The Personal Tech Tidal Wave:

The Surging Use of Electronic Devices on Intercity Buses, Planes, & Trains
2012 – 2013

Part C: Technology in Intercity Travel Study – 2013 Update
Chaddick Institute for Metropolitan Development

DePaul University

June 19, 2013

Joseph P. Schwieterman, Ph.D.*, Alyssa Battaglia, Blaire MacHarg and Marisa Schulz

jschwiet@depaul.edu; 312/362-5731 office

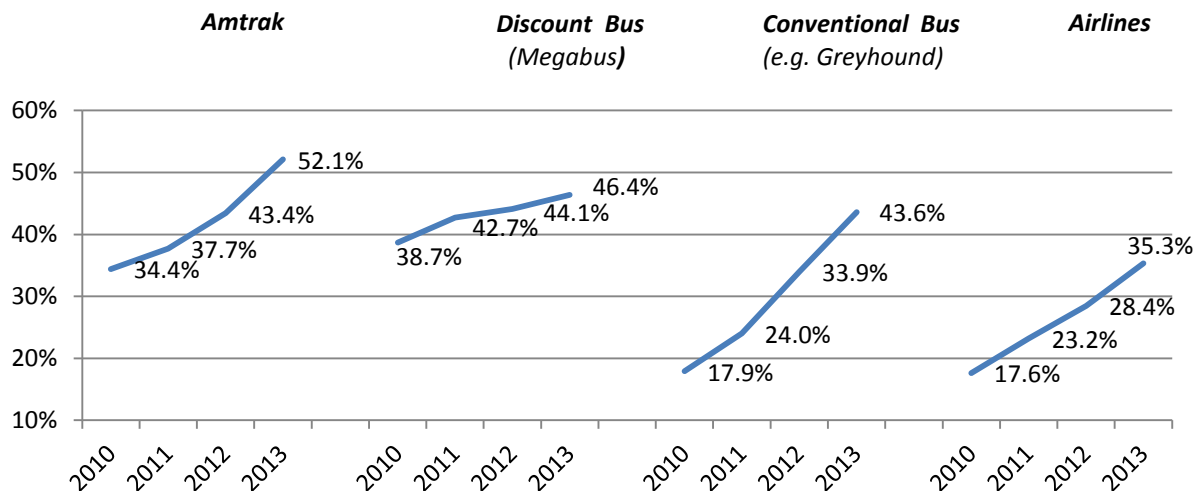*Professor, School of Public Service and Director, Chaddick Institute for Metropolitan Development

Data Team: Alyssa Battaglia, Brandi DeLaoch, Jeff Fredericksen, Ryan Forst, Shawn Janzen, Mollie Pelon, Peter Pavich, Robyn Richardson, Kelsey Somerville, Mallori Stone, and Stephen Woodring

Executive Summary

This report, the fourth 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 8,665 passengers on 117 departures. The results show that:

1. Intercity rail travel has reasserted itself as the most "tech friendly" mode, having technology use that outdistances bus and airline travel by a wide margin. For the first time since we began collecting data in 2009, more than half of observed passengers on a particular mode - in this case, Amtrak - were engaged with devices at randomly selected points we observed. More than 52% of passengers were using devices on the 24 trips we observed, up from 43.4% last year.

2. The use of personal devices surged on all five modes evaluated, as travelers grew more dependent on using sophisticated technologies, en route *(Figure 1)*. All modes of travel, except discount city-to-city buses (e.g., Megabus), saw increases in the rate of technology usage by 20% or more.

3. Tablet/e-reader use rose sharply, particularly on airplanes and trains. On average, one in nine flyers and one in 15 Amtrak riders is using a tablet at any given point.

4. Advances in personal technology are stimulating the demand for bus and train travel, which tend to be slower than airline or car travel but offer significant advantages for tech use.

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

Introduction

Passengers on intercity trips are increasing their reliance on personal electronic devices on buses, planes, and trains at an even faster rate than observed during the initial boom years of social media (2010 – 2012). Moreover, the trend toward rising technology use shows no signs of abating. Electronic devices, whether used for business or pleasure, enable many travelers to do many 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.
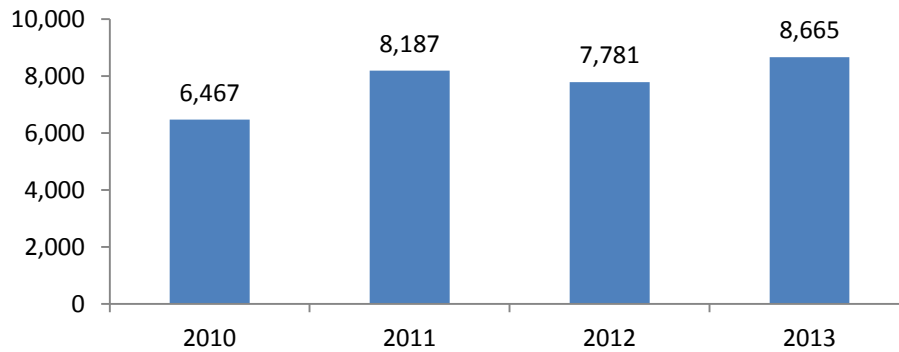
This report also presents newly-collected evidence that the rise in technology is significantly affecting the way Americans decide to move from place to place. The Chaddick Institute's *Technology in Intercity Travel Study* began in September 2009. Since then, the study has expanded to encompass 25,000 unique passenger observations (in which no passenger is counted more than once on a given trip) on 410 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 117 departures between February 15 and May 15, 2013, including:

- 23 commercial flights operating throughout the continental United States;
- 24 intercity Amtrak trains;
- 16 conventional intercity bus departures (predominantly Greyhound and Trailways);
- 22 curbside bus departures (Megabus/Coach USA); and
- 32 commuter trains (sample limited to Metropolitan Chicago).

Altogether, the study team observed 8,665 passengers *(Figure 2)*. 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. We acknowledge this issue may warrant additional study but we believe the associated margin of error is

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, Blackberries 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.

quite small. See the *Appendix* of this report for details about the flights in which passenger observations were made.

In 2013, the team observed 1,688 airline travelers, 2,260 intercity train (Amtrak) passengers, 829 discount city-to-city bus passengers (Megabus and Coach USA), 415 conventional intercity bus passengers, and 3,473 commuter rail passengers. 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 Chicago metropolitan area. For additional details and a list of routes surveyed, please see the *Appendix*. As in the past, 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*).
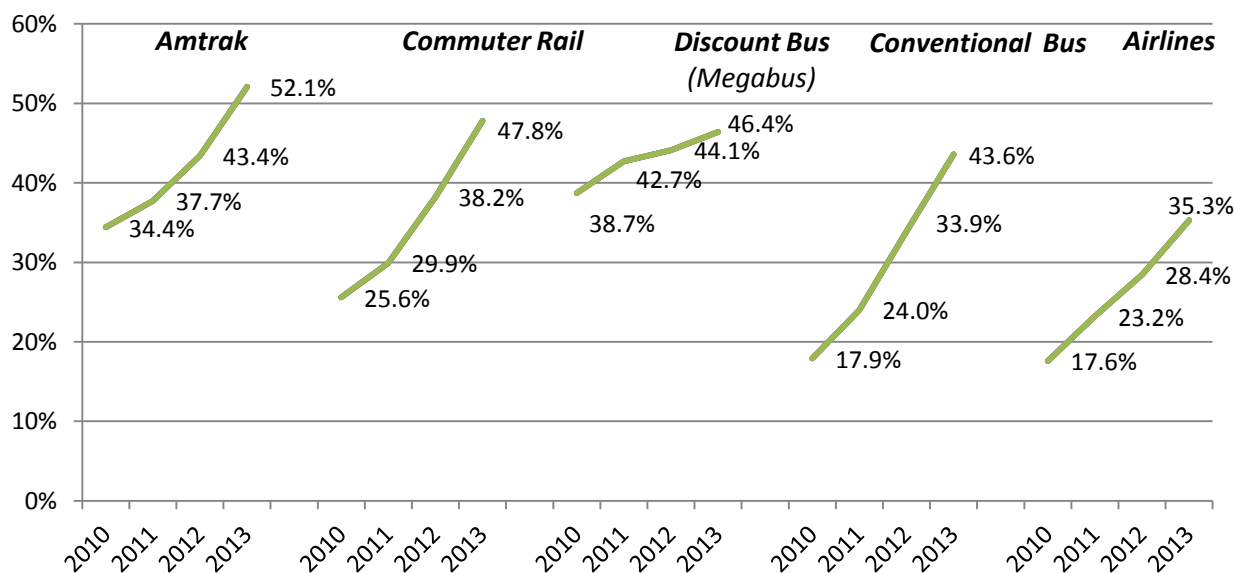
Key Findings

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

Finding 1: Use of personal electronic devices surged on all modes between 2012 and 2013 and this rise shows no sign of abating.

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 52.1% on intercity trains; 47.8% on commuter trains; 46.4% on discount city-to-city buses (e.g., Megabus); 43.6% on conventional buses (mostly Greyhound); and 35.3% on airlines (*Figure 3*). In each case, with the exception of discount city-to-city buses, usage was at least six percentage points higher than the previous year. On commercial flights and conventional intercity buses, usage has more than doubled since we began recording data in 2010.

Figure 3
Share of Passengers using Personal Electronic Technology at Observed Points in Time: 2010-2013
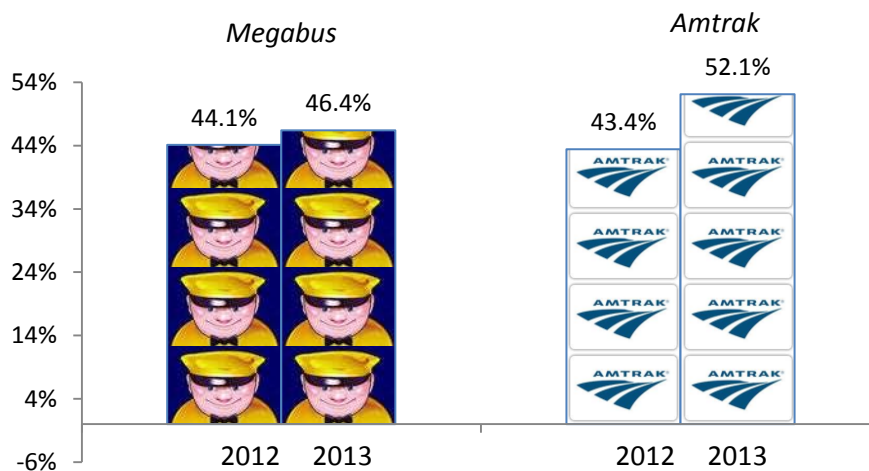
It warrants emphasis that a greater share of passengers—perhaps more than 80%[1]—use electronic devices at some point during their trips. By looking at usage rates at particular moments in time, however, the approach used in this report provides a more accurate portrayal of the *intensity of technological engagement* than studies focusing only on whether a device is being used at some point during the trip.

Finding 2: Both Amtrak and commuter trains now surpass discount city-to-city ("curbside") buses with respect to the share of passengers using personal electronic devices. The generous legroom, availability of power outlets, and tray tables are a powerful combination that technology users find extremely attractive.

For the first time since data collection began in 2009, more than half of all travelers observed on a mode of travel—in this case, intercity trains—were engaged with technology at randomly selected points. For the first time in three years, the highest usage was observed on trains. Among the 2,260 passengers observed on 24 Amtrak trains, 52.1% were using technology, compared to 43.3% last year. Among discount buses, the share of technology users rose from 44.1% to 48.1% *(Figure 4)*.

Figure 4
**Percent of Passengers on Amtrak and Megabus
Using Technology at Observed Points in Time**

Technology use on Amtrak was fueled in part by the superlative environment it offers passengers conducting visually oriented electronic tasks. Spacious seating, tray tables, and power outlets at nearly every seat on Amtrak partially compensate for the absence of Wi-Fi, which is prevalent on discount bus lines such as BoltBus and Megabus. Amtrak continues to struggle to make Wi-Fi available to its

passengers due to the cost and reoccurring technological difficulties. However, the consequence of the lack of Wi-Fi on many trains, and the spotty service Amtrak often suffers where WI-FI is available, appears to be diminishing as more passengers have access to 3G and 4G services on their devices.

Two factors are likely responsible for the comparatively slow growth of technology use observed on discount city-to-city buses this year:
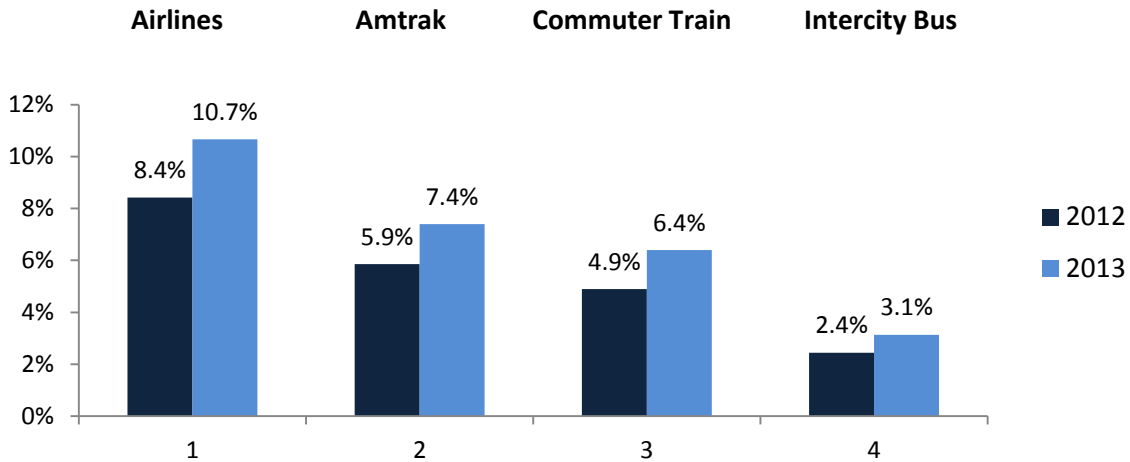
1. Crowded environments attribute to rising load factors. Our past research has shown that a diminishing prevalence of empty seats (rising load factors) on buses and planes tends to deter the use of electronic devices.[2]   (Heavy loads do not appear to affect usage patterns on Amtrak trains, which tend to be able to operate at full capacity without creating a sense of overcrowding). People feel less comfortable using certain types of technology, particularly visually oriented tools, in crowded situations.

2. The widening demographic segments these buses serve. Discount city-to-city bus lines, such as BoltBus and Megabus, once overwhelmingly carried young and tech-savvy travelers, particularly college students, but now the mix of travelers increasingly reflects a broad cross-section of the population.[3] This increasing diversification of clientele appears to have slowed the rate of technology growth. The typical bus appears to have a higher share of less-affluent passengers, who remain less apt to use personal devices (although as noted below, the gap is narrowing), than several years ago.

Finding 3: Tablet and e-reader usage, once limited primarily to commercial flights, has risen sharply on intercity trains (Amtrak) and discount city-to-city bus lines. The greatest concentration of tablet use, however, remains on airplanes. Meanwhile, the use of simpler audio functions, such as listening to music, has dropped.

The share of travelers using tablets/e-readers rose sharply on all modes between 2011 and 2012.   At any given point, about 10.7% of airline passengers, 7.4% of Amtrak passengers, 6.4% of commuter-rail passengers, and 3.1% of intercity bus travelers are using these devices *(Figure 5).* (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 nine flyers and one in 13 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 9
Intercity train (Amtrak)	1 in 13
Commuter Train	1 in 16
Intercity bus (Greyhound and Megabus)	1 in 32

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 more apt to engage in audio-oriented tasks, such as listening to
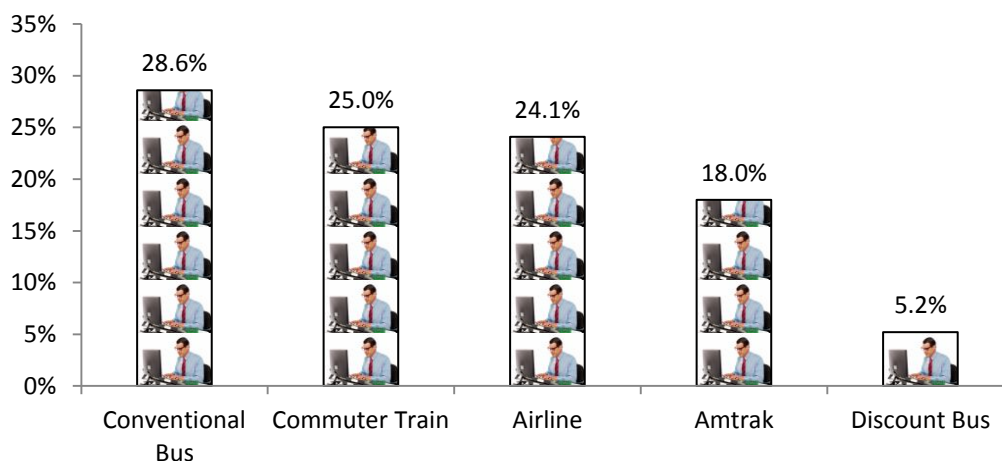
music, which does not require the use of a tablet/e-reader device.

Finding 4: The "digital divide"—the persistent disparity in technology use between affluent and less-affluent travelers—is rapidly diminishing. The dramatic increases in technology usage on Greyhound and other conventional bus lines is a hallmark of this trend.

Over the past year, Greyhound and other conventional bus lines recorded the highest percentage gain in technology use as more passengers bring sophisticated devices with them. As recently as three years ago, less than 25% of Greyhound passengers used technology at any random point, and more than two-thirds of these users were engaged only in audio-oriented tasks. This year, the share of passengers using technology surged to 43.6%—an increase of 28.6% since 2012 (Figure 6). In addition, more than 60% of the technology users engaged in visual or audio-visual tasks, compared to just 35% in 2010. Tablet/e-reader usage, however, remains low among passengers (as noted above), although it is also on the rise.

Figure 6
Percent Growth in Technology Use by Mode
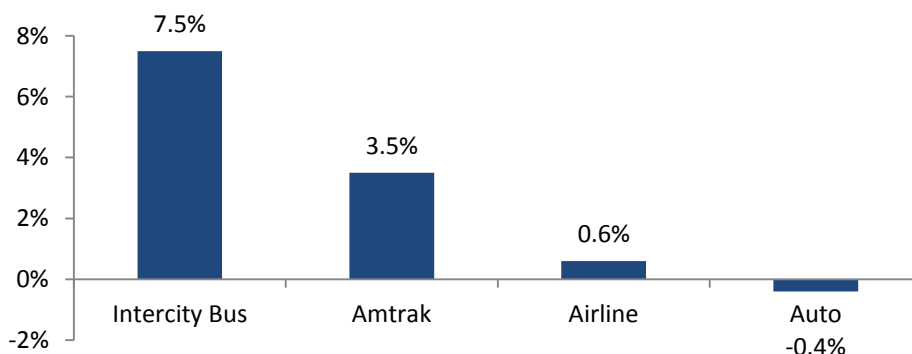*Between 2012 and 2013*

As the digital divide falls, a convergence in technology use is occurring between the various modes of transportation. The three modes that had the lowest technology use in 2012—conventional bus lines, commuter trains, and airlines—had the highest growth between 2012 and 2013.

Finding 5: Compelling evidence exists that the ridership gains made in bus and train travel in recent years is partially attributable to the "tech friendly" qualities of these modes. Bus and train traffic has grown much faster than air and auto traffic over the past several years. Air and auto travel—on which personal technology is often difficult to use—grew only minimally between 2012 and 2013.

The two fastest growing modes of travel over the calendar years 2011 and 2012—intercity trains and discount buses—were also those in which the technology use was observed to be the highest in early 2013. On airlines, the FAA ban on electronic use at takeoff and landing, coupled with congested onboard environments, is a deterrent to technology use (see discussion in Part A of this year's Technology in Intercity Travel report; link provided on page 15). We estimate that the ban disrupts more than 105 million hours of technological activity annually, twice the level as three years ago.

The amount of intercity bus service grew by 7.5% between 2011 and 2012, while the number of Amtrak passengers grew by 3.5% (based on fiscal year ending in September 2012). Airline boardings grew by 0.6% over this period and car travel fell by 0.4%. (See Endnote 4 for a summary of the sources of this data). 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). Greyhound continues to roll out its premium "Greyhound Express" service on many routes nationwide.

Figure 7
Growth in Intercity Services Level by Mode
Between 2011 and 2012
Calendar Year for Air, bus, auto and Fiscal Year for Amtrak

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 boardings and passengers, respectively. Air, bus and auto data based on calendar year while the Amtrak data is based on fiscal year ending September 30, 2012. Auto mileage is measured by year-over-year changes in private automobile mileage (vehicle miles traveled). See Endnote 4 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

Technology use is poised to continue growing over the next year as dramatic changes in technology develop. Several factors are particularly noteworthy:

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   Proposals to lift the FAA ban on the use of personal electronic devices at takeoff/landing;
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.

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, only the passenger most closely situated to the device is 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 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.

DigEplayers on ALASKA AIRLINES: We also omitted the two Alaska Airlines flights from the final analysis 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. The inclusion of these flights raises the cumulative percentage of travelers engaged with technology to 37.0% and the percentage using tablets to 12.7%.

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 – Memphis, Detroit - Grand Rapids, Chicago - Detroit, Chicago – Grand Rapids, Chicago – Milwaukee, Chicago – Indianapolis - Cincinnati, Chicago – Indianapolis - Columbus, and Chicago – Toledo – Cleveland routes. Greyhound passengers were observed on eights routes in various Midwestern states.

FLIGHTS OBSERVED: Noted on *Table 3* below.

TABLE 3
LIST OF SCHEDULED FLIGHTS OBSERVED

Airline	Day/Date	Origin	Destination	Scheduled Departure
Alaska	Friday (03-22-13)	Chicago, IL	Portland, OR	5:10 PM
Alaska	Wednesday (04-03-13)	Seattle, WA	Chicago, IL	6:05 PM
American	Friday (3-8-2013)	Chicago, IL	Miami, FL	9:00 AM
American	Thursday (3-14-2013)	Miami, FL	Chicago, IL	3:35 PM
Delta	Tuesday (3-26-13)	Chicago, IL	Atlanta, GA	4:45 PM
Delta	Tuesday (3-26-13)	Atlanta, GA	Tampa FL	8:35 AM
Southwest	Friday (03-15-13)	Chicago, IL	Las Vegas, NV	9:55 PM
Southwest	Friday (03-08-13)	Chicago, IL	Greenville (GSO), SC	10:50 AM
Southwest	Friday (03-08-13)	Greenville (GSO), SC	Nashville, TN	1:50 PM
Southwest	Monday (03-11-13)	Nashville, TN	Boston, MA	10:45 AM
Southwest	Monday (03-11-2013)	Chicago, IL	Nashville, TN	8:20 AM
Southwest	Tuesday (03-12-2013)	Boston, MA	Washington, D.C.	1:45 PM
Southwest	Tuesday (03-12-2013)	Washington, D.C.	Chicago, IL	4:35 PM
Southwest	Thursday (3/21/2013)	Chicago, IL	Cleveland, OH	2:00 PM
Southwest	Thursday (3/21/2013)	Cleveland, OH	Baltimore, MD	5:00 AM
United	Wednesday (4-3-13)	Tampa, FL	Chicago, IL	6:00 AM
US Airways	Wednesday (3/20/2013)	Chicago, IL	Philadelphia, PA	9:45 AM
US Airways	Wednesday (3/20/2013)	Philadelphia, PA	Chicago, IL	7:42 PM
US Airways	Wednesday (3/20/2013)	Philadelphia, PA	Providence, RI	12:55 PM
US Airways	Wednesday (3/20/2013)	Providence, RI	Philadelphia, PA	4:40 PM
US Airways	Friday (3/8/2013)	Chicago, IL	Charlotte, NC	5:45 AM
US Airways	Friday (3/8/2013)	Charlotte, NC	Pensacola, FL	9:30 AM
US Airways	Wednesday (3/13/2013)	Pensacola, FL	Charlotte, NC	7:35 AM
US Airways	Wednesday (3/13/2013)	Charlotte, NC	Chicago, IL	11:45 AM

COMMUTER RAIL PASSENGERS OBSERVED: All observations were on Metra or the South Shore Line commuter routes as noted on Table. For additional details, 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
North	Milwaukee District North and Union Pacific North	857
Northwest	Milwaukee West and Union Pacific Northwest	436
West	BNSF and Union Pacific West	1,001
Southwest	Rock Island and Southwest Service	517
South	Metra Electric and South Shore Line	667

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

Note: The Milwaukee West line between Chicago and Elgin is classified as a "Northwest" route due to the extensive ridership this line generates from suburbs immediately south of the Jane Adams Northwest Tollway, such as Bartlett, Schaumburg, and Hoffman Estates. These communities are regarded as Northwest suburbs.

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: 2012 – 2013" (*Part B: Technology in Intercity Travel Study – 2013 Update)*

Our report, published in May, focusing on our 2013 results measuring tech use on commuter trains.

 "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

References

Andreev, Pavel. 2010. "Review: State of Teleactivities." *Transportation research. Part C, Emerging technologies*,18(1), p. 3.

Golob, T.F. and A.C. Regan, Impacts of information technology on personal travel and commercial vehicle operations: research challenges and opportunities, *Transportation Research Part C* – Emerging Technologies 9 (2001), pp. 87–121.

Jackson, Linda A., Zhao Yong, Anthony Kolenic III, Hiram E. Fitzgerald, Rena Harold, and Alexander Von Eye. 2008. "Race, Gender, and Information Technology Use: The New Digital Divide." *CyberPsychology & Behavior* 11, no. 4: 437-442. Business Source Complete, EBSCOhost (accessed November 14, 2009).

Needle, David "Big jump to 99m tablet sales worldwide forecast for 2012," TabTimes: Tablet News, Trends and Solutions, December 16, 2011.

Nicas, Jack, "Playing the Wireless Card: Airlines Rush to Add Wi-Fi", *Wall Street Journal*, October 11, 2011.

Pew Charitable Trust. *Pew Internet: Per Internet and American Life Project*. http://www.pewinternet.org/Trend-Data-(Adults)/Device-Ownership.aspx Accessed on April 29, 2013.

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 14 for a link to this study.

Schwieterman, Joseph P, Brian Antolin, Paige Largent, and Marisa Schulz. *The Motor Coach Metamorphosis 2012: Year-in-Review of Intercity Bus Service in the United States*. Chaddick Institute Policy Study, DePaul University, January 6, 2013, available at http://las.depaul.edu/chaddick

---

[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. Although we 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 Joseph P. Schwieterman 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 14 for a link to this study.

[3] For a summary of the demographics qualities of riders based on the Chaddick Institute's 1,000-passenger survey, see our *Who Rides Curbside Buses* report (2011); link provided on page 15

[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] This data is obtained from these sources:

  1. Intercity bus: Schwieterman, Antolin, Schulz, and Largent (2012), available at http://las.depaul.edu/chaddick

  2. Airlines: Bureau of Transportation Statistics/RITA, available at http://www.transtats.bts.gov/Data_Elements.aspx?Data=5;

  3. Amtrak: Amtrak.com, data obtained from, Amtrak Sets new Ridership Record, press release, October 10, 2012, available at http://www.amtrak.com/ccurl/636/294/Amtrak-Sets-New-Ridership-Record-FY2012-ATK-12-092.pdf

  4. Auto: Federal Highway Administration data, as reported by the State Smart Highway Initiative at http://www.ssti.us/2013/02/per-capita-vmt-ticks-down-for-eighth-straight-year/