 commercial flights operating throughout the continental United States;
- 20 intercity Amtrak trains;
- 12 conventional intercity bus departures (all Greyhound);
- 20 curbside bus departures (Megabus/Coach USA); and
- 36 commuter trains (sample limited to Metropolitan Chicago).

Altogether, the study team observed 7,034 passengers *(Figure 2)* in 2014. Amtrak and intercity bus travelers were observed across five Midwestern states, similar to previous years, while airline travelers were observed on a national network of flights. Analysis conducted in 2011 involving a sample of bus and rail passengers throughout the East, Midwest and West revealed that observing bus and rail passengers in these Midwestern states provides results that can be generalized to the United States as a whole. While acknowledging that this issue constitutes a limitation of our study, we believe the associated margin of error is quite small. See the *Appendix* of this report for details about the flights in which passenger observations were made.

Figure 2
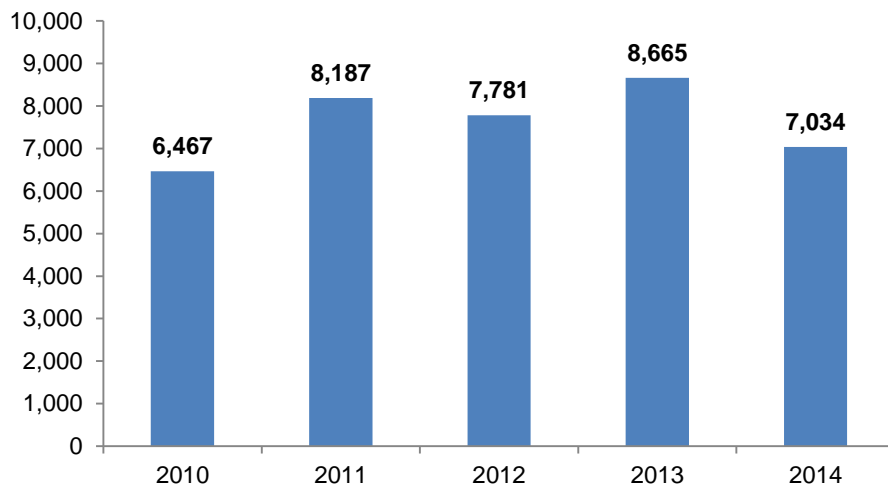# Number of Travelers Visually
Observed by Data Team

Table 1
Types of Activity Recorded

 1. *Audio Activities:* Tasks, such as those involving cell phones or CD players, that can be used with earphones, speakers, or headsets, that are being used strictly an audio function.

2. *Visual or Audiovisual Activities on Devices, not including iPads, Kindles and other Tablet Use:* Visual or audiovisual features, such as laptop computers, BlackBerrys and other smart phones, DVD players, and iPods. (This category includes any traveler looking at an LCD screen for the purpose of engaging in an activity more substantial than placing a phone call.)

3. *Visual or Audio-Visual Activities on iPads, Kindles and other Tablets:* Same as Category 2 except focusing specifically on tablet usage. This final category was newly-introduced in 2012 to better calculate how small and lightweight devices affect traveler behavior.

The sample in 2014 consisted of 1,659 airline travelers, 1,608 intercity train (Amtrak) passengers, 505 discount city-to-city bus passengers (Megabus and Coach USA), 270 conventional intercity bus passengers, and 2,992 commuter rail passengers. Researchers measured the use of three basic features of electronic devices. Tablets and e-readers were broken out in a separate category from other visually-oriented (LCD) devices in 2012 (*Table 1*).

As in previous years, intercity bus and train travelers were observed in a five-state Midwestern area while airline passengers were evaluated on a set of national routes. Commuter rail travelers were only observed in the Chicago metropolitan area. The results for this mode are featured in the *Digitally Connected Traveler*, a companion report available on the Chaddick Institute website. For additional details and a list of routes surveyed, please see the *Appendix*.

Key Findings

Five findings are particularly noteworthy from this year's data collection:

Finding 1: The use of personal devices among passengers remains on an upward trajectory. Discount city-to-city bus service (such as Megabus) experienced the fastest increase in technology use.

The share of passengers using personal electronic devices rose for the fourth consecutive year. At randomly selected points, the share of passengers using technology reached 59.4% on discount city-to-city buses (e.g., Megabus); 54.5% on commuter trains; 52.2% on intercity trains; 44.1% on conventional buses (mostly Greyhound); and 35.9% on airlines (*Figure 3*). On commercial flights and conventional intercity buses, usage has more than doubled since 2010.

Figure 3
**Passenger Use of Personal Electronic Technology by Mode
2010- 2014**
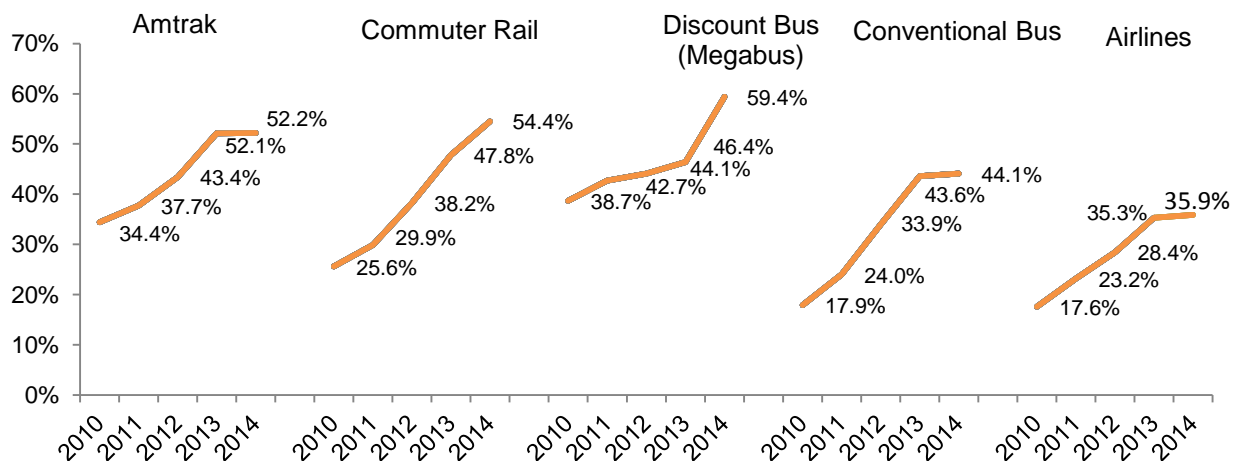
It warrants emphasis that a greater share of passengers—perhaps more than 80%[1]—use electronic devices at some point during their trips. By looking at usage rates at particular moments in time, however, the approach used in this report provides a more accurate portrayal of the *intensity of technological engagement* than studies focusing only on whether a device is being used at some point during the trip.

For the first time in the five years in which we have collected data, technology use on discount city-to-city bus (corporate curbside bus) service has significantly exceeded that of all other modes. Among the 505 passengers observed on 20 Megabus and Van Galder buses operating from curbside locations, 59.4% were using technology, compared to 46.4% last year. On Amtrak, the share of technology users rose only modestly, from 52.1 to 52.2% *(Figures 3 & 4)*.

Technology use on Amtrak and discount city-to-city buses is being fueled in part by the superlative environments these modes offer passengers. On Amtrak, spacious seating, tray tables, and power outlets at nearly every seat create a highly tech-friendly environment. Amtrak introduced Wi-Fi to its Midwestern corridor routes in February 2014. Megabus and Coach USA affiliate Van Galder Lines offer free Wi-Fi and have power outlets on most buses. Moreover, these lines benefit from the stronger cell-phone signals available along the Interstate Highway routes they traverse compared to the weaker signals found along train routes. It is also common for travelers to be able to spread out their belongings using nearby empty seats—a rarity on most flights.

Figure 4
**Percent of Passengers on Amtrak and
Megabus Using Technology at Observed
Points in Time**
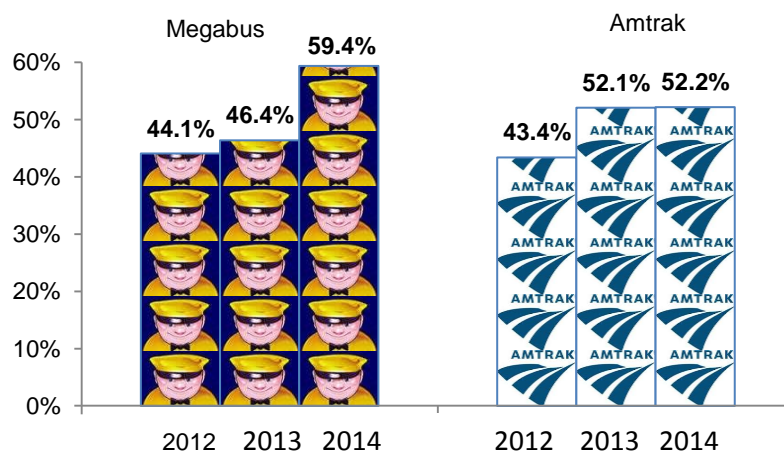
The comparatively slow growth of technology use observed on Amtrak this year may be in part due to a sharp decline in the carrier's Midwestern on-time performance. Amtrak's on-time performance has fallen appreciably this year on most of the routes surveyed, in part due to a surge in freight traffic.[2] Our past research suggests technology use tends to fall as passengers are on trains for periods longer than five or six hours. Therefore, late trains may suppress technology as passengers exhaust the tasks and activities they seek to do on electronic devices.

The sharp rise in use on discount city-to-city bus service appears to reflect the rising tendency of lower-income groups to engage with technology when they travel. Discount city-to-city bus lines, such as BoltBus and Megabus, once overwhelmingly carried young and tech-savvy travelers, particularly college students. In more recent years, however, these carriers have attracted a broader cross-section of the population.[3] Our results suggest that these older and less affluent groups are rapidly becoming more tech-dependent—a trend that is evidenced in the rising use on conventional bus lines (Greyhound) and public transit services since our data collection began.

2. Technology use by airline travelers remains flat and continues to lag behind other modes, suggesting that the relaxation of the FAA policy on the use of personal electronic devices is having little effect. The new policy, which took effect in January 2015, provides airlines new freedoms to allow for the use of certain devices during taxiing, takeoffs and landings. The change appears to have been greeted unenthusiastically by most travelers, who are still unable to connect to Wi-Fi or 3G/4G systems, send text messages, or place phone calls while in flight. Whereas 35.3% were observed using devices at observed points last year, 35.9% were observed doing so this year. Most passengers instead opted to devote their time to reading print material, eating, sleeping and relaxing. There has been no explicit timeline for a further liberalization of policy that would allow travelers to communicate during the takeoff/landing phase of flights.

Figure 5
**% of Airline Passengers Using Technology
at Observed Points**
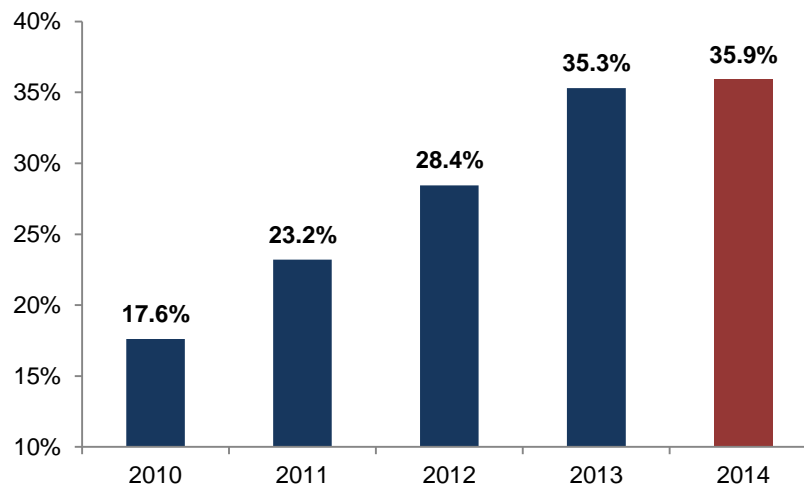
The gap between technology use by flyers and usage on the next least tech-intensive mode—conventional bus service—now exceeds eight percentage points, the highest level it has been since we began data collection in 2009. Only one of the 20 flights observed by our data team had a usage rate among passengers above 50%—a rate common on both bus and train trips.

Finding 3: Tablet and e-reader usage, once limited primarily to commercial flights, continues to rise sharply on all modes of travel. More than one-third of all devices used on airplanes are now tablets/e-readers, but the use of these devices is growing fastest on trains. Meanwhile, the use of simpler audio functions, such as listening to music, continues to decline, particularly on airplanes.

The share of travelers using tablets/e-readers rose sharply on all modes between 2013 and 2014. At any given point, about 12.7% of airline passengers, 10.0% of Amtrak passengers, 8.8% of commuter-rail passengers, and 4.1% of intercity bus travelers are using these devices *(Figure 6).* (For this analysis, we combined the discount and conventional bus data into the "intercity bus" category due to the low number of tablets observed. This allowed for a reduction in the margin of error).

Figure 5:
**Percent of Passengers Using Tablets or
e-readers at Observed Points in Time**
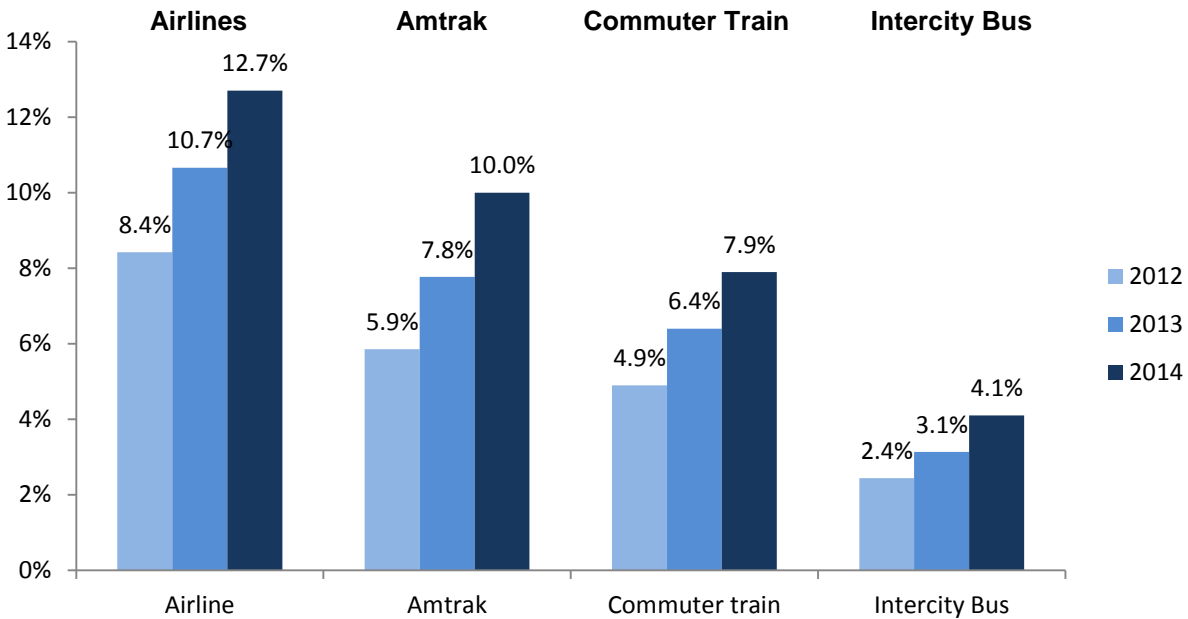
The ratio of tablet/e-reader users to all passengers onboard buses, trains, and planes is summarized in *Table 2*. The greatest proportion of tablet/e-reader users are travelers on commercial airlines, followed by Amtrak and commuter rail. One in eight flyers and one in 10 Amtrak passengers were, on average, using tablets at the times selected for data collection.[4] The use of these devices, conversely, was remarkably rare on intercity bus trips relative to other modes.

Table 2
Ratio of Tablet/e-reader Users to All Passengers

|	Ratio of passengers using tablets/e-readers at observed points to all passengers
Commercial flight	1 in 8
Intercity train (Amtrak)	1 in 10
Commuter Train	1 in 13
Intercity bus (Greyhound and Megabus)	1 in 24

Presently, tablets/e-readers account for 35.4% of all devices used by airline passengers, 19.2% of devices used on Amtrak, 16.1% of devices used on commuter trains, and 8.1% of devices on intercity buses. Part of the reason these devices are so lightly used on intercity bus trips appears to be the technology preferences of the younger and less affluent demographic that these trips attract. Our previous data analysis suggests that this population is quite adept at performing complex tasks on smartphones and more apt to engage in audio-oriented tasks, such as listening to music, which does not require the use of a tablet/e-reader device.

Finding 5: Compelling evidence exists that some of the ridership gains made in discount city-to-city bus and train travel in recent years is partially attributable to the "tech friendly" qualities of these modes. Discount bus and train traffic has grown much faster than air and auto traffic over the past several years. These latter forms of travel—on which personal technology is often difficult to use—grew only minimally between 2013 and 2014.

The two fastest growing modes of intercity travel over the calendar years 2012 and 2013—intercity trains and discount buses—were also those in which the technology use was observed to be the highest in early 2013. (See our *The Metamorphosis of the Motor Coach* study, released in January 2014, for an analysis of the growth of bus travel).

The amount of discount bus service grew by 4.0% between 2012 and 2013, while the number of Amtrak seat-miles grew by 1.4%. Airline seat-times grew by 1.4% over this period and car travel grew by 0.6%. (See Endnote 4 for a summary of the sources of this data). Conventional bus service (which is not shown on the chart) remained virtually flat from year to year. The amount of service provided by discount city-to-city bus lines—which offer travelers uninterrupted cell phone signals as well as free Wi-Fi and power outlets—grew a remarkable 30% last year due to the addition of new hubs throughout the United States (See Schwieterman, et. al, 2013). Nevertheless, Greyhound continues to roll out its premium "Greyhound Express" service on many routes nationwide.

Figure 7
Growth in Available Bus/Plane/Train
Service and Automotive Mileage
2013 vs. 2012
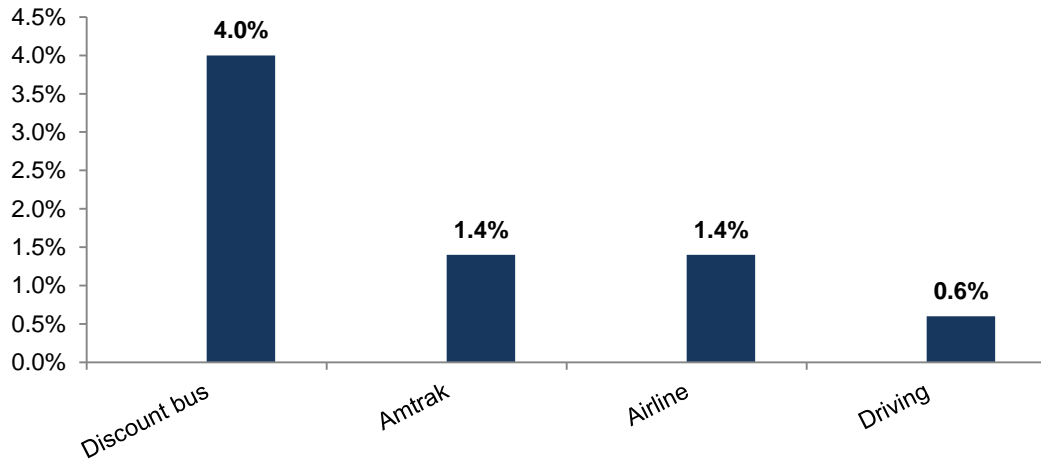
Note: Intercity bus service is measured by changes in *daily bus operations* (see Schwieterman, Schulz, and Largent, 2013), while air and Amtrak service is measured by changes in year-over-year available seat-miles, respectively. Auto mileage is measured by year-over-year changes in private automobile mileage (vehicle miles traveled). See Endnote 5 for details on the sources of this information.[5]

Amtrak travel continues to grow in spite of the difficulty in adding service to meet demand and growing competition from discount bus lines. Such growth, coupled with the observational data provided in this report and survey data we conducted of travelers in six cities (Schwieterman and Fischer, 2011) provides compelling evidence that a causal link exists between the relative rate of growth of various modes of travel and their "tech friendly" qualities.

Conclusion

The following conclusions reported in the 2013 *Personal Tech Tidal Wave* report remain apt today and suggest that the rising use of personal technology will continue to change the way we travel:

Enhancements made by transportation providers are poised to stimulate tech use, including:

o Heightened push to install Wi-Fi and power outlets on commuter rail systems;
o Roll-out of Wi-Fi on growing numbers of Greyhound buses;
o Growing opportunities at airports or on airplanes that allow passengers to rent tablets; and
o Rising numbers of airline seats equipped with power outlets as new-generation
  planes, such as the Boeing 787 Dreamliner, enter service.

Advances in the availability, production and design of personal devices also suggest that usage will continue to rise, including:

o The diminishing weight and increasing capabilities of tablets, which help to transform crowded environments, such as those in airline coach cabins and commuter trains, into more tech-friendly spaces.
o The growing availability of prepaid phone plans, which facilitate the use of sophisticated devices among lower-income populations.
o Longer battery life, which provides greater assurance that travelers have adequate power to use over longer distances.
o Expanding prevalence of 3G and 4G service, which eliminates the need for Wi-Fi on modes in which this amenity has proven costly to provide, such as on trains.

Moreover, the new data from 2014 suggests that:

o The rate of growth in the use of personal devices remains robust but is now slowing, in part due to the near ubiquity of these devices among travelers.   Nevertheless, travelers continue to shift from simpler "audio" activities to more intensive activities, often which involve multitasking with sophisticated personal devices.

- Coach cabins of airlines remain extremely challenging environments for the use of many types of personal devices due to rising load factors and reductions in legroom, both of which reduce maneuverability.

- The inability for travelers to use their phones for communication or connect to the internet during taxiing and takeoff/landing remains a significant deterrent to the use of devices.

o The "digital divide" has all but disappeared onboard buses, trains, and planes. On Greyhound, the use of personal technology use is now significantly higher than on airplanes and is only marginally below that on Amtrak and discount bus lines.

As travelers feel an ever-rising need to stay connected, technology advances appear poised to continue to transform the way Americans move from place to place. The premium passengers place on "powering up" when traveling bodes well for bus and train travel, which are particularly well suited for intensive technology use en route.

Appendix: Methodology and Sample

DATA RECORDING PROTOCOL: Data is recorded as a code (based on the type of device each passenger is using) on smart phones. Data is then sent as a text message after arrival so the results can be consolidated. Please reference *Table 1* in this report for details on how we assign codes to each type of electronic device. The Institute purchases tickets for data collectors—who travel as regular fare-paying passengers on buses, planes, and trains—and collect data in real-time settings.

TIMING ON INTERCITY TRAINS AND BUSES: Data collectors gather information 10 to 15 minutes after leaving downtown terminals and immediately upon departure on return trips from inner-ring suburbs. We assume that technology users are randomly distributed throughout trains. Only when clear and unobstructed views are possible does the data team record data of passengers sitting on upper levels of gallery cars. In many instances, this was not the case, resulting in observations on the lower level being more prevalent than those on the upper level.

SPECIAL CIRCUMSTANCES: Data collectors develop a consistent response to these situations:
- When two passengers are using the same device, both passenger are counted as using a device.

- When a passenger is judged to be below grade-school age (5th grade or less), that passenger is excluded, although we have observed heavy usage among many younger passengers. When a passenger is using a set of earbuds or headphones that is plugged into an electronic device, but that passenger appears to be sleeping, we classify that passenger as using an "audio device."

SAMPLE OF FLIGHTS: Our sample includes representation of six of the seven largest U.S. carriers: Delta, United, American, US Airways, Virgin America, Southwest, and Alaska. We did not sample JetBlue, which ranks sixth, due to difficultly in fitting its flights into our travel schedule. As previously noted, we sample only weekday flights to lessen the risk of sample-related biases. We also do not report our findings by carrier to avoid biases related to having small samples.   Furthermore, the sample consists exclusively of flights involving aircraft that are not equipped with LCD screens in seatback or flights in which videos are shown throughout the trip. These systems are a competing form of "digital entertainment" that make flight-to-flight comparisons difficult. The use of personal electronic devices appears to be much lower on flights equipped with these built-in systems.

EXCLUDED FLIGHTS: The sample does not include flights involving aircraft that are equipped with LCD screens in seatbacks, or flights in which videos are shown throughout the trip. These systems are a competing form of "digital entertainment" that make flight-to-flight comparisons difficult. The use of personal electronic devices appears to be much lower on flights equipped with such built-in systems. Furthermore, we omitted two Alaska Airlines flights from the final data set in 2013 on account of the fact that the airline offered "DigEplayer" rentals (hand-held devices) to passengers on these trips. The data collectors could not easily distinguish between these pre-loaded entertainment devices and personal devices. This was only a factor in the 2013 sample.

GEOGRAPHIC SAMPLE OF FLIGHTS: By virtue of our geographic location in Chicago, roughly two-thirds of our observations involve flights to/from Midway or O'Hare. Even so, virtually all flights we observed have extensive connecting traffic to/from other cities. Moreover, we maintain a high degree of

consistency in the mix of flights we observe from year-to-year, ensuring that we have accurate year-over-year comparisons.

GEOGRAPHIC SAMPLE OF BUSES AND TRAINS: Amtrak passengers were observed on the following routes: Hiawatha Corridor (Chicago – Milwaukee); Lincoln Service (Chicago –St. Louis); Chicago – W. Quincy, Ill. corridor; Chicago – Carbondale, Ill. corridor; and Wolverine Service (Chicago – Detroit) corridor.

Megabus passengers were observed on the Chicago – Grand Rapids – Detroit, Chicago – Milwaukee, Chicago – Indianapolis - Cincinnati, Chicago – Indianapolis – Cincinnati, Chicago – Madison. Coach USA Van Galder passengers observed on Chicago – Rockford – Madison routes. Greyhound passengers were observed on eights routes in various Midwestern states.

FLIGHTS OBSERVED: Our sample of flights in 2013 was, by design, quite similar to the sample drawn in 2014. Details noted on *Table 3* below.

TABLE 3
LIST OF SCHEDULED FLIGHTS OBSERVED, 2014

Airline	Day/Date	Origin	Destination	Scheduled Departure
American	Thursday (5/8/14)	Boston	Chicago	7:50 PM
Delta	Thursday (5/8/14)	Chicago	Detroit	9:05 AM
Delta	Thursday (5/8/14)	Detroit	Boston	12:20 PM
Delta	Tuesday (5/6/14)	Chicago	Atlanta	10:00 AM
Delta	Tuesday (5/6/14))	Atlanta	Jacksonville	1:42 PM
Delta	Tuesday (5/6/14)	Jacksonville	Atlanta	5:15 PM
Delta	Tuesday (5/6/14)	Atlanta	Chicago	7:43PM
Delta	Tuesday (6/17/14))	Louisville	Detroit	9:55 AM
Delta	Tuesday (6/17/14)	Detroit	Chicago	12:30 PM
Southwest	Wednesday (5/21/14)	Houston	Chicago	9:05 AM
Southwest	Thursday (3/27/14)	Chicago	New York	9:20 AM
Southwest	Monday (3/31/14)	New York (LGA)	Chicago	11:55 AM
Southwest	Thursday (4/17/14)	Chicago	Baltimore	7:25 AM
Southwest	Thursday (4/17/14)	Baltimore	Chicago	11:50 AM
Southwest	Thursday (5/29/14)	Chicago	Kansas City	9:05 AM
Southwest	Thursday (5/29/14)	Kansas City	St. Louis	1:35 PM
Southwest	Thursday (5/29/14)	St. Louis	Chicago	2:55 PM
Southwest	Monday (4-7-14)	Chicago, IL	Tampa, FL	12:30 PM
US Airways	Monday (6/16/14)	Chicago	Charlotte	4:00 PM
US Airways	Monday (6/16/14)	Charlotte	Louisville	8:00 PM

COMMUTER RAIL PASSENGERS OBSERVED: All observations were on Metra or the South Shore Line commuter routes as noted on Table 4. For additional details about the 2013 sample, see our *The Digitally Connecter Computer* study published in May 2013 (citation and link below).

Table 4
Commuter Rail Line Classification by Region

Direction	Lines Included	Passengers Observed in 2014
North	Milwaukee District North and Union Pacific North	594
Northwest	Milwaukee West and Union Pacific Northwest	599
West	BNSF and Union Pacific West	452
Southwest	Rock Island and Southwest Service	540
South	Metra Electric and South Shore Line	922

Note: Metra's Heritage Corridor and North Central service were not surveyed

Other Recent Chaddick Studies on Technology Use

"Tablets Take Flight: The Rise of Personal Electronic Devices & The Growing Cost of the FAA Ban on Technology Use During Takeoffs/Landings (*Part A: Technology in Intercity Travel Study – 2013 Update)*"

Our report, published in May, focusing on our 2013 results measuring tech use on commercial flights.

"The Digitally Connected Commuter: The Rapidly Rising Use of Personal Electronic Devices on Chicago's Suburban Trains: 2014 Update (*Part B: Technology in Intercity Travel Study – 2013 Update)*"

Our report, published in July 2014, measures tech use on commuter trains from 2010 - 2014.

"Staying Connected *En Route*: The Growing Use of Tablets and other Portable Electronic Devices on Intercity Buses, Trains, and Planes"

Our 2012 study showing how the growing use of portable electronic technology among intercity air, rail, and bus passengers changing travel behavior. Released January 2012.

"Who Rides Curbside Buses: A Survey of Passengers on Curbside Bus Lines in Six East and Midwest Cities"

Provides survey results from 750 curbside and conventional bus passengers in six cities, including analysis of how traffic is being diverted from other modes. Released June 2011.

"The Top 20 'Top Transit Suburbs" of Metropolitan Chicago': An Index Approach*."*

An evaluation of dozens of amenities and characteristics of Chicago suburbs in order to identify the most attractive places to live for people seeking lifestyles built around commuter-rail service. Released on July 26, 2012.

For free downloads of these studies, please visit the Research & Publications page of the Chaddick Institute website at: http://las.depaul.edu/chaddick

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Schwieterman, Joseph P. and Lauren Fischer, "Privacy Invades Public Space: The Growing Use of Portable Electronic Technology on Intercity Buses, Trains and Planes," Chaddick Institute Policy Study, DePaul University, January 2011. See page 16 for a link to this study.

Schwieterman, Joseph P, Brian Antolin, Justin Kohls, Marisa Schulz, and Kate Witherspoon. *Motoring Into the Mainstream: 2013 Year-in-Review: Intercity Bus Service in the United States*. Chaddick Institute Policy Study, DePaul University, January 6, 2014, available at http://las.depaul.edu/chaddick

Schwieterman, Joseph P, Justin Kohls, Marisa Schulz, and Kate Witherspoon. *The Traveler's Tradeoff: Comparing Intercity Bus, Plane, & Train Fares across the United States*. Chaddick Institute Policy Study, DePaul University, April 21, 2014, available at http://las.depaul.edu/chaddick

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[1] Chaddick Institute surveys show that nearly 90% of intercity bus passengers use some form of technology on intercity trips. See "Who Rides Curbside Buses: A Survey of Passengers on Curbside Bus Lines in Six East and Midwest Cities," available at las.depaul.edu/chaddick. Althoughwe have not conducted a similar survey of airline passengers, the socioeconomic characteristics of flyers suggest these travelers use technology at an even higher percentage. As of December 2012, 87% of American adults have a cell phone and approximately 45% have a smartphone (Pew Charitable Trust, 2012).

[2] See Jon Hilkevitch, "Amtrak fails to weather winter well Delays, cancellations plague service; Wi-Fi rollout gets some of the blame", *Chicago Tribune*, March 05, 2014. Available at: http://articles.chicagotribune.com/2014-03-05/news/ct-amtrak-winter-delays-met-0306-20140306_1_amtrak-service-amtrak-data-amtrak-officials.

[3] For a summary of the demographics of riders based on the Chaddick Institute's 1,000-passenger survey, see our *Who Rides Curbside Buses* report (2011); link provided on page 16.

[4] Discount city-to-city bus lines and conventional bus lines were consolidated into an "intercity bus" category when evaluating tablet usage due to the fact the number of observations for this technology was small, making estimates of year-of-year comparisons less accurate for these specific types of bus operators.

[5]Comparing growth in the amount of service by mode is a little tricky since bus service can only be measured in daily operations while train and plane can be measured in available seat miles. The following data shows the growth of city-to-city bus service, such as BoltBus, Megabus, etc.,

which is the industry's growth sector. The conventional bus sector (e.g., Greyhound) added little new service last year, and instead focused on upgrading existing service with new "Express" offerings (WiFi, outlets, etc).

Mode	Growth	Measure	Source
Discount city-to-city bus	4.0%	Daily operations end of year '13 vs. '12	Chaddick Institute study (2014)
Amtrak	1.4%	Seat miles, Nov/Dec '13 vs. previous year*	Amtrak.com (Note b)
Airlines	1.4%	Seat miles, 2013 vs. previous year (domestic)	Bureau of Transp. Statistics (Note a)
Driving	0.6%	Mileage driven by Americans, '13 vs. '12	Federal Highway Administration (Note b)

* Amtrak does not tabulate statistics by calendar year. We could compute it, however, by going through its 12 monthly reports. Amtrak focuses on fiscal year data (ending October of each year)

Note a: Bureau of Transportation Statistics/RITA, available at http://www.transtats.bts.gov/Data_Elements.aspx?Data=5;
Note b: See *http://www.fhwa.dot.gov/policyinformation/travel_monitoring/13dectvt/index.cfm

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