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Evaluating Opportunities to Enhance Hoosier State Train Ridership through a Survey of Riders' Opinions and an Assessment of Access to the Line



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16. Abstract Passenger rail is an integral part of intercity transportation networks, especially in areas where residents do not have access to a car or there are not any other options for intercity travel. The Hoosier State Train (HST) line connects five stations in Indiana with Illinois. Since 2013, the HST line faced the probability of discontinuation many times. In 2015, the Indiana Department of Transportation (INDOT) reached an agreement with Iowa Pacific Holdings, forming a very unique public-private partnership, with a shared vision to improve on-time performance, improve speed and maintain a reliable schedule, increase ridership, and provide better on-board amenities. This study conducted an on-board survey of HST riders' opinions in October and November 2016. A total of 908 responses were collected (response rate of 85%). The results showed that HST impacts not only counties in Indiana with a station but also counties without a station; approximately one out of five respondents reported that they traveled more than 30 miles to reach a station. A stronger intention to ride the train in the short and long run since 2015 was also reported. Additionally, safety, amenities, and cost were ranked as the most important attributes when choosing to travel on an intercity rail, while reliability, flexibility, and convenience were ranked lower for intercity rail. Recommendations and best practices on addressing a possible gap into the first and last mile travel options for intercity rail riders as well as making parking enhancements around the stations were shared with INDOT to enhance ridership.			
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EXECUTIVE SUMMARY

EVALUATING OPPORTUNITIES TO ENHANCE HOOSIER STATE TRAIN RIDERSHIP THROUGH A SURVEY OF RIDERS' OPINIONS AND AN ASSESSMENT OF ACCESS TO THE LINE

Introduction

Since 2013, the Hoosier State train (HST) line faced the probability of discontinuation many times. In 2015, after many unfruitful attempts and obstacles, INDOT reached an agreement with Iowa Pacific Holdings (IPH), in addition to the existing agreement with Amtrak. This formed a very unique (first of its kind in the U.S.) public-private partnership, with a shared vision to improve on-time performance, improve speed and maintain a reliable schedule, increase ridership, and provide better onboard amenities. An onboard survey was conducted in the fall of 2015, at the beginning of the new agreement with IPH, and suggested the need for a follow-up survey to explore the changes in riders' opinions and capture any changes in the ridership (particularly in population distribution in terms of age, target groups, frequency of travel, etc.).

The objectives of this project were threefold:

1. To develop a framework that can be used to monitor the changes in rider's opinions of the HST services and evaluate the effectiveness of the ongoing service improvements;
2. To utilize this to identify reasons for any changes in ridership since the beginning of the IPH agreement, assess which factors contributed the most to any changes, and evaluate the potential impact on ridership of future planned improvements of the service; and
3. To identify opportunities to enhance the HST service by evaluating intercity rail strategies and best practices on parking and first and last mile strategies.

Study Framework

An onboard survey was designed to monitor changes on riders' perceptions of the HST service and evaluate the effectiveness of ongoing improvements. The fall 2015 survey was considered as the primary source for this follow-up onboard survey, as well as feedback received from the Study Advisory Committee (SAC) members. The follow-up survey was modified to address issues that were identified as part of the 2015 survey results. Those issues were related to origin-destination responses, perceptions about accessibility (e.g., parking availability around stations, access to the platform), the perceived ease of use and usefulness of the passenger rail service, and future usage of the service. The survey instrument was reviewed and approved by the Institutional Review Board (IRB protocol # 1503015896A002).

The questionnaire consisted of four sections. The first section included questions pertaining to trip characteristics and familiarity of respondents with the service. The second section included questions on respondents' opinions and thoughts about the HST. The third section, mode choice, included trip attributes (cost, travel time, comfort, safety, etc.). In that section, respondents were asked to indicate the level of importance of these attributes and rate them for five different modes of transportation currently available in the area. Finally, typical sociodemographic questions were added at the end of the survey instrument to examine differences in attitudes

and behaviors toward passenger rail among different socioeconomic and demographic groups.

The survey data collection took place over nine days during a time span of three weeks (mid-November until early December). The target population included passengers of HST older than eighteen years who were not employees of Amtrak or IPH. Approximately 1,070 people were asked to participate; 908 completed responses were collected, which corresponds to a response rate of 85%.

Findings

The key findings of the 2016 survey, as well as a comparison between the 2015 and 2016 survey findings, are as follows:

- The distribution of respondents by gender, employment situation, and household income was similar in the 2015 and 2016 surveys.
- A significant increase in single household riders was identified in the 2016 survey.
- A higher percentage of people who did not own a vehicle was observed in 2016 compared to 2015 (35% and 14%, respectively).
- HST impacts not only Indiana counties with a station, but also counties without a station. Around 23% of respondents lived outside a county with a station, such as Hamilton, Boone, Monroe, Hendricks, and Howard.
- One out of five respondents reported that they traveled more than 30 miles to reach a station. In addition, more than half of the respondents were dropped off or drove to access the train station. A similar proportion of respondents got a ride or drove a car from the station.
- In 2016, respondents took the train from Rensselaer to Lafayette, a trend that was not observed in the 2015 survey.
- Respondents indicated a stronger intention to ride the train in the short and long run compared to the fall 2015 results.
- Of all respondents, 43% fell into the economically active age range of 25 to 54 and stated a stronger intention to travel in the near future than any other age group.
- Intercity trains were the most favorable mode for riders who traveled less than two miles to access a station.
- In 2016, reliability, safety, and ease of use were ranked as the most important attributes in mode choice decisions across all of the modes, as compared to safety, reliability, and convenience in 2015.
- Safety, amenities, and cost were the most important attributes when choosing to travel on an intercity train for the 2016 survey respondents compared to comfort, cost, and safety as reported in the 2015 survey.

Recommendations/Implementation

Recommendations based on the factors affecting the use of intercity trains include, but are not limited to:

- Passenger rail service was ranked lower based on reliability, flexibility, and convenience, which are the attributes riders rated as most important when choosing a travel mode.
- Setting higher goals and improving on-time performance could improve reliability of the service.
- Providing solutions to the first and last mile problem could enhance flexibility (i.e., ease to reach a desired destination).
- Reconsidering the current HST schedule could enhance convenience; this would also address the first and last mile

problems, mainly in the case of passengers taking the train in Indianapolis.

- Safety, comfort, and availability of onboard amenities could be promoted in a better way to retain and attract new passengers.
- For the Rensselaer station, another strategy could be promoting the train to college students to enhance ridership.

Recommendations based on the review of intercity rail strategies and best practices include, but are not limited to:

- A possible gap into the first and last mile travel options for HST rail riders was identified.
- Ridesharing and carsharing are preferred strategies for addressing the first and last mile problems in urban areas with a rail station.
- Micro-transit could be implemented to provide service to counties further from the stations.
- Improvement of existing or new park-and-ride facilities could offer a significant opportunity for the HST to attract ridership from people who live in counties without stations.
- Future research can identify and assess specific solutions on first and last mile issues around the HST stations, as well as evaluate the current partnership of Amtrak with the transportation network company, Lyft.

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1. INTRODUCTION

1.1 Overview

In the U.S., the development of a nationwide inter-city passenger and high-speed rail (HSR) network has been suggested as a promising and sustainable passenger transport solution associated with many economic, social, and environmental benefits such as mobility and connectivity improvements, business growth, and energy consumption and greenhouse gas emissions reductions.

Once famous for passenger rail transportation, the state of Indiana had the first Union Station in the world and one of the most widespread and luxurious inter-urban rail systems in the U.S. Technology advancements in highway and aviation networks together with the national trend towards a more automobile-oriented transportation systems development left the state with only limited passenger rail service (Pyrialakou & Gkritza, 2016). Today, central Indiana is served by two passenger rail lines, the Hoosier State line (HST), which is a short distance corridor running four days per week between Indianapolis, IN, and Chicago, IL, with intermediate stops in Crawfordsville, Lafayette, Rensselaer, and Dyer, and the Cardinal line, which is a long distance corridor between New York, NY, and Chicago, IL, serving the same stations under the same schedule the remaining three days of the week.

Since 2013, the HST line faced the probability of discontinuation many times. After many unsuccessful attempts and many difficulties, INDOT reached an agreement with Iowa Pacific Holdings (IPH) and a separate agreement with Amtrak (INDOT & Iowa Pacific Holdings, LLC, 2015). IPH started providing the equipment for the line in August 2015, and works with Amtrak to keep the train in service, with a shared vision to improve on-time performance, enhance speed and preserve a reliable schedule, increase ridership, and provide better onboard amenities. INDOT and the communities along the line have been financially supporting the line since 2013 and will continue doing so at least until June 2018 when the current agreement will expire. The result was a very unique (first of a kind in the U.S.) public-private partnership. However, after the termination of the IPH agreement, the service fully transitioned to Amtrak on March 1, 2017.

Past research suggests that investment in public transportation, and specifically, in passenger rail in Indiana would be vital to reaching the communities' long- and short-term objectives. Specifically, the continuation and further advancement of the HST would benefit the state, especially in terms of multimodality, accessibility and connectivity, and economic development. However, an increase in ridership has been highlighted as a key condition to ensure viable services. Apart from the marketing effort, prior research identified a number of improvements to the train services as well as system-wide enhancements that can foster such a growth. For example, it was found that from a planning point of view, improving the reliability of the line, and the schedule's

convenience and flexibility is expected to produce the most benefits. In addition, research suggested that fostering a multimodal planning coordination of services and ensuring that parking is available close to the stations could also support efforts to increase ridership (Pyrialakou, 2016).

In fall 2015, the Purdue research team conducted an onboard survey on the HST to gather information relating to the perceived ease of use and usefulness of the passenger rail service, riders' opinions, and other factors that might affect behavior toward passenger rail service. That survey was conducted over three days during October 2015, and it gathered 421 responses. In the 2015 survey, some differences in the riders' opinions and intentions to use the service in the future arose between younger and older population as well as between men and women. In addition, it was found that only 42% of the riders' lived within counties that have a station; 27% came from other counties in Indiana, and the rest from other states (including but limited to Illinois). Many riders lived in counties of rural (such as Greene, Owen, Pulaski, Putnam, and Tipton) and mixed urban/rural typology (such as Bartholomew, Boone, Clinton, Grant, Hancock, Howard, Knox, Lawrence, Morgan, Shelby, Wabash, and Wayne) that do not offer any other inter-city public (mass) transportation options.

The fall 2015 survey was considered the primary source for this follow-up onboard survey as well as feedback received from the Study Advisory Committee (SAC) members. The follow-up survey was modified to address issues that were identified as part of the 2015 survey results. Those issues were related to origin-destination responses, perceptions about accessibility (such as parking availability around stations, and access to the platform), the perceived ease of use and usefulness of the passenger rail services, and the future usage of the service. The survey instrument was reviewed and approved by the Institutional Review Board (IRB protocol # 1503015896A002). Data collection took place on nine days over a time-span of three weeks (mid-November until early December). The target population included passengers of HST older than eighteen years who were not employees of Amtrak or IPH. Lastly, approximately 1,070 people were asked to participate collecting 908 completed responses, which equals to a response rate of 85%.

1.2 Research Objectives

This research project was a unique opportunity to assess whether the new, innovative public-private partnership model described in the previous section can be effective for short rail corridors, like the HST line. The onboard survey conducted in fall 2015 found riders at the beginning of the new agreement with IPH. Since then, the HST partners have been working on improving the services and increasing ridership. The follow-up survey aims to explore the changes in riders' opinions, and capture any changes in ridership (in terms of age, frequency of travel, etc.).

The goal of this study is to evaluate the opportunities to enhance the HST train ridership through a survey of riders' opinions and an assessment of access to the line. The specific objectives under this main goal are:

1. To develop a framework that can be used to monitor the changes in rider's opinions of the HST services and evaluate the effectiveness of the ongoing service improvements.
2. To utilize this framework in order to:
 - a. identify reasons for any changes in ridership since the beginning of the agreement with IPH, and
 - b. assess which factors contributed the most to any changes, and evaluate the potential impact on ridership of future planned improvements of the services.

1.3 Research Workplan

To achieve the research objectives, four tasks were conducted as discussed below.

1.3.1 Task 1: Survey Data Collection

Data collection took place on board the HST in a time span of three weeks. The target population included all passengers of the HST older than 18 years who are not employees of Amtrak or IPH. Each passenger participated in the survey only once. Approximately 1,070 people were asked to participate collecting 908 completed responses, which equals to a response rate of 85% (the 2015 survey had a response rate of 70%). A pilot survey was conducted on three days during the end of September to early October period at Lafayette's Amtrak station, to test the accuracy and clarity of the questions. The survey instrument (questionnaire) was finalized in view of the pilot survey results and in consultation with project's Study Advisory Committee (SAC) members. The deliverable for this task was the final survey instrument.

1.3.2 Task 2: Survey Data Analysis

A descriptive analysis was conducted to categorize any existing trends in the data. In specific, the research team investigated changes based on socioeconomic and demographic characteristics and usage levels of the HST. It was hypothesized that there were some changes both in the opinions towards the HST and the intention to use the train in the future across different sociodemographic groups. A preliminary report was prepared at the completion of this task.

1.3.3 Task 3: Survey Results Comparison

The responses of the HST riders were summarized and compared to those from the fall 2015 survey. The comparison focused on changes in riders' sociodemographic characteristics and place of residence, riders' opinions on the HST services and corresponding attributes

(e.g., reliability, convenience). The deliverable for this task was a comparison report with the results of both surveys.

1.3.4 Task 4: Recommendations to INDOT and Draft Final Report

Based on the study results, the research team identified opportunities and provided recommendations to INDOT on innovative practices to enhance ridership by evaluating intercity rail strategies and best practices on parking and addressing first and last mile problems.

1.4 Organization of the Report

The structure of this report is as follows. Chapter 2 presents an overview of the survey design and data collection. This chapter also presents the final survey content. Chapter 3 provides the results of the 2016 survey and the comparison of the 2016 and 2015 surveys. Chapter 4 presents a description of the intercity rail strategies and best practices on parking and first and last mile solutions as resources to identify opportunities to enhance the service. Finally, a summary of the key outcomes, lessons learned, and opportunities for future research are presented in Chapter 5.

2. SURVEY DESIGN AND DATA COLLECTION

In order to design the follow-up survey, the questionnaire used in fall 2015 was considered as a primary source. However, the follow-up questionnaire was modified to address issues that were identified as part of the 2015 survey results. Those issues were related to origin-destination responses, perceptions about accessibility (such as parking availability around stations, access to the platform), need for more information about the perceived ease of use and usefulness of the passenger rail services, and information about the future usage of the service.

The 2015 questionnaire was shared with the project's SAC members to identify which questions would remain identical and design new questions. This process took approximately one month, where SAC's members had the opportunity to discuss and provide feedback and recommendations on the questionnaire. A SAC meeting was held at INDOT on August 18, 2016 and a WebEx call meeting on September 13, 2016. Amtrak's Market Research & Analysis Department was also involved in the questionnaire design. The Purdue research team addressed the recommendations made on the survey before the pilot survey was conducted. The Purdue research team also worked on obtaining permission from the Institutional Review Board (IRB), since the study involves human subjects (IRB protocol # 1503015896A002).

2.1 Pilot Survey

The next step was to test the current questionnaire conducting a pilot survey. A pilot survey would test the

TABLE 2.1
Summary of pilot survey key takeaways.

Section	Question	Change
1.1	4	No need for a line to provide an answer
	5	Clarify that the question is about the arrival station
2.1	1	Add a “Not applicable” option
2.4	5	Add a “Not applicable” option
	6	Add a “Not applicable” option
3	c	Point out with a bullet

accuracy of the guidelines of each question and provide better information on whether the type of survey was effective in accomplishing the study objectives. The defined sample for the pilot survey was 3% of the expected total sample (908 completed responses). The questionnaire used in the pilot survey is attached in Appendix A.

To conduct the pilot survey, the Purdue team contacted Lafayette’s Amtrak station volunteer, Mr. Joe Krause, who also helped with the pilot survey in 2015. The pilot survey was conducted on Wednesday September 28, Friday September 30, and Sunday October 2, 2016. The pilot survey was distributed in the morning trip, when the train goes from Indianapolis to Chicago due to the high percentage of riders between Lafayette and Chicago, as shown in the 2015 survey. The key takeaways of the pilot survey are summarized in Table 2.1.

After the pilot survey was conducted and the changes were addressed, the procedure of submitting and getting approval of the survey from the IRB at Purdue was finalized.

2.2 Final Questionnaire

The questionnaire used for the onboard survey began with a brief introduction of the HST, and the improvements that the service had undergone since the joint partnership between IPH, INDOT, Amtrak, and the Cities of Crawfordsville, Lafayette, West Lafayette, and Rensselaer which was formed in 2015. The following sections describe the sections in the final survey instrument (shown in Appendix B).

2.2.1 Section 1: Trip Characteristics and Experience with the HST

The first section was composed of sub-section 1.1 “Trip characteristics and experience with the HST.” This section included questions about the characteristics of the trip and the familiarity of respondents with the service. Several of these questions were not included in the previous survey, but were found important for this follow-up survey in order to gather the information needed to conduct an accessibility analysis. There were two questions related to riders’ origin and destination pair. Question 1 and 4 asked about the particular station where people boarded and got off, respectively. The options for these two questions were the six stations that HST serves. In the same way, there were two

questions associated with the distance people need to travel to reach the departure station, as well as the distance needed in order to reach their final destination. These two questions were numbered 2 and 5 and were open-answered questions.

Section 1 also included questions designed to identify the mode that riders used to reach and leave their departure and arrival stations, respectively. These questions included options such as drive or rent a car, ride the bus, walk, being dropped by someone, use a bicycle, take a taxi or ridesharing service like Uber, Lyft or other mode. The question related to reaching the station where the riders boarded was associated with a sub-question about the location of parking in case they arrived using their personal vehicle. That last question was intended to capture the ease of parking around the station for those who drove a car to access the station. These questions were 3a, 3b, and 6.

Four additional questions were related to the experience on the HST. Question 7 was associated with the frequency, which riders traveled on the HST in the year before the survey. Question 8 asked about the purpose of the trip. Questions 9 and 10 were related to the experience on the train as part of a large group and the possible discounts that could be applied when purchasing tickets for the HST, respectively. Those questions were anticipated to quantify the level of usage of the HST, as well as the level of usage of the available discounts to ride the train.

2.2.2 Section 2: Ease of Use and Usefulness of the HST

Section 2 is composed of 4 sub-sections. Overall, these sub-sections tested the perceptions of the passengers about the current HST service and in the future.

Section 2.1 “Ease of using HST” included eleven questions about the ease of using some resources that people interact with during their experience as riders of the HST. This section included questions related to the interaction with the ticketing system and the information system (Questions 1 and 2). Moreover, this section included questions about the perception of the distance from riders’ house location to the station as well as the parking availability near the HST stations (Questions 3, 4a, and 4b). Section 2.1 also included questions about the ease to access the platform for riders with and without disabilities (Questions 5a and 5b), and questions about riders’ perception on the storage space available for luggage or other essentials goods on board (Questions 6 and 7). Question 8 and 9 were related to the improvements that the service introduced after the joint collaboration started. These questions asked about the changes for onboard amenities (e.g., Wi-Fi, hot meal services, snacks and beverages) and the possibility to ride with a pet on the train service. Question 10 referred to the ease to find travel brochure information related to Indiana destinations at the HST stations. Finally, question 11 asked for the overall ease in traveling with HST. The responses provided to these questions ranged from “strongly agree” to “strongly disagree” with the statements made.

Questions 1, 4a, 4b, and 9 permitted the response of “not applicable” for those who did not find those statements appropriate to their situation.

Section 2.2 “*Usefulness of the HST*” consisted of six questions. These questions aimed to provide information about whether people thought they would be more likely to travel with the HST based on speed, safety, time, cost, and travel purposes. Question 1 asked about the possibility to reach a destination faster by traveling with the HST. Question 2 asked about the perception of a safer trip on the HST, and Question 3 asked about the perception of higher travel time productivity onboard. Questions 4 and 5 were related to the cost of traveling alone or with a group on the train. Lastly, Question 6 questioned whether riding the HST line fits the traveling purposes of the respondents. The responses provided from these questions ranged from “very unlikely” to “very likely” to the statements made.

The Section 2.3 questions on “*Your thoughts about the HST*” were included in order to learn the opinions of riders about the HST. This section was composed by six questions. The first question asked whether it would be beneficial for the environment if more people took the train. Similarly, Question 2 asked if using the HST would contribute to the reduction of traffic congestion and Question 3 asked if it would enhance economic development in Indiana. Question 4 asked if the State of Indiana should invest funding to support the HST service. Riders’ perception about how convenient was the schedule for their trip purposes was asked in Question 5. Finally, Question 6 asked about the on-time perception of the riders to reach a destination using the HST. The responses provided to these questions ranged from “strongly agree” to “strongly disagree” to the statements made.

Section 2.4 “*Using the HST in the future*” asked about the intention to use the HST service in different scenarios. The first question asked about the intention to travel on the train in the next month, which aimed to gauge respondent’s short-term intention to travel on the HST. The second question asked about the intention to travel on the train in the foreseeable future, which aimed to perceive their long-term intention. Question 3 examined the possibility of taking the HST if gas prices were higher in the future. Similarly, Question 4 asked about the possibility of taking the HST if parking costs were higher in the future. The last question of this section (Question 5), asked about the possibility of taking the HST if they were able to ride with their bicycles. The responses provided from these questions ranged from “strongly agree” to “strongly disagree.” Question 5 considered the option “Not applicable” for those who did not own a bike.

2.2.3 Section 3: Mode Choice

The third section consisted of sub-section 3.1 “*Mode choice*.” This subsection led to two tables that provided the primary information needed to conduct a multi-attribute attitude analysis. The attributes measured in

the 2015 survey by Pyrialakou (2016) were the same considered in the 2016 survey. The attributes measured were defined as qualities or features that characterized a transportation mode. Following the suggestions of (Solomon, 2009), based on Fishbein’s theory, the following attributes were considered:

- Cost
- Travel time
- Comfort
- Safety
- Amenities (Wi-Fi, food, etc.)
- Flexibility of travel (ability to go wherever one chooses)
- Convenient/flexible schedule
- Reliability (not being late)
- Ease of traveling (minimize the effort required to travel)

The first table asked the level of importance for each of these attributes when the respondent was selecting a mode for medium distance trip (3 to 5 hours). The evaluation of attributes was rated on a five (5)-point importance scale, from one (1) not important at all to five (5) extremely important.

The second table asked to rate each of the attributes considered in the last question in terms of five different modes: 1. Automobile-Drive Alone, 2. Automobile-Carpool, 3. Intercity Bus, 4. Intercity Train, and 5. Airplane. Respondents were asked to rate the nine attributes in each mode choice on a scale of 1 (poor) to 5 (excellent).

Finally, the section considered a question about daily mode choice. This question asked whether a rider would always go to work or go shopping by car.

2.2.4 Section 4: Demographic Information

Finally, socioeconomic and demographic questions were included in Section 4 in order to examine variations in the attitudes and behaviors towards passenger rail among different socioeconomic and demographic groups. These group of questions asked about the gender of the respondents, age range, employment situation, annual household income, level of education, number of children in the household, number of personal vehicles, and household state, county and city location.

2.3 Onboard Survey

The two student authors of this report administered the survey. Permission from Amtrak to conduct the survey was obtained in advance by submitting a request for “Temporary permit to enter upon Amtrak property” and the completion of a contractor safety and security awareness training session by the students.

Data collection for the onboard survey was scheduled for nine days over a three-week period (Table 2.2). The target population included all passengers of the HST older than eighteen years, who were not employees of Amtrak or IPH. Each passenger could take the survey only once. For this survey, approximately 1,070 people were asked to participate, and finally, 908 responses were collected, which equals to a response rate of 85%.

TABLE 2.2
Onboard data collection schedule.

Day	Date	Departure Station	Arrival Station
Sunday	11/13/2016	Indianapolis	Chicago – Union Station
Sunday	11/13/2016	Chicago – Union Station	Indianapolis
Wednesday	11/16/2016	Indianapolis	Chicago – Union Station
Wednesday	11/16/2016	Chicago – Union Station	Indianapolis
Friday	11/18/2016	Indianapolis	Chicago – Union Station
Friday	11/18/2016	Chicago – Union Station	Indianapolis
Sunday	11/20/2016	Indianapolis	Chicago – Union Station
Sunday	11/20/2016	Chicago – Union Station	Indianapolis
Wednesday	11/23/2016	Indianapolis	Chicago – Union Station
Wednesday	11/23/2016	Chicago – Union Station	Indianapolis
Friday	11/25/2016	Indianapolis	Chicago – Union Station
Friday	11/25/2016	Chicago – Union Station	Indianapolis
Sunday	11/27/2016	Indianapolis	Chicago – Union Station
Sunday	11/27/2016	Chicago – Union Station	Indianapolis
Wednesday	11/30/2016	Indianapolis	Chicago – Union Station
Wednesday	11/30/2016	Chicago – Union Station	Indianapolis
Friday	12/2/2016	Indianapolis	Chicago – Union Station
Friday	12/2/2016	Chicago – Union Station	Indianapolis

The results presented in the next section involve the 2016 survey results in comparison with the 2015 survey results, during the time the HST was operated in a partnership between INDOT, IPH, Amtrak, and communities along the line. The service fully transitioned to Amtrak on March 1, 2017.

3. SURVEY RESULTS AND COMPARISON OF FINDINGS

In fall 2015, the Purdue research team conducted a survey on board the HST to gather information relating to the perceived ease of use and usefulness of the passenger rail services, riders' opinions, and other factors that might affect behavior toward passenger rail transportation. In addition, the effects of other factors that affect an individual's mode choice decisions, such as schedule and route restrictions, reliability, and convenience, were explored in the context of the HST service and the available intercity transportation mode choices between Indianapolis and Chicago. The survey was authorized by INDOT and approved by Amtrak and IPH. That survey was conducted in October 2015 and gathered 421 responses (response rate of 70%).

To monitor the changes between 2015 and 2016, thirty-eight questions from 2015 were included in the 2016 questionnaire. Nineteen new questions were added to the 2016 questionnaire in order to explore the findings from 2015 survey and additional concerns raised by INDOT. Table 3.1 presents the section of the survey and questions that were considered in both 2015 and 2016 surveys. The corresponding results will be presented in the next sections. A statistical test of proportions between the 2015 and 2016 survey results was conducted to examine statistically significant changes between the two surveys. This test aims to evaluate whether or not a portion from a population characterizes the true

proportion from the entire population. The statistical significance of the results is reported with their respective p value in parenthesis, where the test holds.

3.1 Who Rode the Train?

In 2016, 54% of the respondents were female and 46% of them were male. A similar distribution by gender was reported in the 2015 survey, as shown in Figure 3.1. The changes on the percentages for male and female were not significant between the years.

Of all respondents in 2016, 40% fell into the most economically active age range from 25 to 54 years old. Approximately one third of the respondents were from 18 to 24 years old, one fifth were from 25 to 34 years old, one third were from 35 to 64 years old, and approximately one sixth were older than 65 years old. A similar distribution by age was reported in the 2015 survey, where 43% of respondents fell into the most economically active range. Approximately half of the respondents were between 18 and 34 years old, as shown in Figure 3.2. The changes between 2015 and 2016 were significant at 1% level of confidence ($p < 0.001$) in the age group of 45 to 54 years old.

In 2016, 43% of respondents were full time employed, while 32% were students. Thus, half of respondents were currently employed either full or part time. The balance includes 14% retired persons, 2% currently employed, and 2% were classified as "other" in the survey (see Figure 3.3). The same categories were not included in the 2015 survey; for that reason the changes between years are cannot be assessed. Nevertheless, the percentages of respondents working full time were similar.

Of all respondents in 2016, 23% reported an annual household income before taxes under \$25,000, around 20% reported annual income of \$50,000 to \$75,000, and more than 10% of the respondents reported annual

TABLE 3.1
Questions considered in the 2015 and 2016 surveys.

Section	Question
1.1 Trip characteristics	In which station did you board the HST? In which station are you planning to get off the HST? How many times approximately have you taken the HST?
2.1 Ease of using the HST	My interaction with the ticketing system of the HST (Amtrak) is easy and understandable. My interaction with the information system (such as Amtrak app, electronic information boards and other systems providing real-time trip information) of the HST (Amtrak) is easy and understandable. It is easy for me to reach the closest HST station from my house. It is easy for me to park my personal vehicle (car, motorcycle, etc.) near the HST station. It is easy for me to access the platform at the HST station. It is easy for me to travel with the essentials for my trip purposes (carry-on luggage, etc.). Traveling with the HST is easy for me.
2.2 Usefulness of the HST	Using the HST would enable me to reach my destination faster. Taking the HST would make my trip safer. Using the HST would enable me to use the time it takes to reach my destination more productively. When I am traveling alone, using the HST to reach my destination would cost me less. When I am traveling with a group (family, friends, etc.), using the HST to reach my destination would cost me less. I find the HST useful for my traveling purposes.
2.3 Your thoughts about the HST	If more people used the HST, it would be good for the environment. If more people used the HST, it would contribute to the reduction of traffic congestion in Indiana.
2.4 Using the HST in the future	I intend to travel with the HST in the next month. I expect to travel with the HST in the foreseeable future. Higher gas prices would make it more likely that I would take the HST in the future. Higher parking costs would make it more likely that I would take the HST in the future. The availability of a bike-car would make it more likely that I would take the HST in the future.
3.1 Mode choice	The level of importance of each attribute: For each of the following transportation modes, rate each attribute by using a score from 1 to 5. Whether I go to work or go shopping, I almost always travel by car.
4.1 Demographic questions	Gender What is your age range? What describes best your employment situation? Please indicate your approximate annual household income before taxes. (Include total income of all adults living in your household.) What is your highest level of education? Including yourself, how many persons are in your household? Please indicate the number of children in your household under the age of 18. How many personal vehicles (including cars, trucks, motorcycles, etc.) does your household have access to or own? In a typical week, how many miles do you drive your personal vehicle? In which Indiana county is your house located? In which city is your house located?

household income of over \$150,000. A similar distribution by annual household income was reported in the 2015 survey, where the majority of respondents stated that their annual household income before taxes was under \$25,000, as shown in Figure 3.4.

In the 2016 survey, more than 10% of the respondents reported that their highest level of education was high school, 30% reported that some college was their highest level of education, and 28% of them indicated that they were college graduates. Relatively few (1%) reported less than a high school education (see Figure 3.5). The same categories were not included in the 2015 survey, for that reason the changes between years cannot be assessed. Nevertheless, the majority of respondents in both

surveys stated that some college was their highest level of education.

The respondents of 2016 survey came from a wide range of household sizes. A single person household was more common (33%) among the respondents than other household size. However, two-person household was also very common, with 29% of respondents reporting this household size. The percentage of two-person households was higher than the one-person households in the 2015 survey, as shown in Figure 3.6. In addition, the changes between 2015 and 2016 with respect to one-person and four-person households were significant at the 1% level ($p < 0.01$).

The majority of the respondents did not have any children in their household when the 2016 survey was conducted.

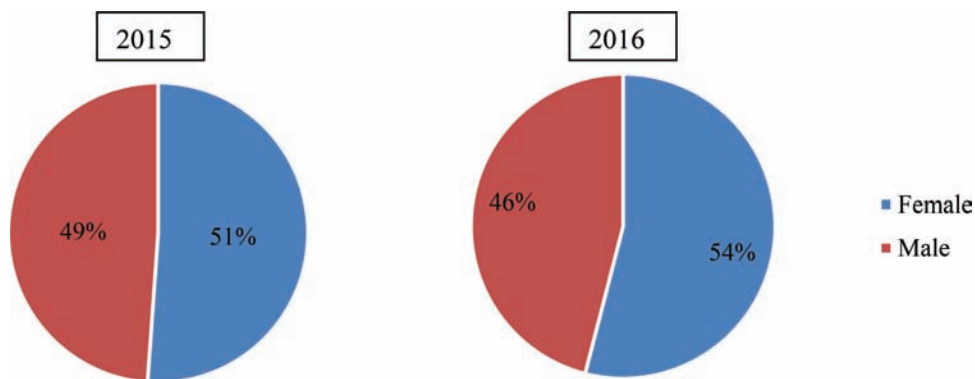


Figure 3.1 Distribution of respondents by gender.

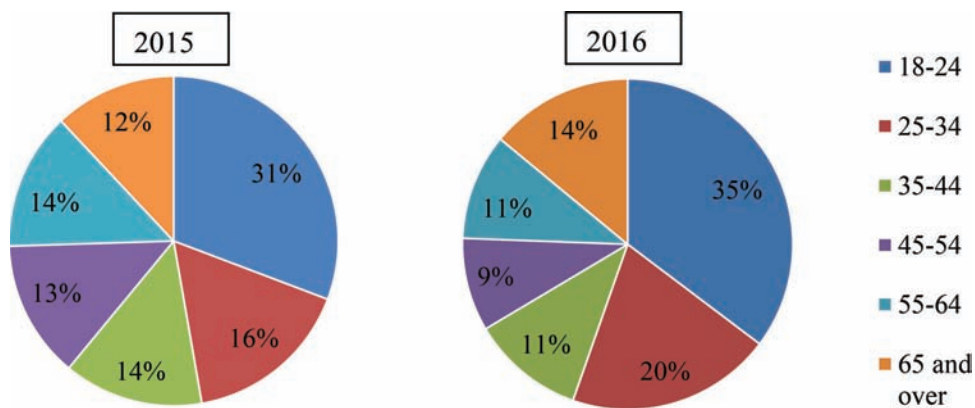


Figure 3.2 Distribution of respondents by age.

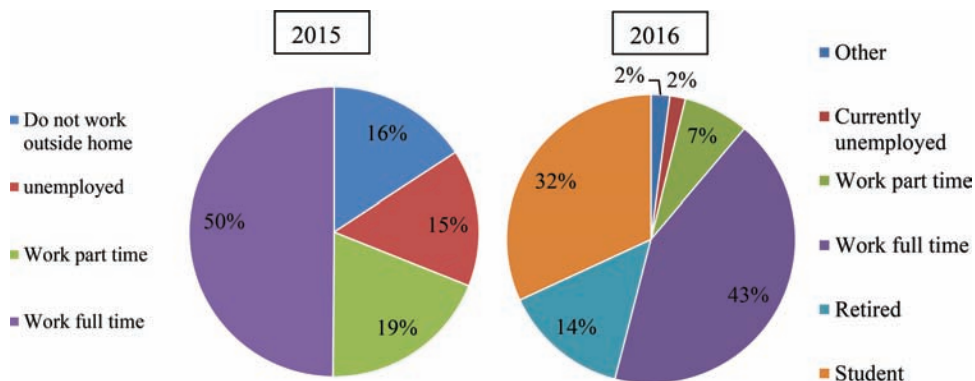


Figure 3.3 Employment situation of respondents.

However, the change in percentage of zero children in the household was significant between 2015 and 2016; the percentage was 11% fewer in 2015 with respect to 2016 responses (see Figure 3.7). The changes of proportion for one, two, and three children in the household were also significant from one survey to another (p values < 0.01).

Approximately 22% of the riders did not own a vehicle with the highest proportion of them being between 18 and 34 years old. Around 27% of the riders owned one personal vehicle in their households and 30% of them owned two vehicles. Additionally, approximately 13% of the riders owned three vehicles and 10% of them

owned four or more vehicles, as shown in Figure 3.8. Additionally, riders that owned two or more vehicles in their households still took the train with approximately 30% of them owning two vehicles, 13% of them owning three vehicles, and 10% of them owning four vehicles.

Comparing the 2016 results with the 2015 survey results, approximately 14% of the riders did not own a vehicle (see Figure 3.9). Fewer passengers rode the train if they reported the households owned three or more vehicles, and more passengers rode the train if their households owned three or fewer vehicles.

For those respondents who owned a vehicle, most reported in both surveys that they were driving 5 to

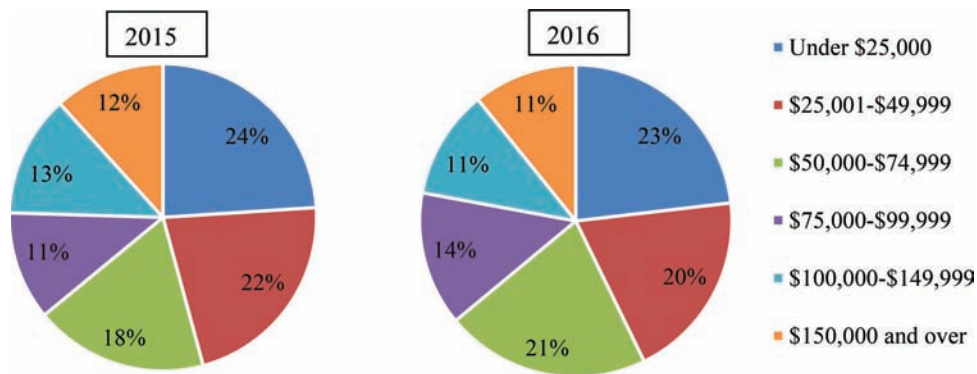


Figure 3.4 Distribution of respondents by annual household income.

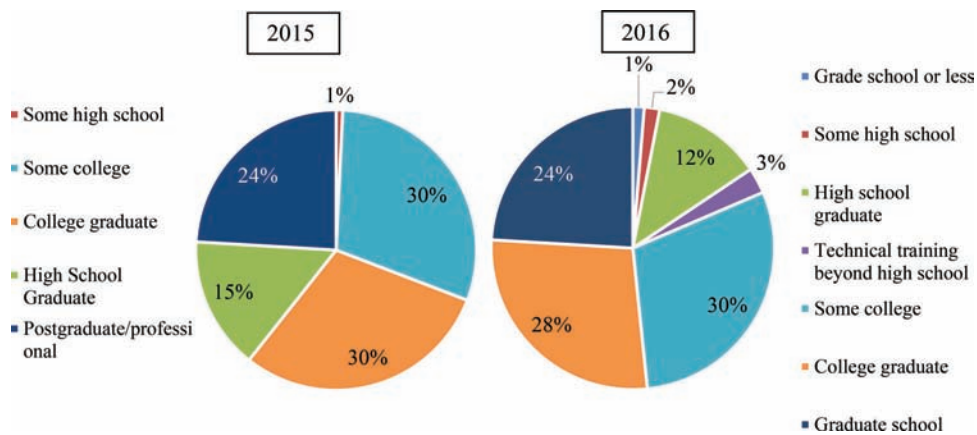


Figure 3.5 Distribution of respondents by highest level of education.

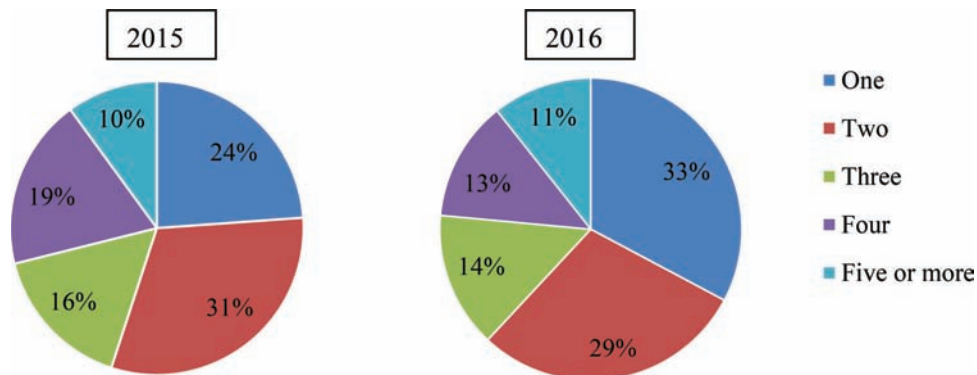


Figure 3.6 Distribution of respondents by household size.

99 miles per week (33% and 40%, respectively), as shown in Figure 3.10. This change was significant at 5% level (p value < 0.05) between the two surveys, as well as the percentage of respondents who drove 100 to 299 miles and 300 to 499 miles per week. The percentages of respondents, who drove 500 to 1,000 miles or more than 1,000 miles per week, were lower in 2016 than in 2015.

More riders took the HST train more frequently before the 2016 survey than in the previous year to the 2015 survey, as shown in Figure 3.11. As it can be seen in Figure 3.11, 31% of respondents took the train between 1 and 2 times before 2016 survey, but only 19% of respondents stated the same frequency in the 2015 survey (p value < 0.01).

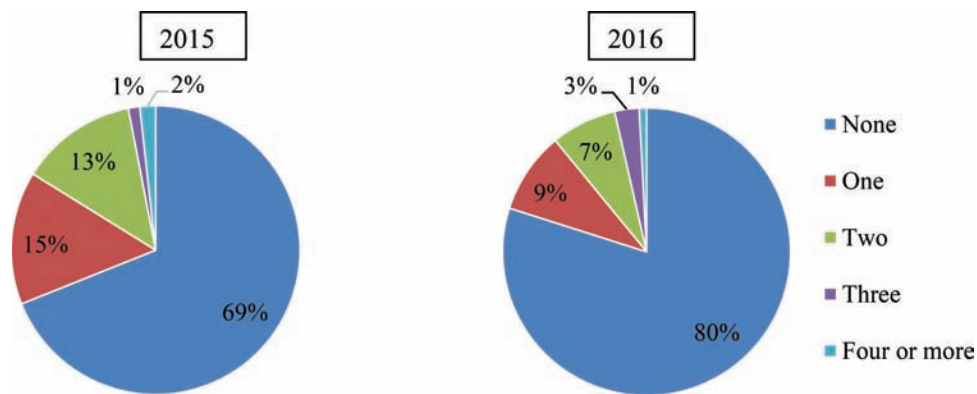


Figure 3.7 Number of children in the respondents' reported household.

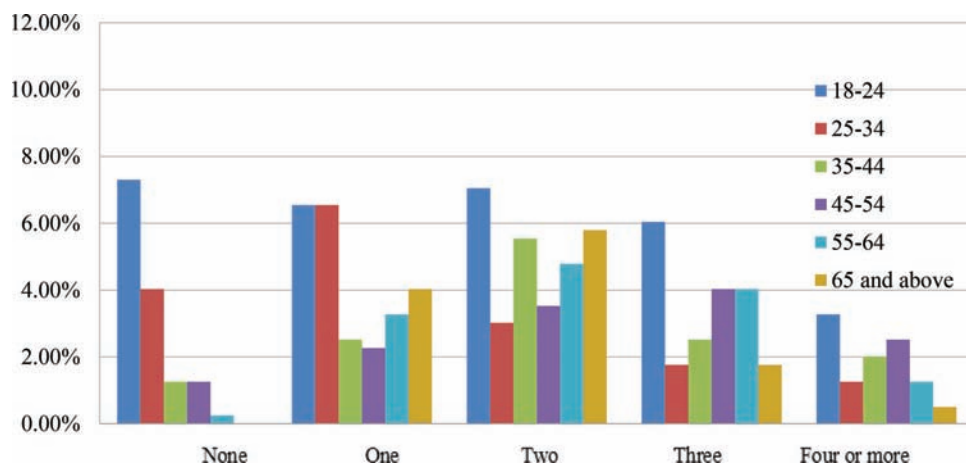


Figure 3.8 Vehicle ownership across age groups (2015 survey).

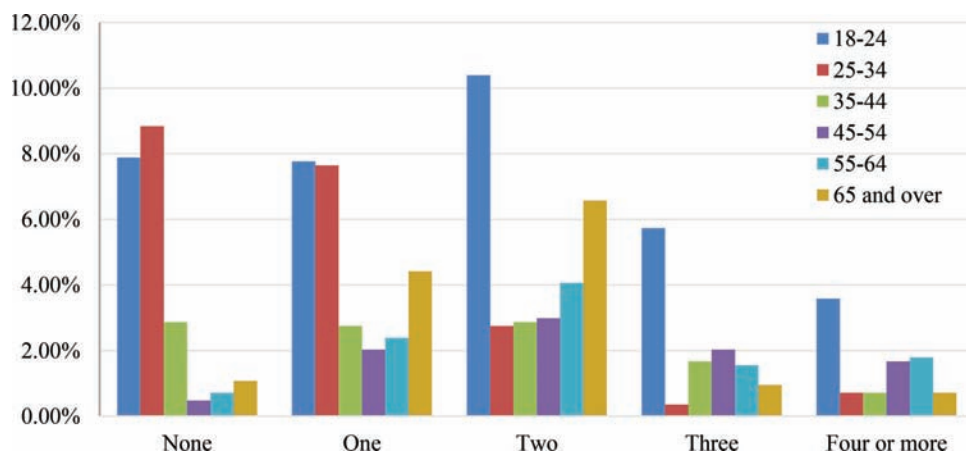


Figure 3.9 Vehicle ownership across age groups (2016 survey).

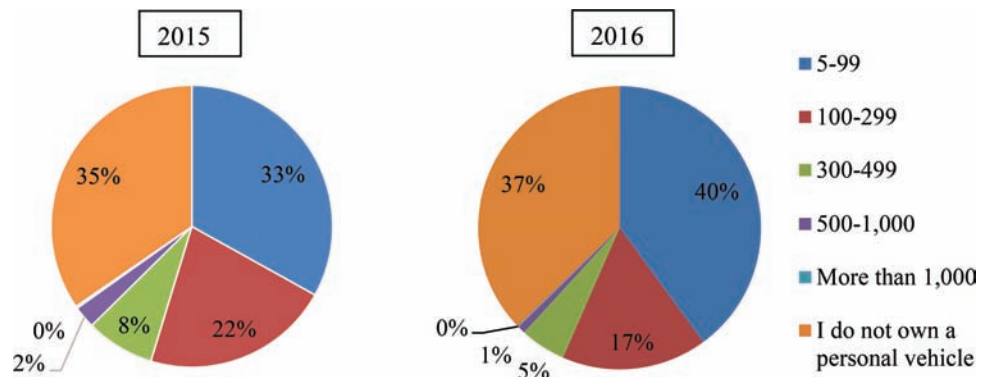


Figure 3.10 Respondents' reported weekly vehicle mileage.

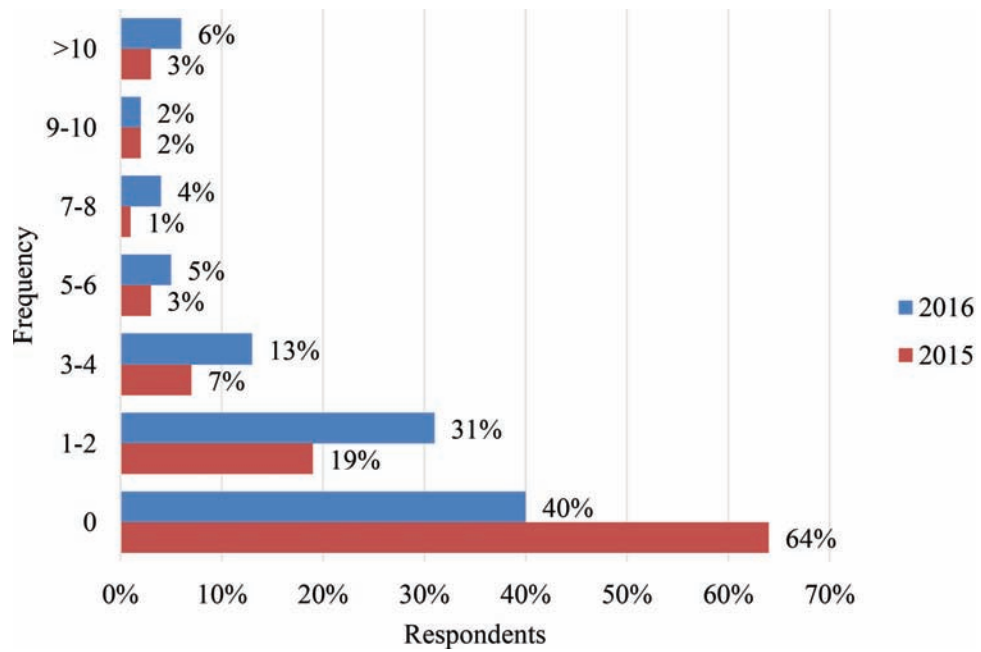


Figure 3.11 Frequency of travel.

3.2 Where Did Riders Live and What Were Their Travel Patterns?

3.2.1 Household location by state

It was found that 59% of the respondents had their households located in Indiana; 20% had their households located in Illinois, and the rest of the respondents' household location was distributed in different states, as it can be seen in Figure 3.12.

3.2.2 Household Location by County

Counties without station represented the origin of 22.9% of the total number of trips. Riders from Hamilton, Monroe, Boone, Hendricks, Hancock and Johnson traveled longer distances than riders that lived in Jasper (a county with a station). Respondents who traveled from Hamilton County had their households located in Fishers, Carmel, Westfield and Noblesville. Respondents who traveled from Boone were mainly from Zionsville, Whitestown, Lebanon, Thorntown and Sheridan, as shown in Figure 3.13. Respondents who traveled from Hendricks were from Brownsburg, Avon, and Plainfield. Respondents who traveled from Hancock were mainly from Greenfield. Additional cities mentioned in the survey can be found in Appendix C.

Counties without station in 2015 represented the origin of 27% of the total number of trips. Riders from Johnson, Hamilton, Hendricks, Monroe, Hancock and

Madison traveled longer distances than riders that lived in Jasper (a county with a station), as shown in Figure 3.14. The changes between 2015 and 2016 were significant at a 90% level of confidence, according to the test of proportions.

Comparing both maps, it can be seen that in 2015, riders lived farther away from the station than in 2016. Counties without station such as Dearborn, Knox, Wayne, and Vanderburgh were not reported as household location in 2016 survey. This finding indicates the importance of identifying strategies to help passengers residing further away from the HST line reach the stations.

3.2.3 Where did riders come from and where did they go?

The Origin-Destination (OD) pairs indicated that passengers were mostly traveling from Chicago to Indianapolis, followed by Lafayette and Crawfordsville, as shown in Figure 3.15. From Indianapolis, passengers were mostly traveling to Chicago (91%) and Dyer (4%). Nearly all passengers traveling from Lafayette went to Chicago (98%). Passengers from Rensselaer mainly traveled to Chicago (70%) and 15% of them traveled to Indianapolis. 46% of passengers who took the train from Dyer traveled to Indianapolis, 35% and 19% traveled to Chicago and Lafayette, respectively. These results are in line with Amtrak's HST report for the same month (November 2016), where the main OD pair was Chicago to Indianapolis, followed by Chicago to Lafayette and Chicago to Crawfordsville.

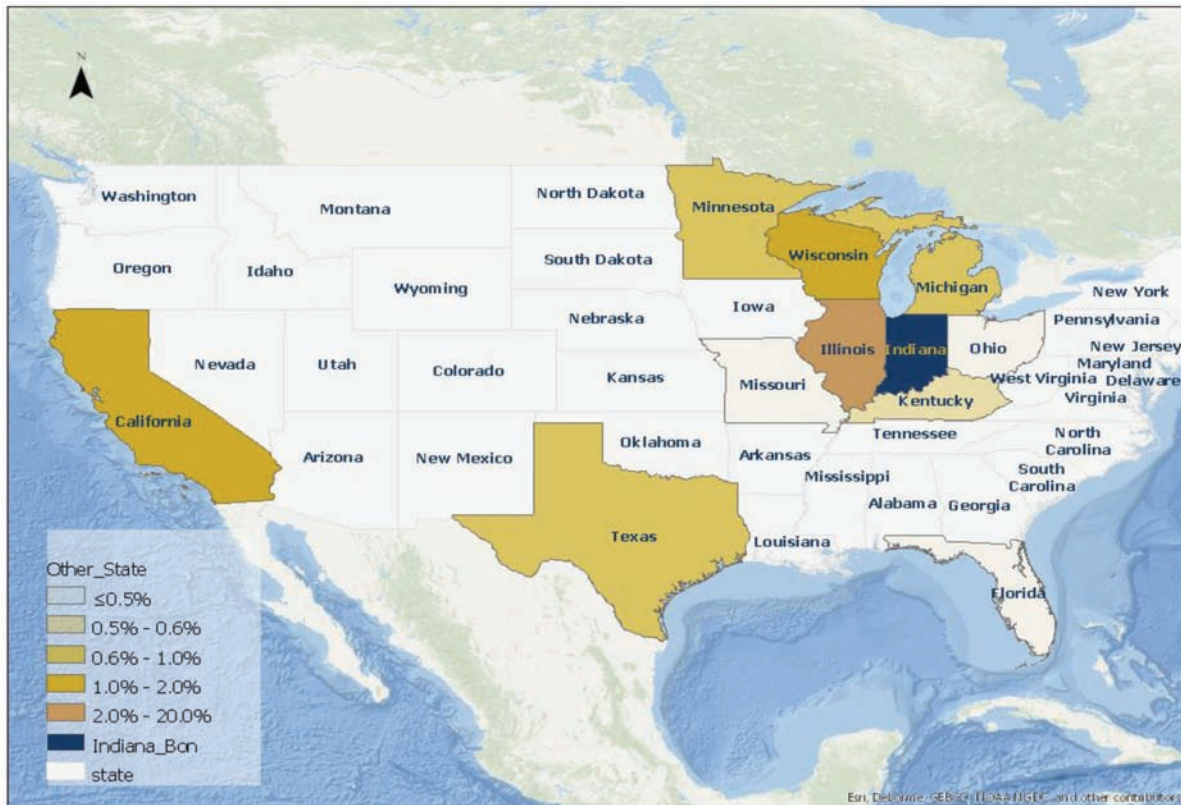


Figure 3.12 Household location by state.

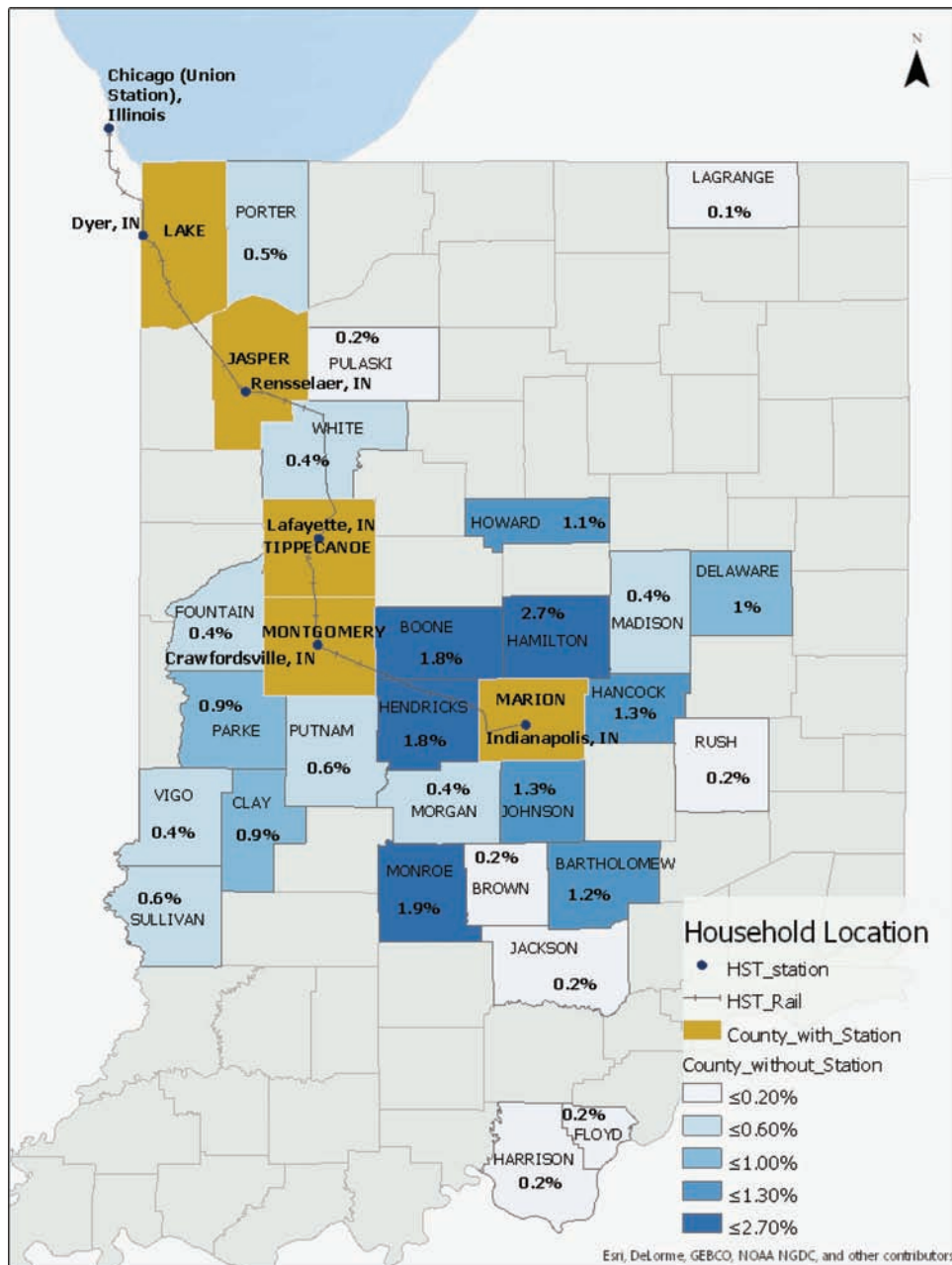


Figure 3.13 Household location by county 2016.

A similar trend can be observed in the OD pairs reported in the 2015 survey. However, according to the findings of the 2016 survey, passengers took the train from Rensselaer to Lafayette, a trend that was not observed in the results of the 2015 survey (see Figure 3.16). This shows a positive trend that needs to be sustained. Additionally, according to the findings of the 2016 survey, 9 passengers took the train from Crawfordsville to Lafayette and Dyer; OD pairs that were not observed in the 2015 survey.

In 2015, the origin stations with the highest representation of young travelers were again Chicago, Lafayette and Indianapolis. However, in 2015, the principal

destination of younger travelers was Lafayette (12.2% of total responses). Across all age groups, the highest proportion of the respondents took the train from Chicago (43.6%), followed by Indianapolis with 28.7% of total respondents, and Lafayette with 18.9%.

The destination stations with the highest representation of young travelers (18–24 years) were Chicago (17.5%), Lafayette (7.9%), and Indianapolis (5.8%), as shown in Figure 3.17. Most senior riders, 65 years old and over, traveled to Chicago (6.9%). Across all age groups, the most popular destination was Chicago (48.1%), followed by Indianapolis (21.5%) and Lafayette (20.8%).

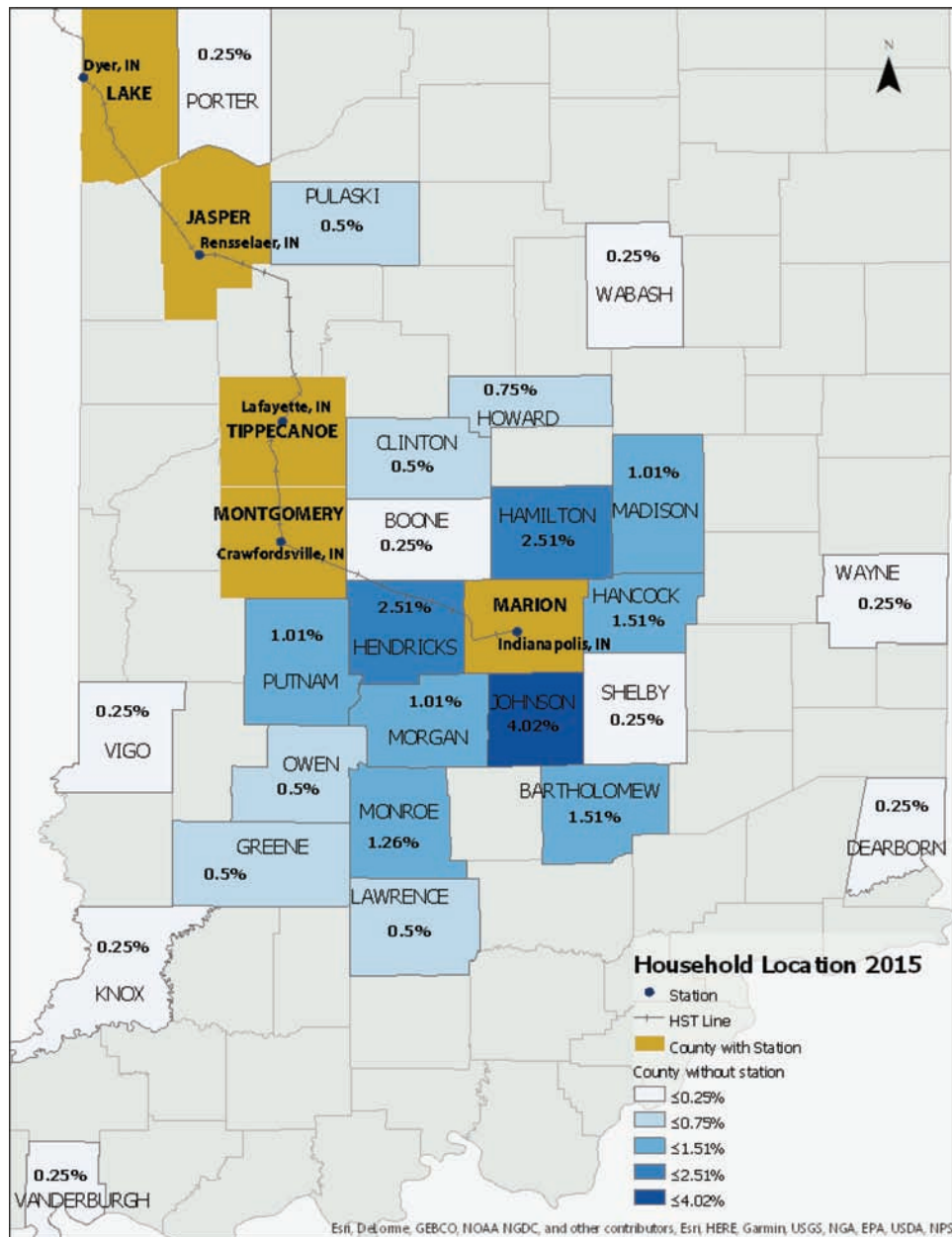


Figure 3.14 Household location by county 2015.

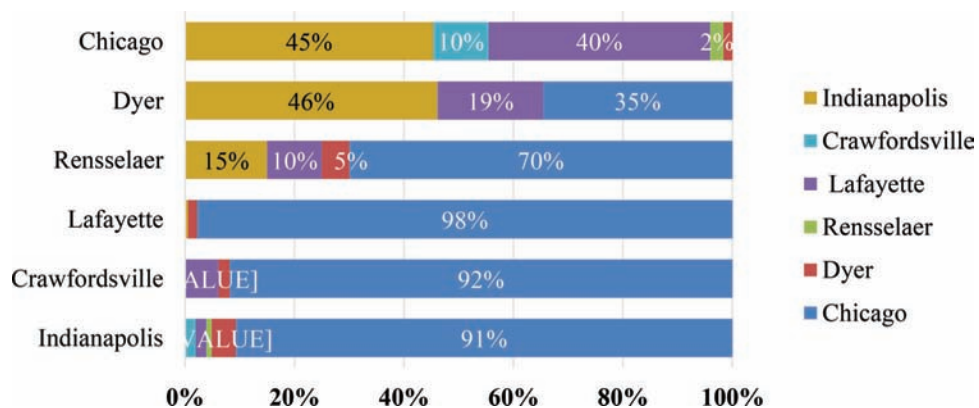


Figure 3.15 OD Pairs (2016 Survey).

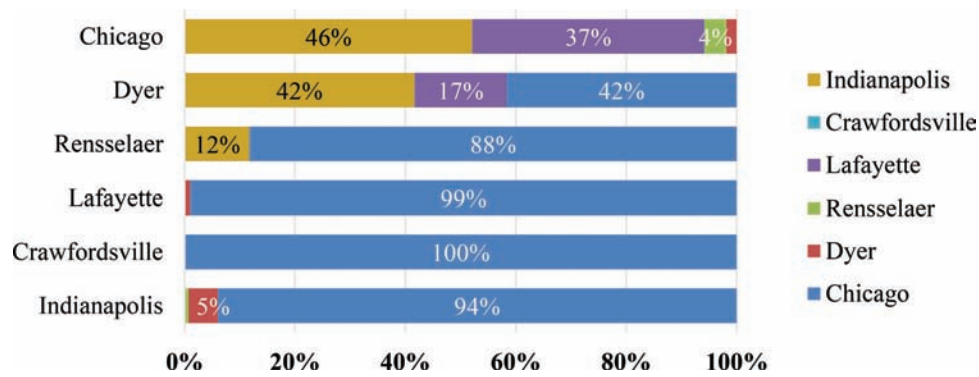


Figure 3.16 OD Pairs (2015 Survey).

Origin							Destination							
18 - 24	6.9%	1.6%	10.0%	1.2%	1.9%	13.6%	5.8%	1.9%	7.9%	0.6%	1.6%	17.5%		
25 - 34	4.4%	0.7%	2.6%	0.4%	0.5%	11.5%	5.6%	1.1%	5.1%	0.6%	0.1%	7.8%	Indianapolis	
35 - 44	2.9%	0.7%	1.8%	0.4%	0.1%	4.9%	3.2%	0.5%	2.0%	0.2%	0.1%	5.2%	Crawfordsville	
45 - 54	2.8%	0.9%	2.4%	0.0%	0.1%	2.9%	1.9%	0.6%	1.3%	0.0%	0.2%	5.1%	Lafayette	
55 - 64	3.4%	1.1%	2.2%	0.2%	0.1%	3.3%	1.1%	0.6%	2.7%	0.2%	0.2%	5.6%	Rensselaer	
65 and over	3.6%	1.4%	2.9%	0.4%	0.4%	5.3%	3.9%	1.1%	1.8%	0.2%	0.1%	6.9%	Dyer	
													Chicago	

Figure 3.17 Origin and destination of respondents by age (2016 survey).

Origin							Destination							
18 - 24	3.4%	0.5%	12.2%	1.5%	0.8%	11.7%	2.6%	1.8%	7.7%	1.0%	1.3%	16.4%		
25 - 34	4.4%	0.0%	3.6%	0.0%	0.0%	9.1%	4.3%	1.0%	3.6%	0.0%	0.5%	7.4%	Indianapolis	
35 - 44	4.1%	1.3%	0.5%	0.3%	0.3%	7.3%	4.6%	0.5%	1.0%	0.0%	0.3%	6.4%	Crawfordsville	
45 - 54	6.2%	1.3%	1.0%	0.0%	0.3%	4.4%	2.8%	0.5%	1.0%	0.0%	0.0%	8.7%	Lafayette	
55 - 64	5.7%	1.3%	0.8%	0.0%	0.0%	6.2%	3.8%	0.5%	1.3%	0.5%	0.3%	7.4%	Rensselaer	
65 and over	4.9%	1.6%	0.8%	0.0%	0.0%	4.7%	2.0%	0.5%	1.5%	0.3%	0.3%	7.4%	Dyer	
													Chicago	

Figure 3.18 Origin and destination of respondents by age (2015 survey).

In that year, the destination stations with the highest representation of young travelers (18–24 years) were Chicago (16.4%), Lafayette (7.7%), and Indianapolis (2.6%). Most senior riders aged, 65 years old and over, took the train from Chicago (7.4%). Across all age groups, the most popular destination was Chicago (53.7%), followed by Indianapolis (20.2%) and

Lafayette (16.1%). These findings are presented in Figure 3.18.

3.2.4 How Did Riders Travel to Take the Train?

The following figures represent the distance that riders were willing to travel to reach a station in order

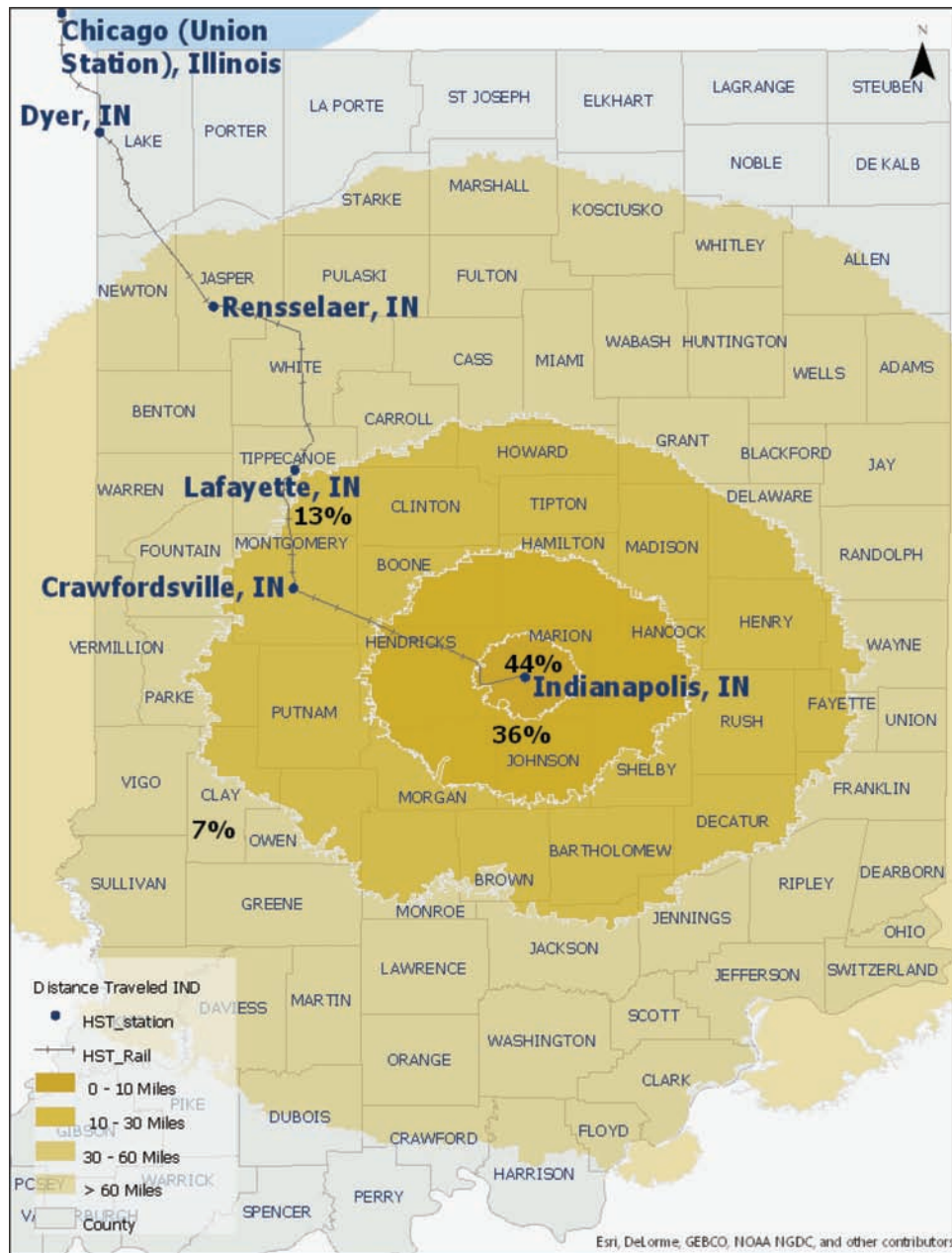


Figure 3.19 Distance traveled to reach Indianapolis station.

to take the train. To represent the distance, four buffers were created for each station: 0–10 miles, 10–30 miles, 30–60 miles, and more than 60 miles. The highest proportion of respondents that took the train traveled short distances (less than 10 miles) in order to reach the respective station.

In specific, 44% of respondents that took the train from Indianapolis traveled less than 10 miles to reach the station, 36% of them traveled between 10 and 30 miles, and 13% of them traveled between 30 and 60 miles. As shown in Figure 3.19, 7% of respondents traveled more than 60 miles in order to take the train from Indianapolis.

As shown in Figure 3.20, 79% of the respondents that took the train from Lafayette traveled less than 10 miles, 13% of them traveled between 10 and 30 miles, 2% of them traveled between 30 and 60 miles, and 6% of respondents traveled more than 60 miles in order to take the train.

Of respondents that took the train from Dyer, 53% traveled less than 10 miles to reach the station, and 47% of them traveled between 10 and 30 miles.

Of respondents that took the train from Rensselaer, 69% traveled less than 10 miles to reach the station, 8% of them traveled between 10 and 30 miles, and 23% of them traveled between 30 and 60 miles. Of the respondents,

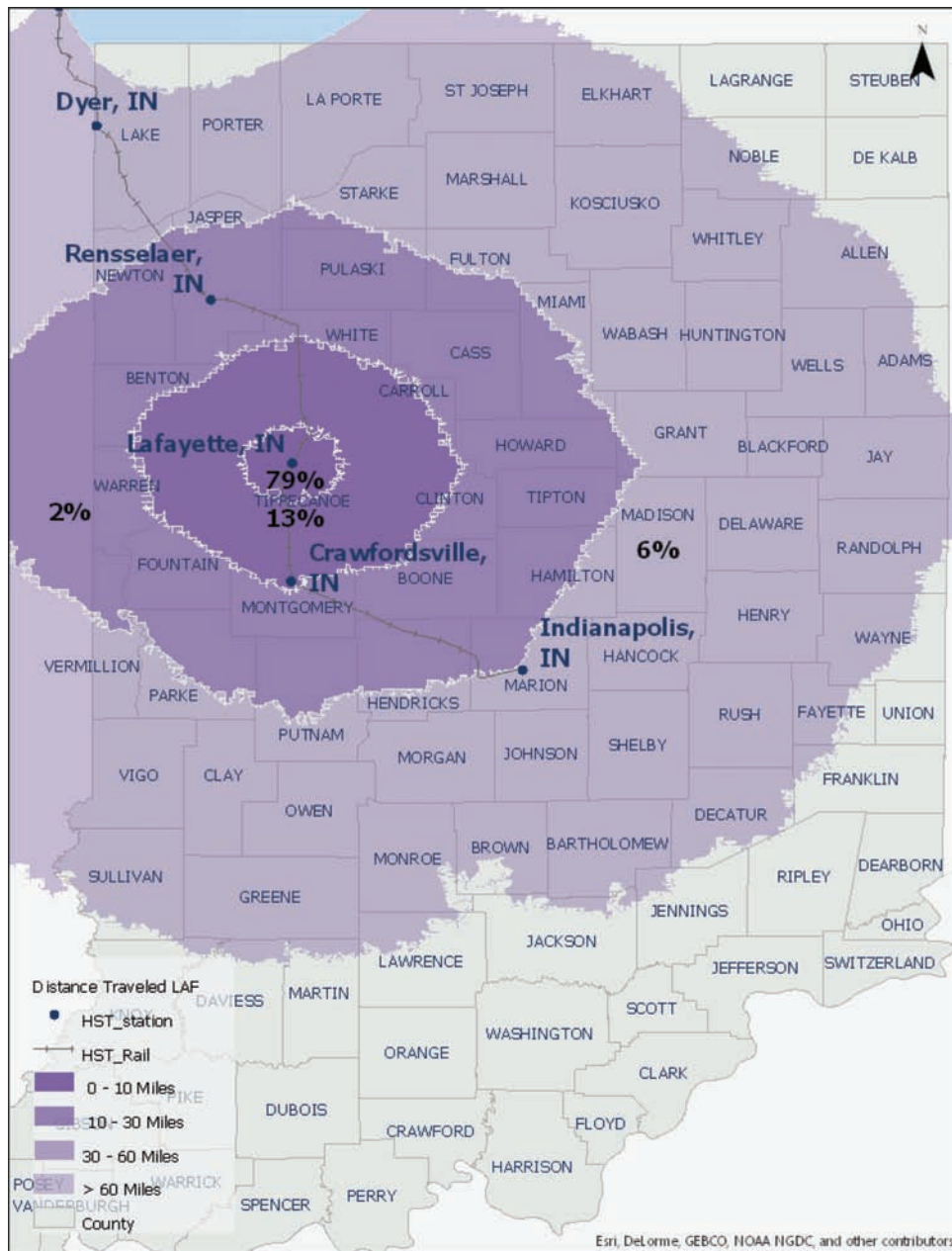


Figure 3.20 Distance traveled to reach Lafayette station.

48% traveled less than 10 miles, 15% of them traveled between 10 and 30 miles, 25% of them traveled between 30 and 60 miles, and 13% traveled more than 60 miles in order to take the train from Crawfordsville (see Figure 3.21).

3.2.5 How did riders reach and leave the station?

The most dominant mode of transportation for access and egress to the station in Indianapolis was the option of having someone dropping the passenger off to the station/picking the passenger up from the station (45% and 58%, respectively). The second option was

driving or renting a car (25% and 21%, respectively), and the third option was using a taxi or a ridesharing service (20% and 15%, respectively). A similar trend was observed for the rest of the stations in Indiana (see Figure 3.22). This finding suggests that there is a possible gap into the first and last mile travel options for the riders and alternative options to fill this gap need to be considered.

Approximately 31% of the riders (286 respondents of the onboard survey) drove to reach the respective train station; 46% of these riders parked at the station's parking lot, and around 30% parked at a parking garage near the station (see Figure 3.23).

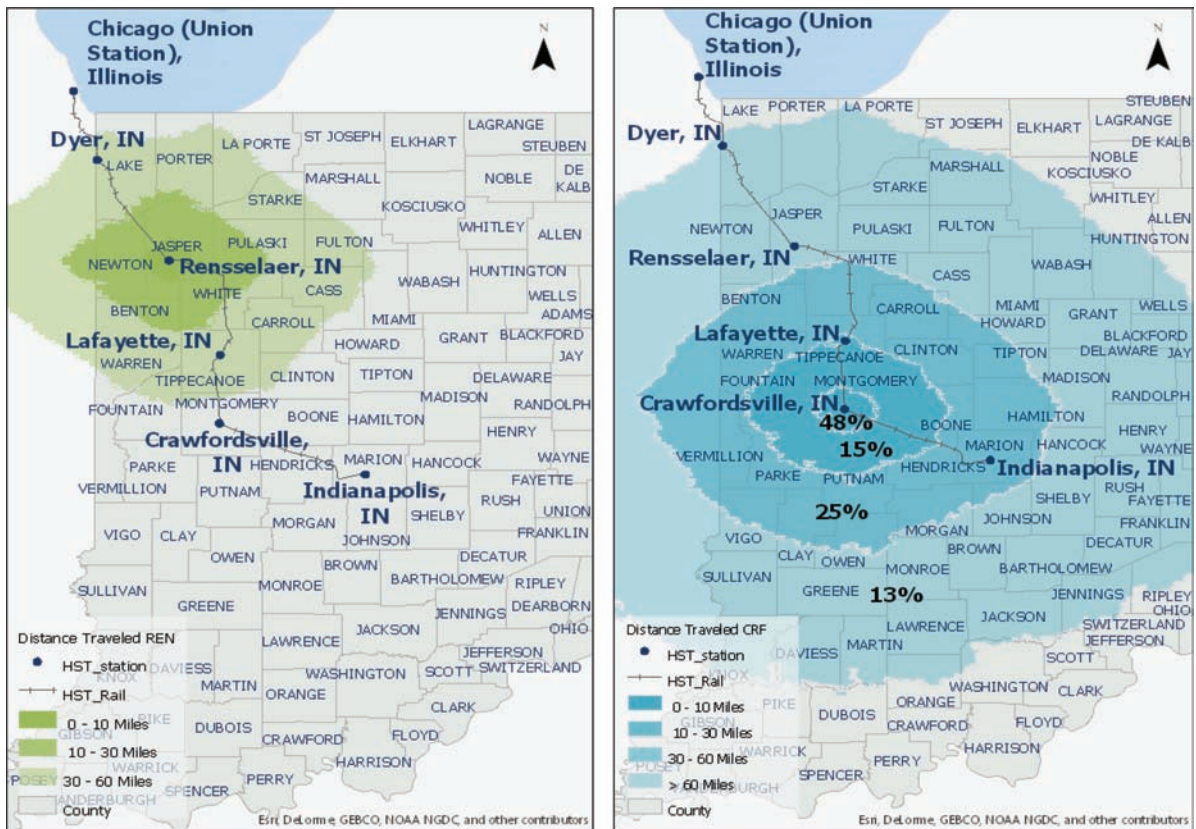


Figure 3.21 Distance traveled to reach Rensselaer (left map) and Crawfordsville (right map) stations.

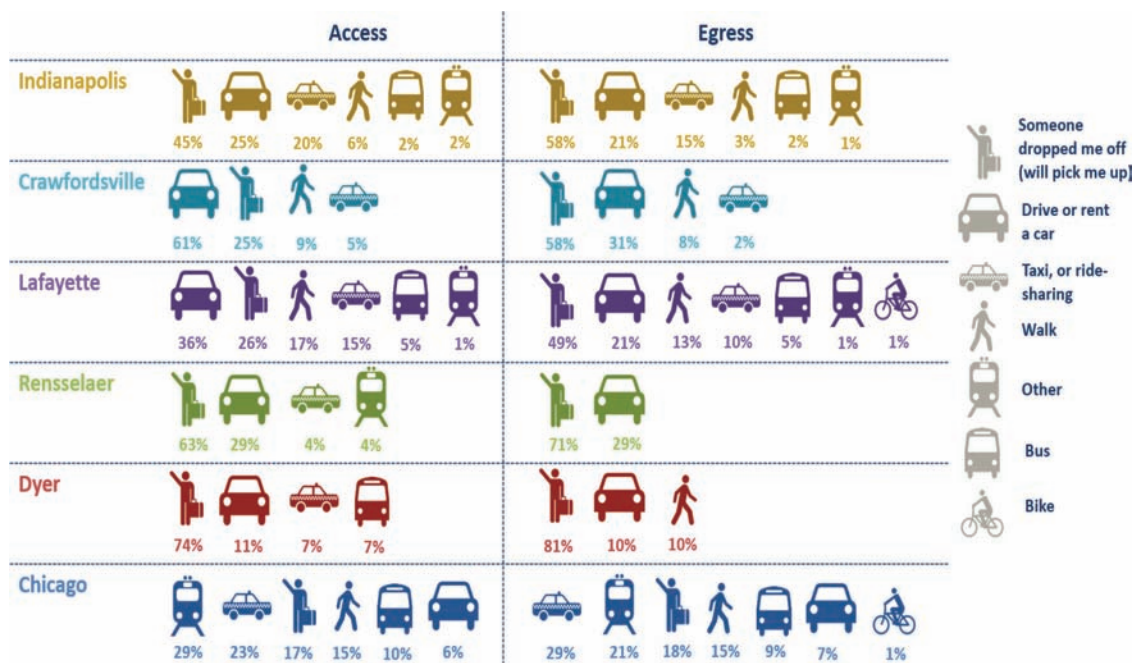


Figure 3.22 Modes used for access and egress by station.

3.2.6 Trip purpose

The most dominant trip purpose according to the riders' responses (approximately 83%) was social-recreational. Around 8% stated that they took the train on a school trip and around 6% stated that they were commuting to/from their work, as shown in Figure 3.24.

3.2.7 Travel discounts

Only 47% of riders (403 respondents of the onboard survey) stated that they had used any of the available

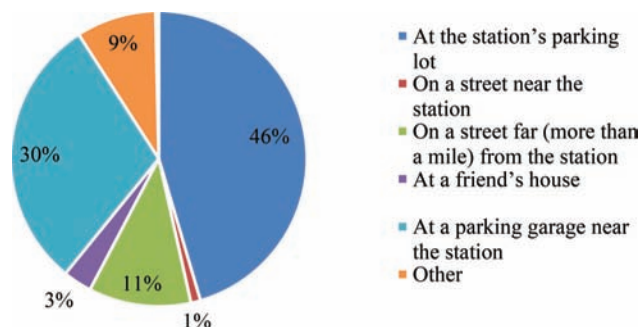


Figure 3.23 Parking location for respondents who drove to reach the station.

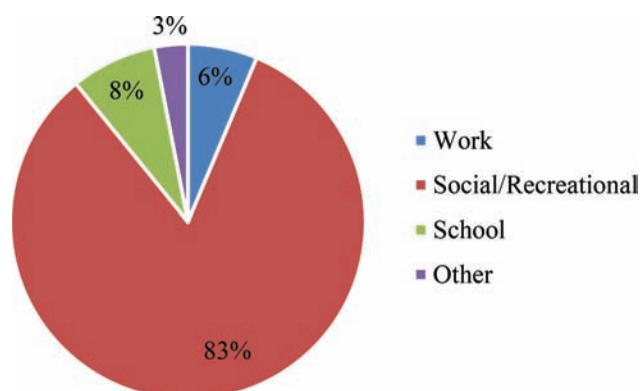


Figure 3.24 Trip purpose of respondents.

discounts to purchase a ticket. The most popular discount used was the “15% off for student members” and “seniors save 15%,” as shown in Figure 3.25.

3.3 What Were Riders' Thoughts About the Train?

3.3.1 Ease of Using the HST

In 2016, approximately 69% of the respondents stated that their interaction with the ticketing system of the train was easy, as shown in Figure 3.26. In 2015, this question did not incorporate the “not applicable” option; however, the percentage of agreement was 85%, which meant a significant change between the findings in 2016 (p value < 0.01). The percentage of respondents disagreeing with this statement was equal in both years.

The majority of the respondents in 2016 (around 75%) found the information system (Amtrak app, electronic information boards) of the train easy to use (see Figure 3.27). The percentage of agreement was lower in 2015 (69% of respondents). In addition, the percentage of disagreement about the statement was higher in 2015. This could indicate that the information system was more understandable and easy for the riders in 2016 than in 2015.

It was found that the percentage of agreement in the statement “It is easy for me to reach the closest HST station from my home” in 2016 was higher (71%) than in 2015 (66%), as shown in Figure 3.28. This change was significant at the 1% level (p value < 0.01). The percentage of responses disagreeing with this statement was similar in both years. This might be reflective of that fact that riders from closer counties to the HST stations responded to the survey, compared to the 2015 survey.

In 2016, fewer riders (26%) agreed with the statement that asked about the ease to park a personal vehicle near a station than in 2015 (31%), as shown in Figure 3.29. The change in the proportion of riders was significant at the 1% level (p value < 0.01). Also, a higher percentage of riders that did not own a car participated in the 2016 (33%) than in the 2015 survey (24%). This change was also significant at the 1% level (p value < 0.01).

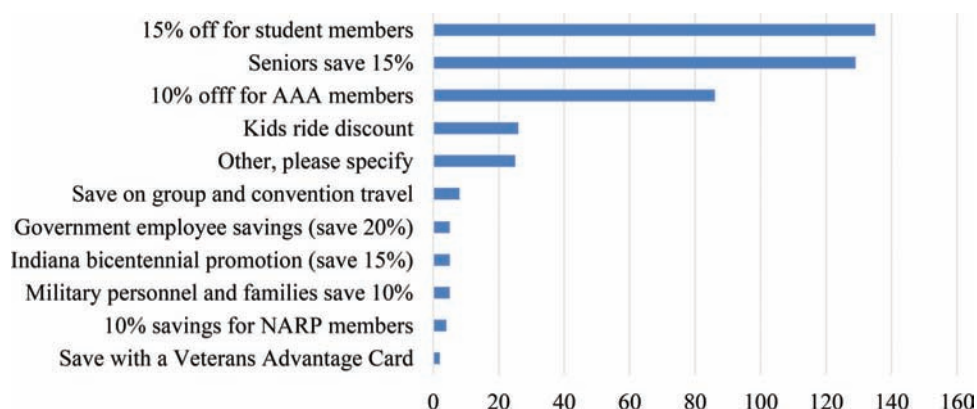


Figure 3.25 Travel discount used to purchase a ticket.

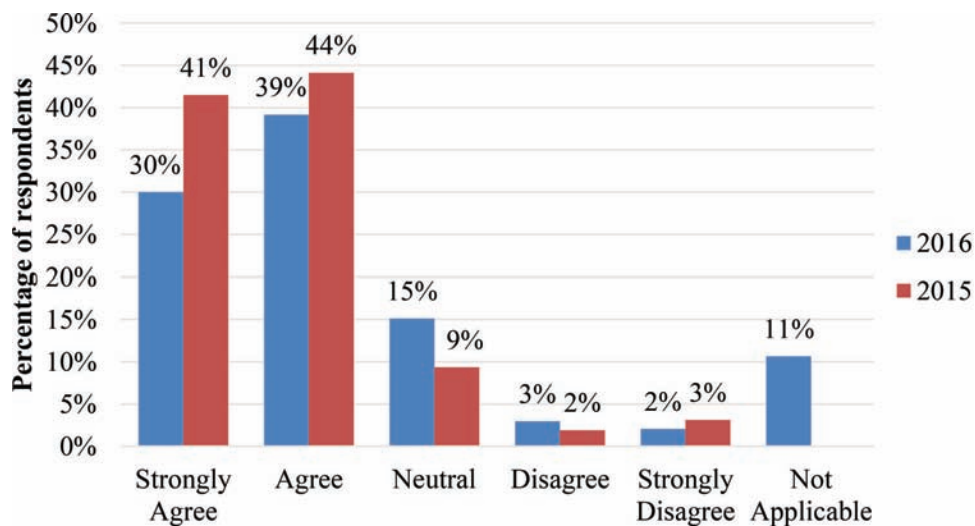


Figure 3.26 My interaction with the ticketing system of the HST is easy and understandable. (Note: Percentages are rounded to the nearest integer and bars may vary in height.)

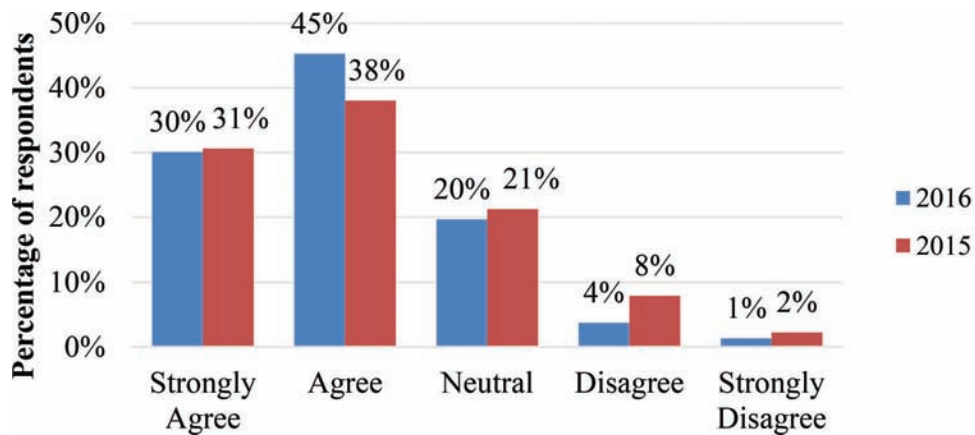


Figure 3.27 My interaction with the information system of the HST is easy and understandable. (Note: Percentages are rounded to the nearest integer and bars may vary in height.)

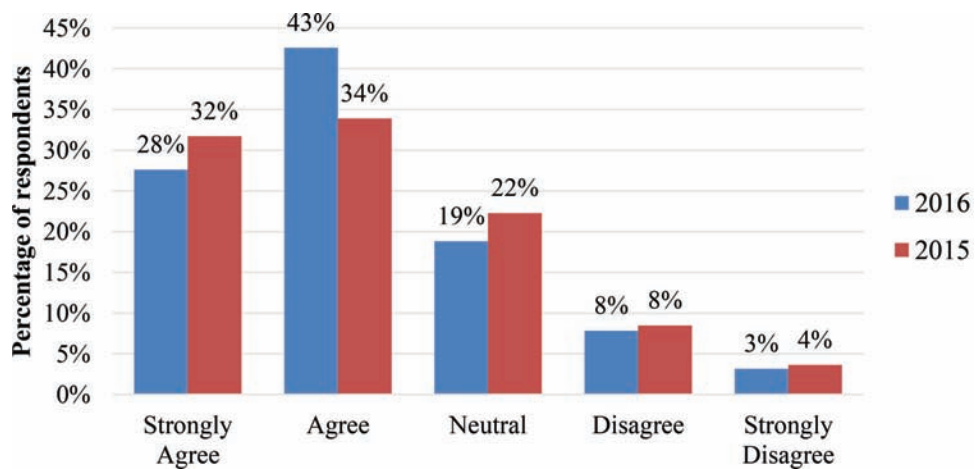


Figure 3.28 It is easy for me to reach the closest HST station from my house. (Note: Percentages are rounded to the nearest integer and bars may vary in height.)

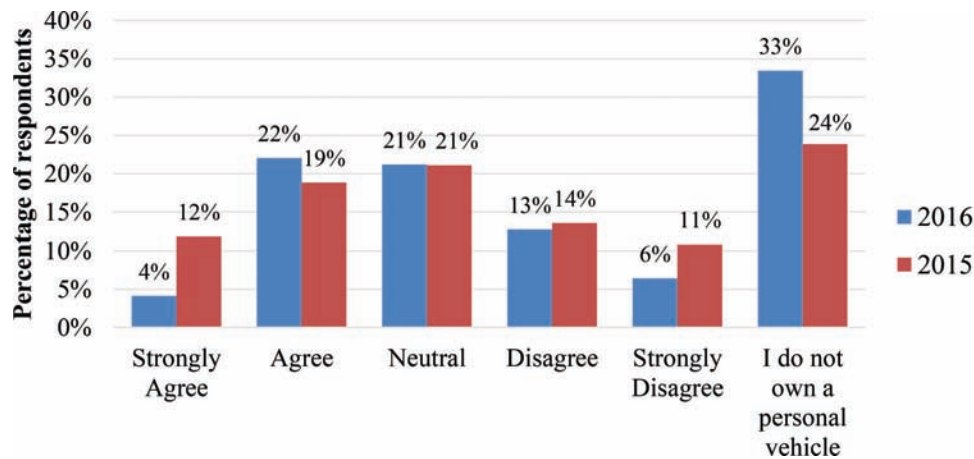


Figure 3.29 It is easy for me to park my personal vehicle (car, motorcycle, etc.) near the HST station. (Note: Percentages are rounded to the nearest integer and bars may vary in height.)

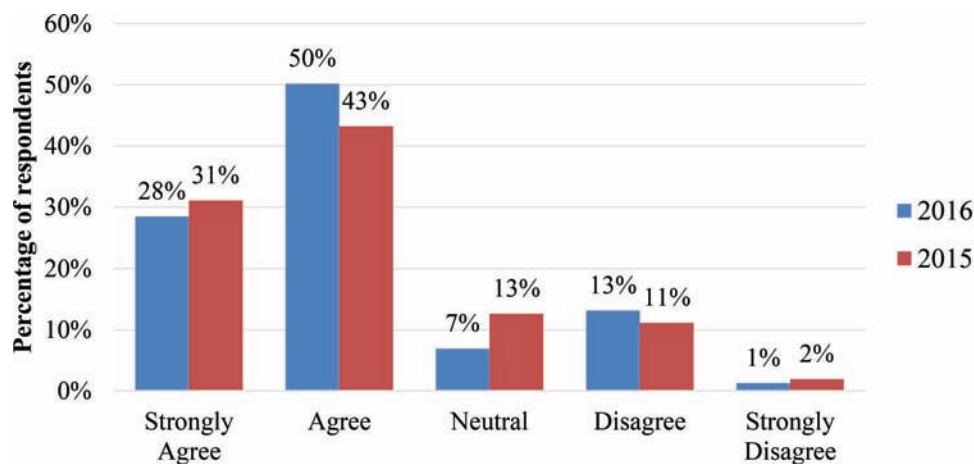


Figure 3.30 It is easy for me to access the platform at the HST station that I use. (Note: Percentages are rounded to the nearest integer and bars may vary in height.)

When riders were asked about their opinions on accessing the platforms when boarding the train stations, approximately 78% of them responded that it was easy to access the platform in 2016 (see Figure 3.30). Only around 14% considered that the platforms were not easily accessible in 2016. A similar trend was observed in 2015. Most of the riders (74%) agreed that accessing the platforms when boarding the train was easy. The percentage of riders who disagreed with the statement were fairly similar in both surveys.

In 2016, 47% of riders strongly agreed with the statement that it was easy for them to travel with the essentials for their trip purpose, as shown in Figure 3.31. In contrast, only 35% of riders expressed that opinion in 2015. However, the overall percentage of agreement was 88% in both years. The proportion of riders, who disagreed with the statement, was also less in 2016 than in 2015. This suggests that the train provides enough space for riders to travel comfortably with their belongings.

The majority of the riders (more than 85%) reported that the changes in amenities that were introduced in August 2015 (e.g., Wi-Fi, hot meal services, snacks and

beverages) made their trip more pleasant, as shown in Figure 3.32. This question was not asked in 2015 survey. However, it is important to highlight that only 3% of respondents disagreed with the fact that those changes made their trip more pleasant. Thus, this is something that should be considered for future enhancements to the service.

Passengers were asked whether traveling with the train was easy for them. Around 54% of the riders agreed and 34% strongly agreed on the ease of using the HST (see Figure 3.33). These patterns seemed fairly similar in 2015, when around 84% of riders agreed with the statement. Overall, more riders stated that they found the HST an easy way to travel, both in 2015 and 2016.

The ease of use varied by age group in both surveys, as shown in Table 3.2. In 2015, younger people (18–24) found it easier to take the HST as well as people between 35 and 44 years old. However, those findings were not similar in 2016. In the 2016 survey, riders between 45 and 54 years old indicated the highest percentage of strong agreement about that statement. Riders between 18 and 24 years old were also more neutral with respect to that statement in 2016 than in 2015.

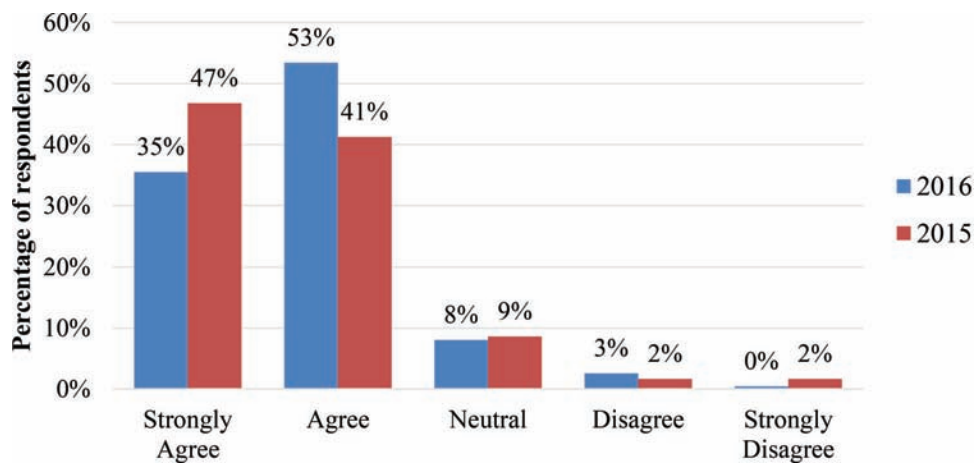


Figure 3.31 It is easy for me to travel with the essentials for my trip purposes (carry-on luggage, etc.). (Note: Percentages are rounded to the nearest integer and bars may vary in height.)

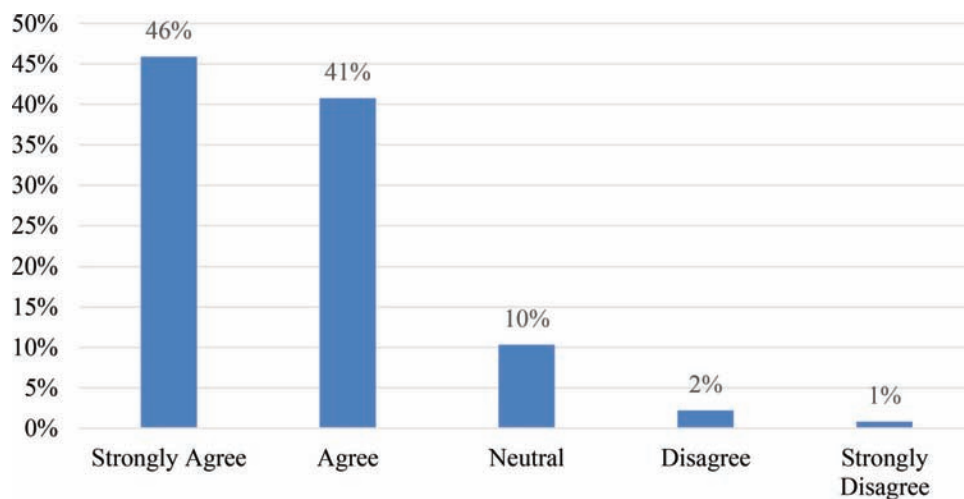


Figure 3.32 The changes in amenities in the HST make my trip more pleasant.

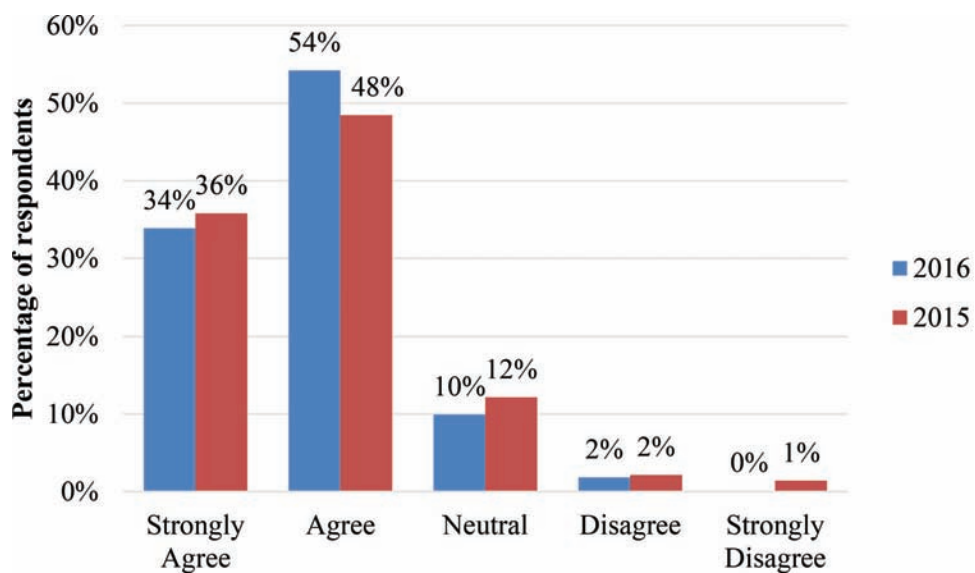


Figure 3.33 Traveling with the HST is easy for me. (Note: Percentages are rounded to the nearest integer and bars may vary in height.)

TABLE 3.2
Ease of use of the train across age groups (2016 and 2015).

2016 Survey Responses: "Traveling with the HST is easy for me"						
Age Group	18–24	25–34	35–44	45–54	55–64	>65
Age Group % of Total	(35)	(20)	(11)	(9)	(11)	(14)
Strongly Disagree %	0.34	0.00	0.00	0.00	0.00	0.00
Disagree %	2.69	1.79	0.00	1.30	1.12	1.75
Neutral %	12.79	9.52	11.83	2.60	6.74	7.02
Agree %	55.89	54.76	50.54	50.65	58.43	51.75
Strongly Agree %	28.28	33.93	37.63	45.45	33.71	39.47
Total %	100	100	100	100	100	100

2015 Survey Responses: "Traveling with the HST is easy for me"						
Age Group	18–24	25–34	35–44	45–54	55–64	>65
Age Group % of Total	(31)	(16)	(14)	(13)	(14)	(12)
Strongly Disagree %	1.63	0.00	1.82	0.00	0.00	4.26
Disagree %	1.63	1.52	1.82	3.70	0.00	6.38
Neutral %	7.32	12.12	14.55	11.11	14.81	17.02
Agree %	48.78	48.48	40.00	55.56	53.70	40.43
Strongly Agree %	40.65	37.88	41.82	29.63	31.48	31.91
Total %	100	100	100	100	100	100

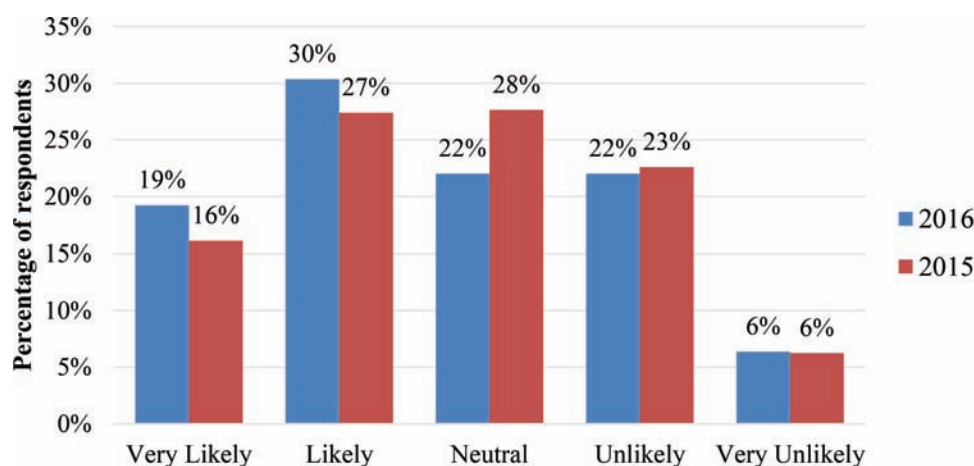


Figure 3.34 Using the HST would enable me to reach my destination faster. (Note: Percentages are rounded to the nearest integer and bars may vary in height.)

3.3.2 Usefulness of the HST

The majority of respondents in 2015 and 2016 stated that using the HST would enable them to reach their destination faster. This percentage was 43% and 49%, respectively. The number of riders who agreed with that statement was higher for 2016 than in 2015 (see Figure 3.34). However, there was a similar portion of riders who disagreed with that in both years, showing that the travel time on HST is of concern to some riders.

In addition, riders were asked about their perception of safety when traveling on the train. A similar percentage of agreement and disagreement with the statement asked was observed in both surveys, as shown in Figure 3.35.

The majority of the respondents in 2016 agreed that riding the HST would enable a person to use the time riding the train productively. The same pattern was observed in 2015, as shown in Figure 3.36. Overall, the perception of using the time productively while riding the train is substantially higher compared to the opposite statement.

Approximately 30% and 35% of the riders in 2016 thought that it was very likely and likely, respectively, that using the HST would cost them less to reach their desired destination (see Figure 3.37). The same pattern was observed in 2015. However, the percentage of riders that disagreed to this statement did not change either. This might indicate an opportunity to improve the cost structure for riding the HST.

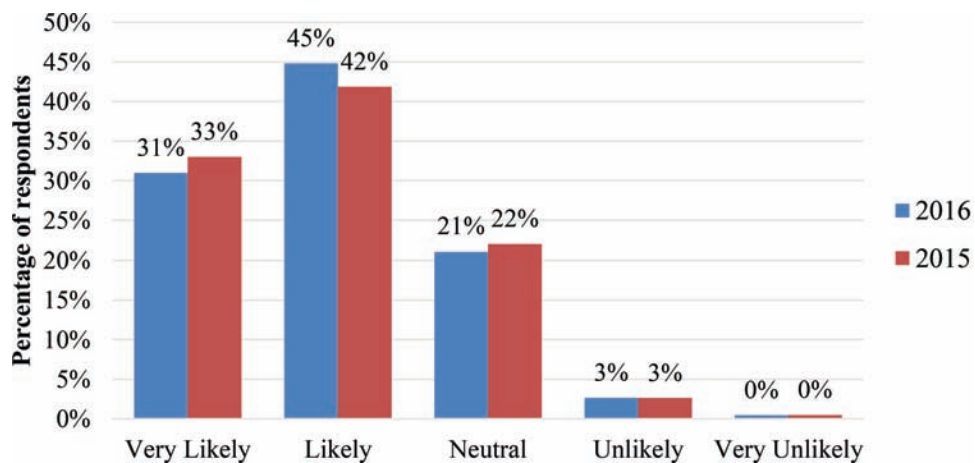


Figure 3.35 Taking the HST would make my trip safer. (Note: Percentages are rounded to the nearest integer and bars may vary in height.)

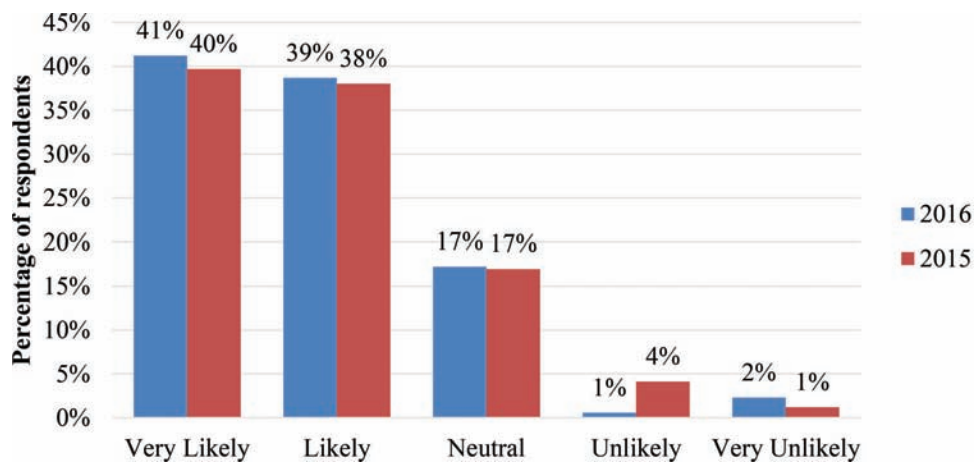


Figure 3.36 Using the HST would enable me to use the time it takes to reach my destination more productively. (Note: Percentages are rounded to the nearest integer and bars may vary in height.)

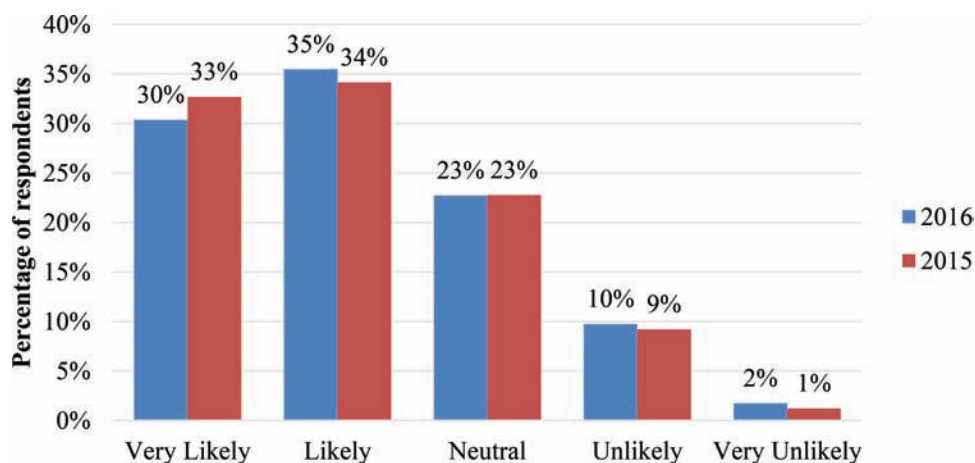


Figure 3.37 When I am traveling alone, using the HST to reach my destination would cost me less. (Note: Percentages are rounded to the nearest integer and bars may vary in height.)

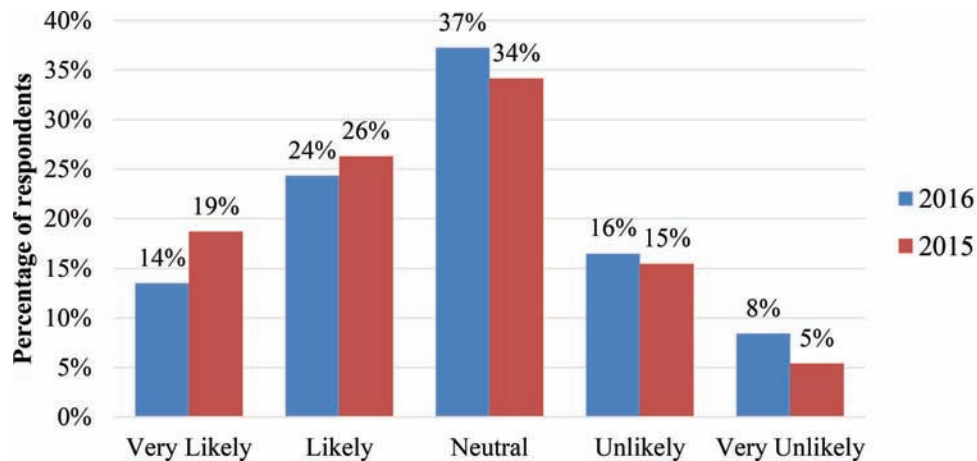


Figure 3.38 When I am traveling with a group, using the HST to reach my destination would cost me less. (Note: Percentages are rounded to the nearest integer and bars may vary in height.)

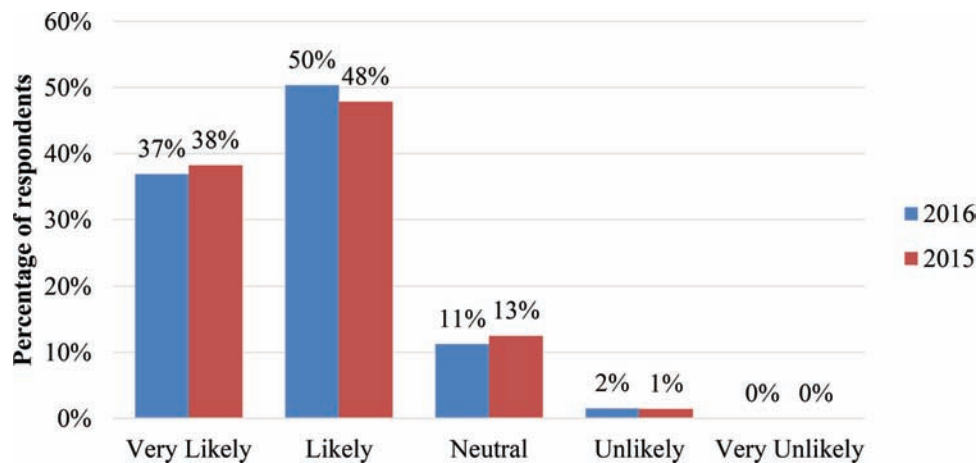


Figure 3.39 I find the HST useful for my traveling purposes. (Note: Percentages are rounded to the nearest integer and bars may vary in height.)

Similarly, the respondents were asked whether the HST would enable them to reach their destination cheaper when they travel with a group, as shown in Figure 3.38. Most of the respondents had a neutral stance with this statement in both surveys.

Around 87% of passengers in the 2016 survey agreed that the HST was useful for their travel purposes, as shown in Figure 3.39. This trend was similar in 2015, when 86% of respondents agreed with that same statement. The portion of riders who disagreed was low in both surveys.

3.3.3 Thoughts about the HST

In 2016, approximately 78% of the riders agreed with the statement that traveling with the HST would be good for the environment, as shown in Figure 3.40. Similarly, 80% of respondents agreed with the statement in the 2015 survey. It is also important to note that only 3% in 2016 and 1% in 2015 disagreed with that statement.

Only 2.5% riders did not agree that riding the train would contribute to a reduction of traffic congestion in Indiana, according to the 2016 survey (Figure 3.41). The corresponding percentage was similar in the 2015 survey.

Nearly two thirds of the respondents stated that if more people took the HST, it would enhance economic development in Indiana (see Figure 3.42).

Only around 2% of the riders opposed to the idea that the State of Indiana should invest funding to support the HST service (see Figure 3.43).

3.3.4 Intention to Take the HST in the Future

Figure 3.44 shows the stated intention to take the train in the following month of the survey. It can be seen that short-term intention to take the HST increased substantially from 2015 (41% in 2016 compared to 23% in 2015). This increase is statistically significant at the 1% level (p value < 0.001).

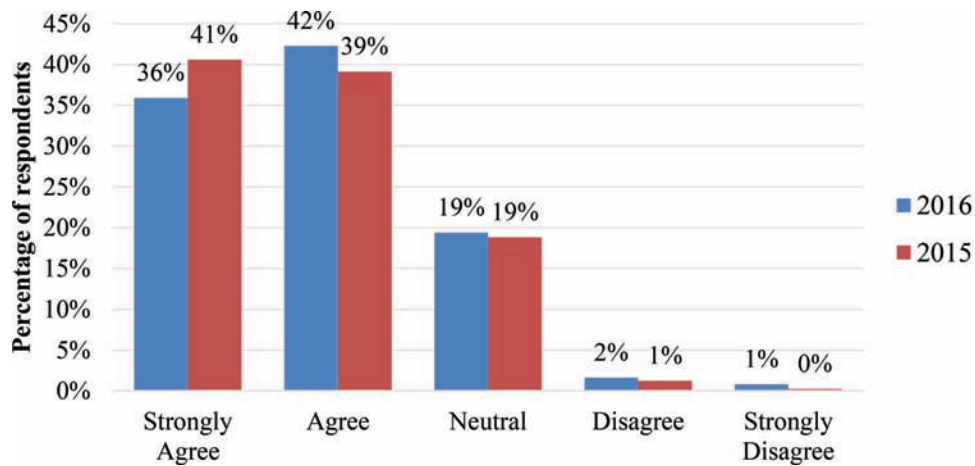


Figure 3.40 If more people used the HST, it would be good for the environment. (Note: Percentages are rounded to the nearest integer and bars may vary in height.)

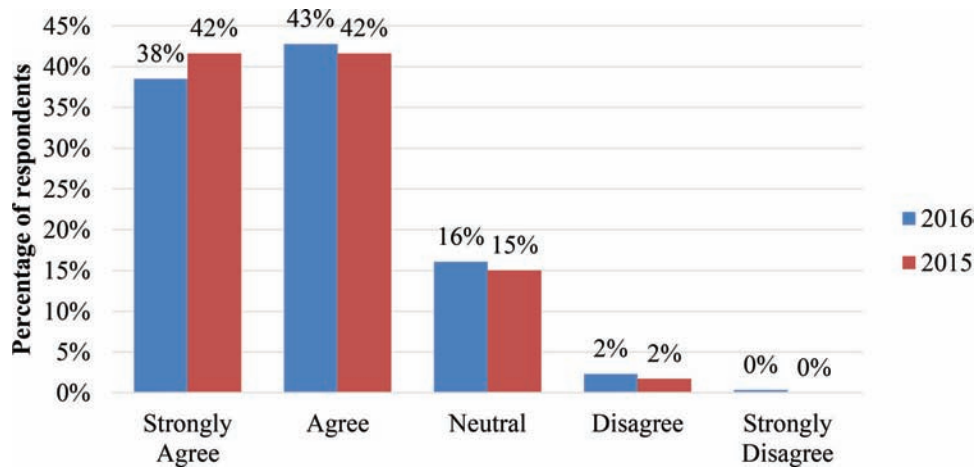


Figure 3.41 If more people used the HST, it would contribute to the reduction of traffic congestion in Indiana. (Note: Percentages are rounded to the nearest integer and bars may vary in height.)

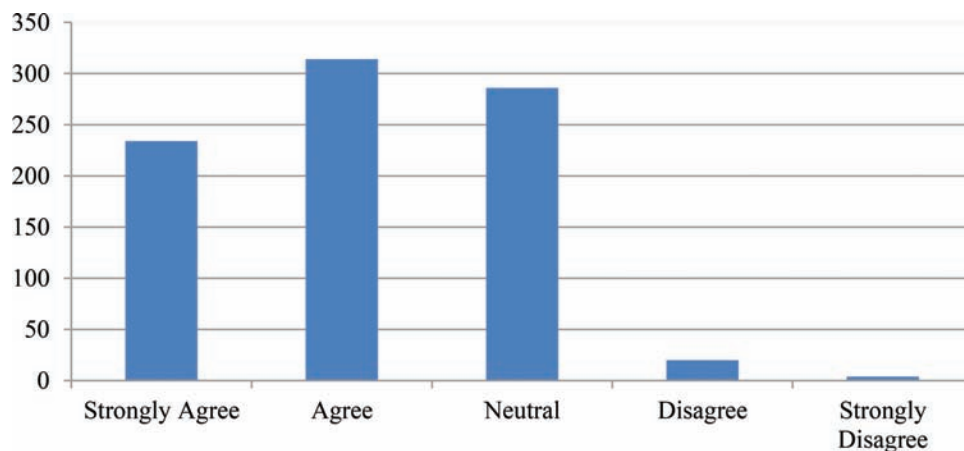


Figure 3.42 If more people took the HST, it would enhance economic development in Indiana.

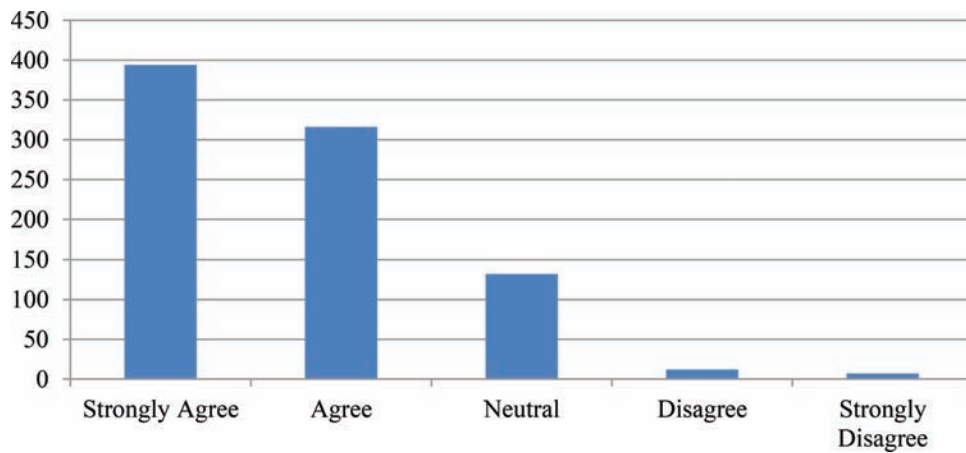


Figure 3.43 The State of Indiana should invest funding to support the HST service.

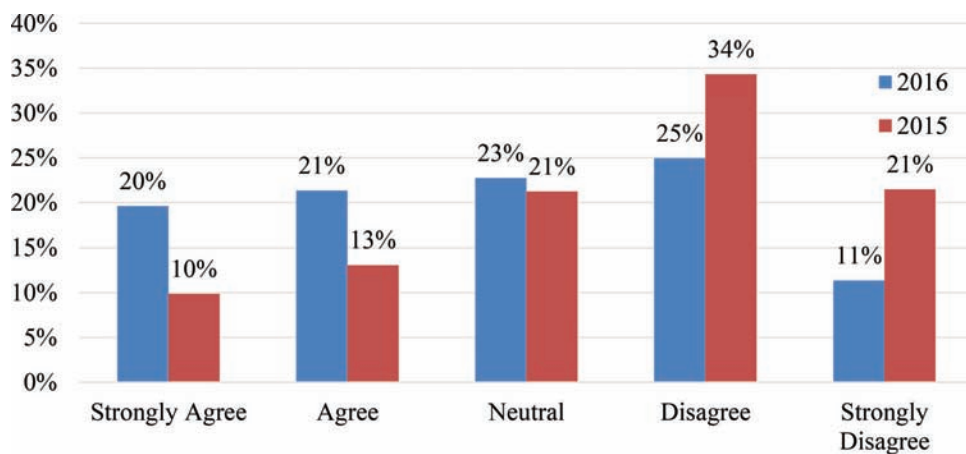


Figure 3.44 I intend to travel with the HST in the next month. (Note: Percentages are rounded to the nearest integer and bars may vary in height.)

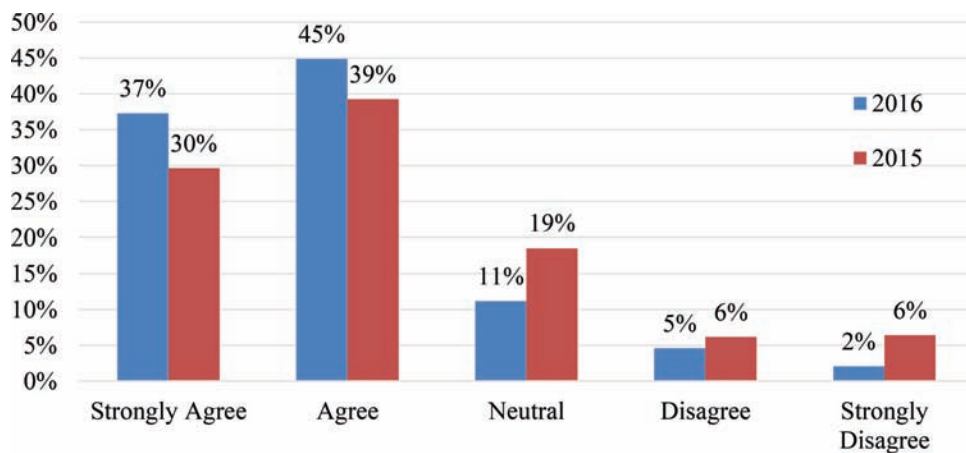


Figure 3.45 I expect to travel with the HST in the near future. (Note: Percentages are rounded to the nearest integer and bars may vary in height.)

Around 82% of the 2016 survey respondents stated that they intended to travel with the HST in the long term, compared to approximately 69% of the 2015 survey respondents (see Figure 3.45). This

indicates that the long-term intention to take the HST increased from 2015 as well. This increase is statistically significant at the 1% significance level (p value < 0.001).

TABLE 3.3
Intention to take the HST in the short run across age groups (2016 and 2015).

2016 Survey Responses: "I intend to travel with the HST in the next month"						
Age Group	18–24	25–34	35–44	45–54	55–64	>65
Age Group % of Total	(35)	(20)	(11)	(9)	(11)	(14)
Strongly Disagree %	9.73	9.52	13.98	3.95	14.77	20.35
Disagree %	24.83	25.60	23.66	18.42	35.23	19.47
Neutral %	21.81	18.45	26.88	27.63	18.18	26.55
Agree %	27.18	23.21	13.98	22.37	15.91	11.50
Strongly Agree %	16.44	23.21	21.51	27.63	15.91	22.12
Total %	100	100	100	100	100	100

2015 Survey Responses: "I intend to travel with the HST in the next month"						
Age Group	18–24	25–34	35–44	45–54	55–64	>65
Age Group % of Total	(31)	(16)	(14)	(13)	(14)	(12)
Strongly Disagree %	11.48	21.54	27.27	22.64	22.22	36.96
Disagree %	30.33	26.15	41.82	45.28	35.19	34.78
Neutral %	26.23	21.54	14.55	13.21	29.63	17.39
Agree %	18.85	18.46	9.09	9.43	5.56	6.52
Strongly Agree %	13.11	12.31	7.27	9.43	7.41	4.35
Total %	100	100	100	100	100	100

TABLE 3.4
Intention to take the HST in the short and long run by gender (2016 and 2015).

2016 Survey Responses				
Gender	"I intend to travel with the HST in the next month"		"I expect to travel with the HST in the foreseeable future"	
	Female	Male	Female	Male
Gender % of Total	(54)	(46)	(54)	(46)
Strongly Disagree %	20.44	19.59	1.97	2.31
Disagree %	19.11	23.45**	5.70	2.83
Neutral %	19.11	26.29	11.84	10.03
Agree %	12.44	10.57*	42.32	47.81
Strongly Agree %	28.89	20.10	38.16	37.02
Total %	100	100	100	100

2015 Survey Responses				
Gender	"I intend to travel with the HST in the next month"		"I expect to travel with the HST in the foreseeable future"	
	Female	Male	Female	Male
Gender % of Total	(51)	(49)	(51)	(49)
Strongly Disagree %	24.26	18.42	5.42	6.88
Disagree %	38.12	31.05	6.90	5.29
Neutral %	20.79	21.05	16.26	20.11
Agree %	9.41	16.84*	40.89	38.62
Strongly Agree %	7.43	12.63**	30.54	29.10
Total %	100	100	100	100

**, * Significantly different proportions at 5%, 10% level, respectively.

3.3.4.1 Intention to take the HST by age. The distribution of the short-term and long-term intention to take the train varied greatly by age group in both surveys, as shown in Table 3.3. The riders from 18 to 24 years old, who responded to the 2015 survey, indicated a stronger intention to travel with the HST in the following month of the survey than any other age group. In 2016, this trend was different. Riders between 45 and 54 years old indicated a stronger intention to

travel with the HST in the following month of the survey than any other age group.

3.3.4.2 Intention to take the HST by gender. The intention to use the train in the short and long run was also examined across male and female respondents, as shown in Table 3.4. In 2015, the intention to travel in the following month was higher among male respondents than female respondents. Those changes in

TABLE 3.5
Intention to take the HST in the short run by vehicle ownership (2016 and 2015).

2016 Survey Responses: "I intend to travel with the HST in the next month"					
No. of Vehicles Owned	0	1	2	3	4 or More
% of Total Respondents	(22)	(27)	(30)	(12)	(9)
Strongly Disagree %	8	11	14	12	11
Disagree %	22	23	24	31	32
Neutral %	19	25	27	21	15
Agree %	30	19	18	19	23
Strongly Agree %	22	22	17	18	20
Total %	100	100	100	100	100

2015 Survey Responses: "I intend to travel with the HST in the next month"					
No. of Vehicles Owned	0	1	2	3	4 or More
% of Total Respondents	(14)	(25)	(30)	(20)	(11)
Strongly Disagree %	11	16	22	30	25
Disagree %	38	36	34	32	34
Neutral %	22	22	28	15	16
Agree %	18	16	9	13	11
Strongly Agree %	11	10	8	10	14
Total %	100	100	100	100	100

percentages were statistically significant at the 5% and 10% level. In 2016, there was not a significant difference between male and female respondents. However, it is also observed that the overall intention to travel in the long run was higher than that in the short run.

3.3.4.3 Intention to take the HST by vehicle ownership. Most respondents (30%) in both surveys stated that they owned two vehicles. When the intention of traveling with the HST in the following month was asked, 17% of respondents in 2015 indicated that they agreed with the statement (see Table 3.5). However, in 2016, the same percentage of respondents who owned two vehicles stated that 35% of them intended to travel with the HST in the following month. The percentage of respondents that had none or one vehicle was significantly higher in 2016 (p value < 0.01). These groups of respondents were also more positive to take the HST in the following month of the survey in 2016, where 52% and 41% of respondents who owned none or one vehicle agreed with the statement, respectively. Comparing to 2016, only 29% and 26% of respondents in 2015 who owned none or one car, respectively, responded positively in that question.

The intention to travel in the HST in the near future was also analyzed across vehicle ownership groups, as presented in Table 3.6. The group of respondents, who owned two vehicles in 2015 and 2016 (30%), indicated a higher intention to travel in the HST in 2016 than in 2015 (82% and 70%, respectively). The percentage of people with none or one vehicle who agreed to travel in the foreseeable future on the train was fairly similar between 2015 and 2016.

3.3.4.4 Intention to take the HST by household size. Due to significant changes in the number of single

households riding the train between 2015 and 2016, the intention to ride the HST by household size was evaluated (see Table 3.7). In the short term, the group of respondents, who lived in a single-person household in 2015 and 2016 (24% and 33%, respectively), showed a higher intention to take the HST in 2016 than in 2015 (43% and 26%, respectively).

Likewise, in the long term, the group of respondents who lived in a single person household in 2015 and 2016 (24% and 39%, respectively), showed a higher intention to take the HST in 2016 than in 2015 (80% and 66%, respectively), as presented in Table 3.8. Fewer respondents belonging in single person households (p value < 0.01) or households with two or three persons strongly disagreed with that statement (p value < 0.05).

More than half of the riders thought that higher gas prices would make it more likely that they would take the train in the future, as shown in Figure 3.46.

3.3.5 Mode Choice

In Section 3 of the survey (the same section was included in both surveys), respondents were asked to rank nine different attributes from 1 being not important at all to 5 being extremely important that they consider in their mode choice decision for a medium distance trip (3–5 hours). Due to that, the maximum score that an attribute could receive was 5 points. The following tables (Tables 3.9 and 3.10) explain the importance of the different attributes among the age groups in 2015 and 2016. As it can be seen in both surveys, respondents between 25 and 44 years old ranked reliability as the most important compared to the other factors (4.2/5 in the 2015 survey and 4.1/5 in 2016 survey). Ease of traveling was ranked higher in 2016 than in 2015 for the respondents between 18 and 24 years old.

TABLE 3.6
Intention to take the HST in the long run by vehicle ownership (2016 and 2015).

2016 Survey Responses: "I expect to travel with the HST in the foreseeable future"					
No. of Vehicles Owned	0	1	2	3	4 or More
% of Total Respondents	(22)	(27)	(30)	(12)	(9)
Strongly Disagree %	0	3	3	2	1
Disagree %	5	6	2	5	4
Neutral %	11	12	13	5	14
Agree %	47	41	45	50	41
Strongly Agree %	36	38	37	38	39
Total %	100	100	100	100	100

2015 Survey Responses: "I expect to travel with the HST in the foreseeable future"					
No. of Vehicles Owned	0	1	2	3	4 or More
% of Total Respondents	(14)	(25)	(30)	(20)	(11)
Strongly Disagree %	0	5	5	11	9
Disagree %	11	10	3	3	7
Neutral %	9	18	23	22	11
Agree %	44	39	38	41	39
Strongly Agree %	36	27	32	24	34
Total %	100	100	100	100	100

TABLE 3.7
Intention to take the HST in the short run by household size (2016 and 2015).

2016 Survey Responses: "I intend to travel with the HST in the next month"					
Household Size	1	2	3	4	5 or More
% of Total Respondents	(33)	(29)	(15)	(13)	(11)
Strongly Disagree %	12	11	14	10	11
Disagree %	22	27	23	23	33
Neutral %	24	24	23	22	18
Agree %	22	19	24	27	17
Strongly Agree %	21	20	16	19	20
Total %	100	100	100	100	100

2015 Survey Responses: "I intend to travel with the HST in the next month"					
Household Size	1	2	3	4	5 or More
% of Total Respondents	(24)	(31)	(16)	(19)	(10)
Strongly Disagree %	16	24	30	18	20
Disagree %	39	34	27	30	45
Neutral %	18	23	22	23	20
Agree %	19	9	14	16	3
Strongly Agree %	7	10	6	12	13
Total %	100	100	100	100	100

Section 3, *Mode choice*, also asked the respondents to rank from 0 to 5 the different attributes as they pertain to five modes of transportation used for medium distance trips. These rankings were then used in a Multi-attribute Attitude Model (MAM), in a bid to identify the most preferable mode ranked in terms of these nine factors. The MAM also allows identifying which attributes are the most important in mode choice decisions. The results of the MAM would allow the stakeholders to determine which attributes need to be enhanced in order to increase passenger rail ridership.

The MAM was originally proposed by Fishbein and Rosenberg in 1967. This model is based on the idea that an individual's attitude towards an object is a function of his/her beliefs about the object that are relevant to the evaluation and the implicit evaluative responses pertaining to those beliefs. In the context of marketing, this model has been extended to postulate that attitudes toward brands are governed by a consumer's beliefs about their ability to satisfy specific product attribute intensities that he/she desires. The results of the MAM include the total average score (total rank) estimated

TABLE 3.8
Intention to take the HST in the long run by household size (2016 and 2015).

2016 Survey Responses: "I expect to travel with the HST in the foreseeable future"					
Household Size	1	2	3	4	5 or More
% of Total Respondents	(33)	(29)	(15)	(13)	(11)
Strongly Disagree %	2	2	3	2	2
Disagree %	6	4	3	2	3
Neutral %	11	12	12	8	15
Agree %	43	45	46	50	41
Strongly Agree %	37	38	36	39	39
Total %	100	100	100	100	100

2015 Survey Responses: "I expect to travel with the HST in the foreseeable future"					
Household Size	1	2	3	4	5 or More
% of Total Respondents	(24)	(31)	(16)	(19)	(10)
Strongly Disagree %	6	7	10	3	5
Disagree %	12	5	3	4	5
Neutral %	16	19	18	22	18
Agree %	37	41	42	41	40
Strongly Agree %	29	28	27	31	33
Total %	100	100	100	100	100

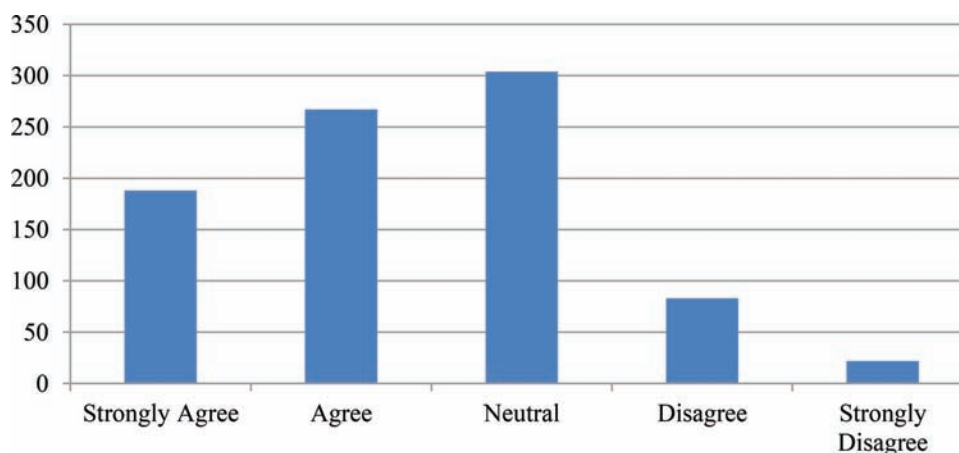


Figure 3.46 Higher gas prices would make it more likely that I would take the HST in the future.

using the index A_j (see Eq. 3.1) and the decomposed scores for each attribute.

$$A_j = \sum_{i=1}^n b_{ij} a_i \quad (3.1)$$

where, for each individual, A_j represents the attitude toward brand j , which in this analysis takes the form of a transportation mode, b_{ij} represents the rating of the mode of transportation j on attribute i , a_i represents the importance of attribute i in forming an overall attitude toward the transportation mode, and n represents the number of attributes that the person considers. The decomposed score with respect to an attribute i will correspond to the product $b_{ij} a_i$. The higher the value of the index, the more attractive the mode is.

Following the notation above, Section 3, *Mode choice*, asked the respondents to rank as not at all important, slightly important, moderately important, very important,

and extremely important ($a_i = 1, 2, \dots, 5$), the following nine attributes ($n=9$) identified as relevant in medium distance trips (between 3 and 5 hours travel): cost, travel time, comfort, safety, amenities, flexibility of travel ("be able to go wherever I want to go"), convenience/flexibility of travel, reliability ("not being late"), and ease of traveling ("minimize the effort required to travel"). Next, the respondents were asked to rate the importance of each of these nine attributes with a score of 1-poor to 5-very good ($b_{ij} = 1, 2, \dots, 5$) in view of the choice of the following five different transportation modes ($j=1, 2, \dots, 5$): automobile-drive alone, automobile carpool, intercity bus, intercity train, and airplane. Based on the above, the maximum possible value of the total rank is $A_{j,max} = 5 \times 5 \times 9 = 225$, with the maximum value that each attribute can receive equal to 25.

The 2016 survey results showed that intercity train was the highest ranked mode with 132.1 points,

TABLE 3.9
Importance of attributes by age (2016 survey).

Attribute	18–24	25–34	35–44	45–54	55–64	65 and Over	Average
a. Cost	3.9	4.0	3.9	3.8	3.6	3.4	3.8
b. Travel time	3.7	3.8	3.7	3.7	3.6	3.3	3.6
c. Comfort	3.6	3.8	4.1	4.2	4.1	3.9	3.9
d. Safety	4.0	4.0	4.1	4.4	4.3	4.2	4.1
e. Amenities	3.2	3.4	3.8	3.8	3.8	3.7	3.5
f. Flexibility of travel	3.7	3.8	3.9	4.0	3.9	3.9	3.8
g. Convenient	3.8	4.0	3.9	4.1	3.9	4.0	3.9
h. Reliability	4.1	4.2	4.1	4.3	4.1	4.1	4.1
i. Ease of traveling	3.9	4.2	4.2	4.3	4.1	4.1	4.1

TABLE 3.10
Importance of attributes by age (2015 survey).

Attribute	18–24	25–34	35–44	45–54	55–64	65 and Over	Average
a. Cost	3.9	4.2	3.9	3.5	3.6	3.4	3.8
b. Travel time	3.8	3.8	3.8	3.6	3.7	3.5	3.7
c. Comfort	3.5	3.8	4.0	3.9	3.9	3.9	3.8
d. Safety	4.1	4.1	4.3	4.3	4.4	4.3	4.2
e. Amenities	3.1	3.1	3.7	3.4	3.6	3.5	3.3
f. Flexibility of travel	3.7	4.0	4.1	3.8	4.0	3.9	3.9
g. Convenient	3.9	3.9	4.1	4.0	4.0	3.9	4.0
h. Reliability	4.0	4.2	4.1	4.1	4.1	4.1	4.1
i. Ease of traveling	3.7	4.1	4.1	4.1	4.0	4.0	4.0

TABLE 3.11
Multi-attribute attitude model scores (2016 survey).

	Intercity Train	Drive Alone	Airplane	Carpool	Intercity Bus
General Rank	132.10	130.39	117.08	115.50	97.28
Reliability	15.10	17.26	14.31	14.54	12.02
Safety	17.37	14.24	16.14	13.47	12.18
Ease of traveling	15.73	14.57	12.90	12.98	11.52
Convenient	11.44	18.07	12.59	14.26	10.79
Comfort	15.83	14.15	12.64	11.77	9.12
Flexibility of travel	11.88	17.54	12.67	13.73	10.10
Cost	15.90	11.78	8.08	13.13	12.56
Travel time	12.25	13.74	14.23	12.54	10.04
Amenities	16.60	9.02	13.54	9.09	8.94

followed by drive alone with 130.39 points out of 225 possible points, as presented in Table 3.11. In addition, the most important attributes for respondents in the 2016 survey also changed. Reliability, safety, and ease of traveling were the most important attributes for 2016 respondents.

Table 3.12 shows that according to the 2015 survey, the highest ranked mode was driving alone with 138.59 points, followed by intercity train with 135.15 points out of 225 points. Also, the most important attributes for the respondents of 2015 survey were safety, reliability, and convenience.

Figure 3.47 shows that intercity passenger rail in the 2015 survey received high scores related to safety, comfort, amenities, and ease of use, but particularly low

scores connected to travel time, flexibility, convenience, and reliability. Similarly, some of the attributes perceived as the “weaker” ones for passenger rail services are among the most important factors in riders’ mode choice decisions (i.e., reliability, flexibility, and convenience).

Figure 3.48 shows that in the 2016 survey, intercity passenger rail received high scores related to safety, amenities, cost, comfort, and ease of use, but especially low scores related to travel time, flexibility, convenience, and reliability. At the same time, some of the attributes perceived as the “weaker” ones for passenger rail services are among the most important factors in riders’ mode choice decisions (i.e., reliability, flexibility, and convenience), a finding which is in line with the 2015 survey results.

TABLE 3.12
Multi-attribute attitude model scores (2015 survey).

	Drive Alone	Intercity Train	Carpool	Air	Intercity Bus
Total Rank	138.59	135.15	120.05	119.94	107.2
Safety	12.95	15.4	12.41	14.95	11.55
Reliability	19.92	15.73	16.83	15.58	13.9
Convenience	17.98	10.56	14.17	11.09	10.24
Ease of Use	14.16	13.83	12.58	11.29	10.9
Flexibility	17.69	11.2	13.96	12.13	10.41
Cost	11.19	17.57	13.61	9.79	16.33
Travel Time	18.11	14.75	16.49	19.11	12.07
Comfort	17.93	17.8	14.83	14.81	11
Amenities	10.29	13.96	9.58	12.37	8.12

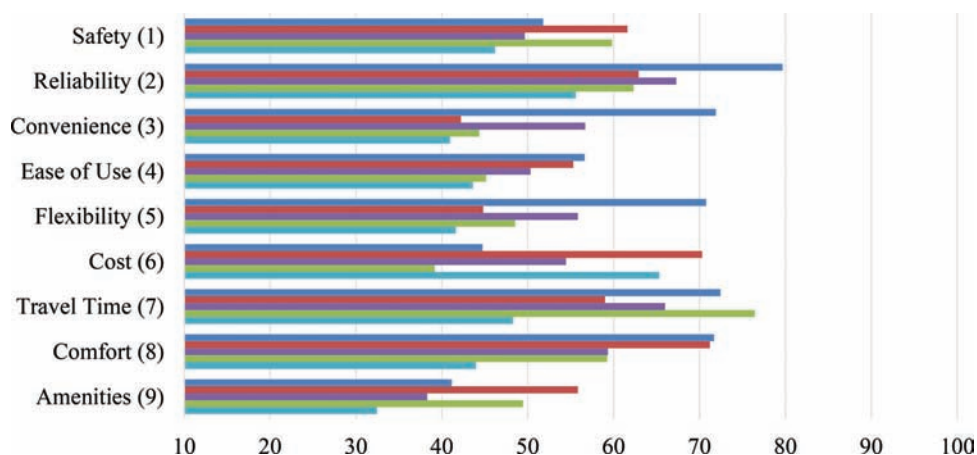


Figure 3.47 Average score per attribute (2015 survey).

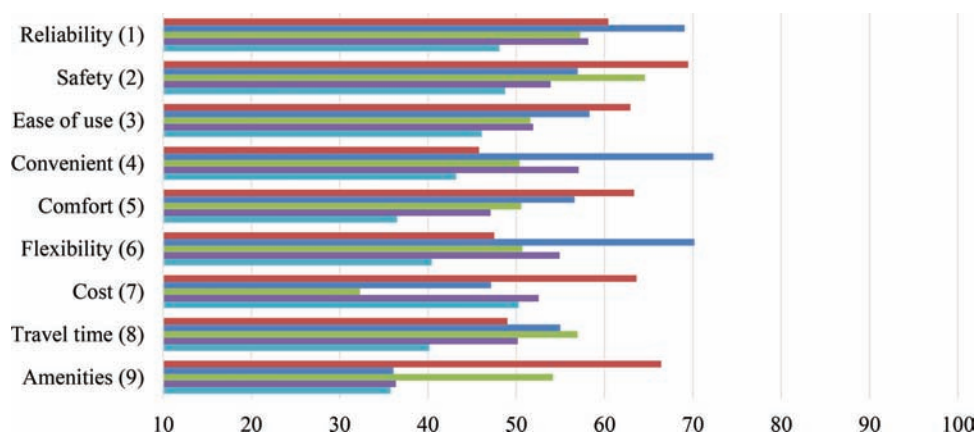


Figure 3.48 Average score per attribute 2016.

Considering the 2015 and 2016 surveys results, changes within the attributes were not found statistical significant. The major changes were in the order of the four most important attributes that shifted from safety being number one in 2015 to number two in 2016. However, the four most important attributes remained the same. In terms of intercity passenger rail service, the most important attributes were fairly similar in both surveys (safety, comfort, amenities, and ease of use).

3.3.5.1 Influence of access in mode choice decisions.

A subsequent analysis explored the relationship between distance from the station (as a proxy of access to the line) and mode choice decisions. To that end, the results of MAM were estimated for different distance ranges. To determine these ranges, data from the following question in the first section of the survey was used “Approximately how many miles did you travel to reach the station?” It was decided to identify an initial range of values based

on the data collected and conduct a sensitivity analysis to explore the effects of selecting different ranges of distance. The sample was divided in quartiles and the corresponding three cut-off points were used to identify four distance ranges. The use of quartiles ensures that enough data will be analyzed for each range (because each range includes approximately 25% of the observations). For this analysis, the resulted quartiles ranges are as follows: 0 to 2 miles (range 1), from 2 to 7 miles (range 2), from 7 to 24 miles (range 3), and more than 24 miles (range 4). To test whether the results of the MAM are significantly different across different ranges, a one-tailed *t*-test for unequal sample size and unequal variance was used. The results for range 1 in each scenario were compared with those of range 2, range 3, and range 4.

Subsequently, a sensitivity analysis was conducted to identify any changes in the MAM due to the changes in the ranges that are analyzed. To ensure that the four ranges had at least 10% of the observations, the maximum distance decrease or increase from the quartiles scenario is chosen to be 50%. The scenarios considered include a 33% decrease and increase from the quartiles scenario (Scenarios 1 and 2 respectively) and a 50% decrease and increase from the quartiles scenario (Scenarios 3 and 4 respectively). Based on these percentage changes, the following four scenarios are used for the sensitivity analysis:

- Scenario 1: 0 to 1.5 miles, 1.5 to 5.5 miles, 5.5 to 19.75 miles, and greater than 19.75,

- Scenario 2: 0 to 2.5, 2.5 to 8.5 miles, 8.5 to 28.25 miles, and greater than 28.25 miles,
- Scenario 3: 0 to 1 miles, 1 to 4 miles, 4 to 15.5 miles, and greater than 15.5 miles, and
- Scenario 4: 0 to 3 miles, 3 to 10 miles, 10 to 32.5 miles, and greater than 32.5 miles.

The average score (total rank) refers to the estimated index in Equation 1 and represents the attitude towards a transportation mode. Table 3.13 presents the results for the quartiles (base case) scenario, which examined four different MA models, one for each range.

The results of the MAM show the total average score (total rank) that refers to the estimated index. The higher the value of the index is, the more attractive the mode is. The stated distance to access the station (derived from the survey question: “*Approximately how many miles did you travel to reach your origin station*”) was classified to four quartiles (from 0 to 2 miles, 2 to 7 miles, 7 to 24 miles, and more than 24 miles), to analyze the respective changes in the MAM index. The findings suggested that traveling by an intercity train and driving alone were the most preferred alternatives for medium distance trips (more than 50 miles). This finding was anticipated for two reasons. First, because the survey was conducted onboard the HST, the respondents had already chosen to travel by intercity train when they were surveyed. Therefore, their preference of intercity passenger rail over other competing modes was expected. Second, it was also expected

TABLE 3.13
Multi-attribute attitude model – access analysis.

Range 1 (From 0 to 2 miles)					
	Train	Drive Alone	Carpool	Airplane	Bus
Total Rank	126.05	125.52	113.59	113.15	96.49
Safety	17.04	12.97	12.53	16.15	11.74
Reliability	14.33	16.42	14.11	13.70	11.79
Ease of use	15.90	13.91	12.66	12.33	11.54
Cost	15.07	11.73	14.57	8.79	13.55
Convenience	10.75	17.86	14.21	12.41	10.81
Comfort	15.83	13.50	11.31	11.85	9.09
Travel time	12.02	13.93	12.81	14.41	10.35
Flexibility	10.96	17.30	13.67	11.87	9.75
Amenities	14.15	7.90	7.72	11.63	7.87
Range 2 (From 2 to 7 miles)					
	Drive Alone	Train	Airplane	Carpool	Bus
Total Rank	132.70*	125.53	115.93	114.75	97.08
Reliability	17.96	14.67	14.14	14.95	12.53
Ease of Use	15.02*	15.41**	13.38	13.05	12.05
Safety	14.24	17.26	15.95	12.98	12.06
Convenience	18.23*	10.97	12.41	14.11	11.13
Flexibility	18.10	11.61	13.25	13.82	10.70
Comfort	13.99	15.45*	12.53	11.17	8.93
Cost	11.62	14.24**	8.15*	13.48**	12.35**
Amenities	9.86***	14.64	12.19	8.97**	7.89*
Travel Time	13.67	11.29**	13.93	12.21	9.43**

TABLE 3.13
(Continued)

Range 3 (From 7 to 24 miles)					
	Drive Alone	Train	Airplane	Carpool	Bus
Total Rank	132.56*	130.59*	115.45	114.63	93.84
Safety	14.19*	17.69	16.83	13.19	11.59
Reliability	17.48	15.39	14.33	14.67	11.73
Ease of Use	14.60	15.95*	11.95	12.92	11.09
Convenience	18.90*	12.02	12.72	14.52	10.64
Comfort	14.42*	15.63*	12.54	11.58	8.61
Flexibility	17.91	11.92	12.32	13.52	9.96
Cost	11.84	14.72	9.07	13.48*	12.21**
Travel Time	13.83	13.00	14.57	12.36	10.04
Amenities	9.39***	14.27	11.13	8.39**	7.96

Range 4 (Greater than 24 miles)					
	Train	Drive Alone	Airplane	Carpool	Bus
Total Rank	131.14*	130.37	118.41	114.88	92.91
Safety	18.25	14.94*	16.58	14.12	12.63
Reliability	15.57	17.72*	14.48	14.32	11.63
Ease of Use	15.93	13.88	13.35	12.11	10.99
Convenience	11.16	18.06	12.73	14.05	9.86
Comfort	16.38	14.18*	13.19*	11.68	8.41
Cost	15.31	11.61	9.06	14.20	12.13*
Flexibility	12.24	17.78	13.40	13.84	10.00
Travel Time	12.56	13.74	14.13	12.48	9.73
Amenities	13.75*	8.44	11.48	8.07	7.55

*Significant at 0.1 level, **significant at 0.05 level, ***significant at 0.01 level.

that driving alone would be one of the most preferred ways to travel, because Indiana is generally an automobile-oriented state. For example, data suggest that approximately 76 percent of U.S. commuters chose to drive alone in 2015 (U.S. Bureau of Transportation Statistics, 2015).

The results of the analysis also suggested that intercity train is the most favorable mode for riders who traveled less than two miles to access a respective station. This finding implies that people who traveled less to access a station would be more likely to take the train. Furthermore, for this group of respondents (i.e., with high levels of access to the station), safety, ease of use, and reliability were identified as the most important factors in mode choice decision making for intercity travel. The order of importance of these three highly ranked attributes and the rest six attributes varied as the level of access to the train varied. In general, riders' opinions on train's performance with respect to these attributes were similar regardless of how much they traveled to access the line. However, this was not the case for riders' perceptions of the drive-alone mode. Specifically, riders with the lowest level of access to the line (group of respondents that traveled more than 24 miles to reach a station) thought that driving alone was more difficult, less safe, but more reliable compared to the riders with the higher level of access to the line. Another finding worth noting was that cost and travel

time were not perceived as important attributes on mode choices.

3.3.4 Anecdotal Evidence

Although an open-ended comment box for feedback was not provided on the survey, some respondents decided to share their opinions about the service in different sections of the survey. Those comments are summarized next.

3.3.5.2 What did riders state they like about the HST?

- "I love trains!"
- "Great amenities and so comfortable!"
- "The train today is very clean, comfortable and spacious"
- "You can get work done! Use the time productively on the train. Let someone else drive while you take the train."
- "Please keep the train going"
- "Market the fact that the train is EASIER, CHEAPER and has MORE SPACE than an airplane."

3.3.5.3 What could be improved?

- "More Train frequencies, 3 daily please"
- "There is a need of a convenient rental car (24-7) options near Indianapolis Union Station."
- "Extent the Hoosier State Train to Columbus, IN"
- "Hoosier State should go to Indy Airport"

- “Indianapolis Amtrak Station needs improvements because it is not a good representation for the city or state.”
- “Passenger trains need priority over freight”
- “Needs more trains, 6 am is too early, 12 am return time to Indy is too late”
- “Schedule is the biggest issue with the Hoosier State”
- “Needs to be faster!”
- “Needs long-term parking nearby”
- “Let people know how to use the train more often”
- “More special events on the train”
- “Service for getting around Indiana and out of the state by public transportation is pretty abysmal I am curious to see the results of your Amtrak survey. Do you think your work might have an impact on increased future services? I certainly hope so!”

3.3.5.4 Other

- “In Indy I primarily use IndyGo to get around and when I travel to Chicago it is frequently by either Amtrak or Greyhound”
- “North East corridor is our model + Europe + Japan”
- “Please let me know what you find out, and thanks for looking at these transportation issues!”

4. INTERCITY RAIL STRATEGIES AND BEST PRACTICES

Different factors, such as fare level, service frequency, quality of the waiting environment, and in-vehicle/onboard amenities, can make a transportation service more competitive and appealing to passengers. Improving and promoting these factors can potentially attract more riders (Tilahun, Thakuriah, Li, & Keita, 2016). Additionally, other factors, such as ease of traveling, parking availability, and travel time, could be influential in the mode choice of an intercity passenger. Ease of access to stations/terminals is another important factor in mode choice decisions. A trip from one destination to another in intercity passenger rail is not a single one, but rather a “chain of trips,” which includes a journey to, and from the designated station. As such, a transportation provider would also need to consider how people are traveling on the first and last miles of their trips in order to attract more riders.

The outcomes of the onboard survey conducted on the HST in 2016 (presented in the previous chapters) showed that the dominant mode of transportation for access and egress to a station in most of the cities in Indiana were either being dropped off/picked up or driving/renting a car. This finding suggested that there is a possible gap into the first and last mile (FMLM) travel options for HST riders and alternative options to fill this gap need to be considered. Further, this finding makes clear that Hoosiers prefer to ride a car to reach a station. Because of that, parking availability becomes an important factor to consider when improvements to the service are made.

The following sections provide a summary of strategies and best practices that transportation providers

across the country have implemented to address two main factors: access and egress to the stations and parking policies. Both sections present a literature review where the main topic of the section is defined. After that, the most common strategies are presented. Lastly, best practices across the United States (U.S.) are presented. These sections serve as guidance for the improvements that could be made to the HST in order to attract new riders and retain current passengers.

4.1 First and Last Mile Related Strategies

Access to transit facilities is a factor thought to influence the level of usage of services (Moniruzzaman & Páez, 2012). The access journey to a passenger rail line can be a factor in determining if rail is chosen as a travel alternative (Rietveld, 2000). Since rail stations are usually located relatively far from each other, even within the major cities, getting to a station or from a station is usually an important part of a rail journey, and therefore, must be accounted for in the efforts to increase rail use. Improvements to the accessibility of stations might be cheaper and overall, more cost effective than improvements to the actual train journey (Givoni & Rietveld, 2007).

The first and last mile of a trip has been used to describe passengers traveling with regard to getting to and from transit stops. This problem first emerged in the context of freight transportation, with failed attempts to deliver a product the first time as well as the congestion that this created in the road system. The FMLM problem has been addressed in different public transit contexts, mainly in urban areas. However, it is also an important part of an intercity trip.

The FMLM problem has been solved in different ways according the mode of transportation used as a feeder (defined as a peripheral route or branch in a system, which connects minor or more remote nodes with a route carrying heavier traffic). Shared-use vehicle service is a term including both carsharing and station car programs as solutions to the first mile and last mile problem (Shaheen, Meyn, & Wipiewski, 2003). However, the difference between these two concepts is that carsharing enables an individual to obtain the benefits of private-vehicle use at a lesser cost relative to vehicle ownership, taxis, or conventional rental. On the other hand, station car programs primarily facilitate transit access. Nevertheless, both are currently used as a FMLM solution. A summary of strategies were identified in TCRP Research Report 188 (Feigon & Murphy, 2016) and shown in Table 4.1. It is worth to mention that these options could be also combined to result in multimodal solutions to the FMLM problem.

Carsharing has been widely adopted in different cities (i.e., San Francisco, Portland) to solve the FMLM problem. This strategy enables short-term automobile use that local governments and public agencies can employ in their efforts towards reducing vehicle miles traveled and supporting carbon mitigation. The concept of carsharing is “guiltless”: individuals and businesses

TABLE 4.1
Strategies to address the FMLM problem.

Term	Description	Source
Crossing and Connections	A set of strategies focused on pedestrians that include enhance crosswalks to protect pedestrian and active transportation users when crossing vehicular traffic, cut-troughs and shortcuts to provide more direct routes to and from the station, raised crossings, among other.	(Metro, 2014)
Bikesharing	A short-term bike rental, usually for short periods of an hour or less that typically requires a membership. Information technology (IT)-enabled public bikesharing provides real-time information about the position and availability of bikes at stations in an area.	(Feigon & Murphy, 2016)
Carsharing	Automobile rental for intervals of less than a day. Major carsharing business models include traditional or round-trip, where users borrow and return vehicles to their original location; one-way or free-floating, which permits users to pick up a vehicle at one location and drop it off at a different one; and peer-to-peer (p2p), which allows car owners to rent out their vehicle, when they are not using it, to other carsharing members.	(Feigon & Murphy, 2016)
Micro-transit	IT-enabled private multi-passenger transportation services that serve passengers on dynamically generated routes, and may expect passengers to make their way to and from common pick-up or drop-off points. This type of service is referred to as “micro transit”, as it resembles transit but on a reduced and more flexible scale.	(Feigon & Murphy, 2016)
Private shuttles	Traditional private shuttle services include corporate, regional, and local shuttles that make fewer stops, often only picking up designated riders.	(Feigon & Murphy, 2016)
Ridesharing	Ridesharing is a new travel option where passengers share a ride to a common destination. Traditional forms of ridesharing include carpooling and vanpooling.	(Feigon & Murphy, 2016)
Kiss and Ride	A designated pick-up/drop-off area at a convenient location next to the station.	(Metro, 2014)
Park-and-Ride	Parking lots with public transport connections that allow passengers and other people heading to city centers to leave their vehicles and transfer to a bus, rail system, or carpool for the remainder of the journey.	(Metro, 2014)
Autonomous Vehicles	Autonomous vehicles (AVs) have been studied as a potential solution for the last mile trips between a train station and the traveler’s final destination.	(Yap, Correia, & van Arem, 2016)

gain access to private vehicle use without the cost and responsibilities of auto ownership (Shaheen, Rodier, Murray, Cohen, & Martin, 2010). A carsharing system has the power of changing dynamics in the economy because of the cost savings associated with the service. The key elements of a carsharing system are: parking allocation, parking caps, fees and permits, installation, signage, maintenance, parking enforcement, impact studies, and public involvement. Some areas have considered on-street carsharing parking and some others have allowed exclusive parking within a specific zone. However, the number of spots is sometimes limited around transit stations. On the other hand, some public agencies charge carsharing operators for parking around the stations in order to recover lost parking revenue from general use to carsharing-only spaces. Other agencies have chosen to allow free parking for carsharing operators. Carsharing could be a good option when connecting a

train station with the airport or any other relevant destination around a city.

As discusses earlier in the report, the onboard HST survey results suggested that there is a possible gap into the FMLM travel options for intercity rail riders and alternative options to fill this gap should be considered. In specific, it was found that there are riders who travel from counties further away from a county with a station to reach the station, and complete their journey on the train. The results also showed that most of the respondents used an automobile to reach or leave a station in Indiana. The three main options observed to reach Indiana Stations were: someone dropped me off or will pick me up, drove or rented a car, and taxi or ride-sharing. The third option, which includes ridesharing services, is the one presented along with “best practices” found in the U.S. In general, the market share of ride-sharing services has increased rapidly and one of the

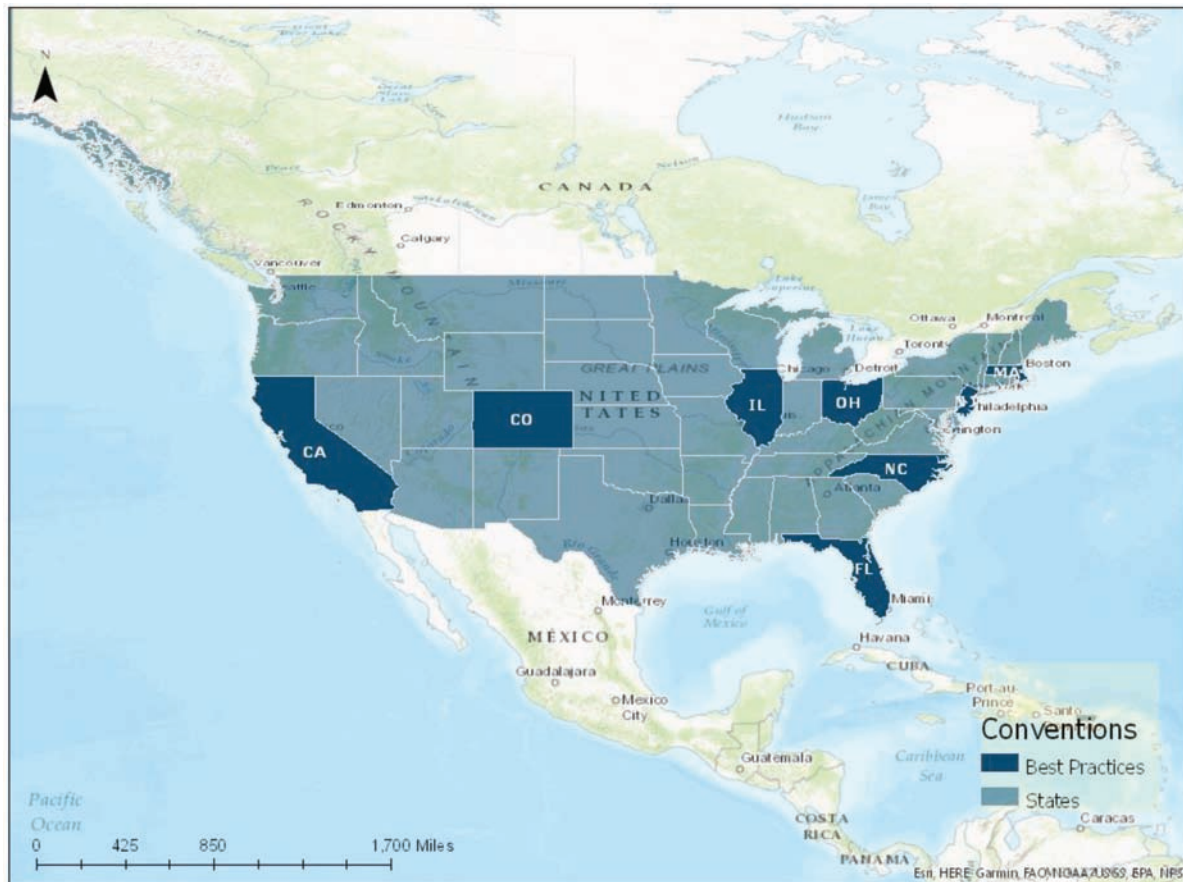


Figure 4.1 Select “best practices” on FMLM solutions across the U.S.

potential markets that such services are exploring and targeting through their strategic programs is to complement public transportation services, such as transit or rail. There are many applications of ridesharing services complementing rail services at a national level, but for the purpose of this study, ten case studies in different locations are presented in Figure 4.1 and Table 4.2, as follows.

1. *Los Angeles, California:* Metrolink has a promotion with Lyft to provide greater transit access to and from downtown Los Angeles. Riders who begin or end at Los Angeles Union Station receive up to \$50 in Lyft credit.
2. *Marin and Sonoma Counties, California:* Marin Rail Commuters are offered a \$2 discount when using Lyft to reach the stations. This program benefits Sonoma-Marín Area Rail Transit riders and it’s a partnership between SMART and Lyft.
3. *Centennial, Colorado:* Residents in a defined service area are able to call for free Lyft rides to and from the Rapid Transit District (RTD) light rail station that provides connections to Denver. This program was possible due to a partnership between Lyft and RTD. Rides are able to request the Lyft through its application or with Go Denver, the agency app. To help the program succeed, city officials held training workshops in libraries and recreation centers to show rides how to use the mobile apps.
4. *Chicago, Illinois:* Metra declared Uber as its Official Rideshare Partner for providing services to and from Metra stations. The three-year partnership began in February 2017. In this partnership, Uber paid Metra to have its name and message featured on their promotional material and electronic communications. Also, using a promo code, a new user could get up to \$15 off for their first ride.
5. *Greater Dayton, Ohio:* The program “RTA connects” is a partnership between Greater Dayton Regional Transit Authority and Lyft that offers the convenience of booking the trip around the schedule of the riders entering a coupon code located on the bus stop. This program also allows riders to book their trips with Lyft through the RTA Call Center. The only requirement is that the rider would need to be picked up or dropped off at an RTA stop.
6. *Summit, New Jersey:* Riders of the commuter rail train are able to get Uber rides to and from the train station for \$4-daily fee, which is the price for using the commuter parking lot. The rides are offered between 5 am and 9 pm only. This city was the first municipality to enter a contract with Uber for the service.
7. *North Carolina:* NC transit operators offer last mile connections for Amtrak riders that use the Piedmont and Carolinian trains. This program is possible due to a partnership between the North Carolina Department of Transportation Rail Division and 11 transit operations. The program offer passengers on those trains a free transit pass good for travel in select cities.

TABLE 4.2
Summary of best practices.

City/County	State	Agency	Station/Lines(s) Served	Program	Strategy	Price
Los Angeles	CA	Metrolink	Angeles Union Station	ND	Partnership with Lyft	\$5 discount per ride, up to \$50
Marina and Sonoma counties	CA	Sonoma-Marina Area Rail Transit (CA)	SMART	LyftLine	Partnership between SMART and Lyft	\$2 Discount
Centennial	CO	Rapid Transit District	Dry Creek light-rail station.	Go Denver	Partnership with Lyft	Free with ticket
City of Jacksonville and Northeast Florida	FL	Jacksonville Transportation Authority (JTA)	Downtown	Ultimate Urban Circulator Program or U ² C.	Easy Mile EZ10 autonomous vehicle	ND
Tampa	FL	Hillsborough Area Regional Transit Authority	Hillsborough Area Regional Transit Authority	HyperLINK	Tesla Electric car	ND
Tampa	FL	Pinellas Suncoast Transit Authority	PSTA bus stops	Direct Connect	Partnership with Uber and United Taxi	\$3 discount per ride
Chicago	IL	Metra	Metra	Official Rideshare Partner	3 year partnership with Uber	Typical Uber cost
North Carolina	NC	Amtrak	Piedmont and Carolinian	Last mile	Partnership between NCDTO and 11 transit operators	Free
City of Summit	NJ	Summit	Summit commuter rail station	ND	Partnership with UberX	\$2
Greater Dayton	OH	Greater Dayton Regional Transit Authority	Fixed-route buses	RTA connects	Partnership between GDRTA and Lyft. No smartphones needed	ND

ND = not defined.

8. *Jacksonville and Northeast Florida:* Jacksonville Transportation Authority (JTA) hosted a demonstration of the Easy Mile EZ10 autonomous vehicle that will serve as a FMLM strategy to feed JTA stations. The demonstration was held on February 23, 2017, pending implementation.
9. *Tampa, Florida:* The Hillsborough Area Regional Transit Authority is working with Tesla to create a ride hailing service for transit users. The service will be called HyperLINK and will be the first of its kind worldwide. This service is not available to the riders yet.
10. *Tampa, Florida:* The Pinellas Suncoast Transit Authority has a program called Direct Connect that allows riders to use a taxi or ride-hailing to access a bus stop. Riders are transported to bus stops within eight zones throughout Pinellas County and receive \$5 discount off the ride. This partnership is between PSTA with Uber and United Taxi.

Most of the case studies considered a partnership with a ridesharing system (Uber, Lyft, etc.) to increase ridership. Some others used fixed-route buses to address the FMLM problem. The lines or stations presented are mainly for intercity rail; however, some others are for light rail use in urban areas. A summary of the practices are presented in Table 4.2.

4.2 Parking Related Strategies

The HST stations consist of a total of 1,167 long-term parking spots and 50 short-term parking spots in Indiana stations (Amtrak, n.d.). The onboard survey of 2016 found that 31% of the riders drove to reach their respective train station; 46% of those riders parked at the station's parking lot, and around 30% parked at a parking garage near the station (see Figure 3.23). Moreover, 26% of respondents agreed that it was easy to park a personal vehicle near a station. This trend changed significantly ($p > 0.001$) from 2015, where 31% respondents stated the same. From the anecdotal evidence, respondents suggested that the HST line needs additional long-term parking nearby the train stations. In view of the above, this section discusses potential parking strategies for the HST stations.

In general, parking is a significant factor influencing transportation access and ridership (Jacobson & Weinberger, 2016). Park and ride (PnR) facilities provide public transportation riders with not only parking location, but also with drop off/pick up points, and occasionally transfer points (Cherrington et al., 2017). "The nexus of parking and public transportation makes park-and-ride a unique form of public transit" as many riders use biking, carpool or vanpool for their trips (Cherrington et al., 2017). Due to larger catchment areas, rail stations tend to have more parking. The further away the station is from the main destination, the greater the possibility of a larger parking facility (Duncan & Christensen, 2013).

Some of the benefits associated with park-and-ride facilities are documented in (TRB, 2003). This document mentioned that PnR derives the following benefits: offer alternatives to driving alone; focus transit rider

demand to enable transit service in low-density area; provide access to rail and commuter bus transit services; offer convenient and safe meeting points for vanpool and carpool users; decrease vehicle miles traveled; and release neighborhoods of problems related with informal parking. Other benefits associated with PnR include: opportunities for drop off and pick up, provide a reliable location for people to leave their personal vehicle while using public transportation, and enhance regional coordination between local and regional agencies, among others.

Despite the known importance about park and ride facilities, many agencies have also faced a challenging decision of whether or not to charge for parking. This decision can bring some benefits, but also challenges that include adverse impact on ridership, the logistics of collecting parking fees, and customer relations. As such, many transit agencies have contemplated parking policies to increase their ridership and reduce the resources used on parking.

There are different types of PnR facilities that are typically grouped in two main categories. The first categorization is by function, location, or road access features. The second categorization is by ownership. The types of PnR due to those categorizations are presented in Table 4.3.

The categorization by ownership offers different opportunities. Whether to own or lease parking facilities provides the following features:

- *Owning park and ride facilities:* provides control over aspects of the parking facility; however, it requires capital investment and ongoing operations and maintenance a state of good repair. It also offers flexibility in future uses of the land and potential to return the investments.
- *Leasing park and ride facilities:* provides the opportunity to expand the available area to park due to possibly adding nearby parking facilities; however, it limits flexibility for parking policies, requires limited upfront capital investment and ongoing operating cost, and creates a level of uncertainty for future parking availability.

Many agencies are either sharing on owning their own facilities. Some examples are presented herein (Cherrington et al., 2017):

- BART and Houston METRO own and operate parking lots around stations.
- CTA and Metra in Chicago own the parking lots, but those are operated and managed by contractors. CTA leases space for parking when special events are taking place around Chicago.
- UTA and DART are agencies that own lots and contract some operation tasks, such as snow removal, cleaning, and landscaping. UTA has agreements with a number of churches around the stations to provide parking service.
- NJ TRANSIT has several types of shared-use facilities, where they act as a property owner, lease, or a benefactor of available nearby parking. Most of their parking lots are not operated by NJ TRANSIT, and their spaces are limited. In view of that, this agency found that the shared-use approach to parking is advantageous as it allows a better service in other aspects instead of parking operations.

TABLE 4.3
Park and ride (PnR) facility types (TRB, 2003).

Type	Description
Categorization by Function Location or Road Access Characteristics	
Service type and site context	Classified into suburban, park-and-pool, transit center, opportunity/joint use, informal, and satellite park-and-ride facilities.
Proximity to destination	Classified into peripheral facilities located on the edge of the primary destination, local urban facilities 1 to 10 miles, suburban facilities 10 to 50 miles, and remote long-distance facilities 50 to 100 miles (AASHTO, 2004).
Location and road system characteristics	Classified based on the location from the Central Business District: urban corridor, peripheral, High Occupancy Vehicle corridor, urban fringe, and remote.
Parking capacity	Classification related to employment center such as peripheral facilities, suburban facilities, and major activity center.
Categorization by Ownership	
Transit agency owned	These facilities are fully operated in house or by contract.
Transit station park-and-rides	This type can serve multiple transit modes, such as feeder bus-to-rail or bus-to-bus transfers.
Specific-use park-and-rides	These facilities are designed for PnR service with operation of corresponding transit service and frequently have easy access to freeways for both travelers and bus access/egress.
Special-case park-and-rides	This category includes all other less common type of facilities, such as peripheral park and ride.
Other public agency owned (shared use)	These facilities are preserved by other public agencies that allow transit customer access through governmental arrangement.
State land park-and-rides	These facilities are on state-owned land.
Local jurisdiction park-and-rides	These facilities are typically developed for multipurpose use, such as access for commercial districts.
Special-district park-and-rides	These facilities are developed by other public entities, such as community colleges.
Privately owned (shared use)	Facilities are operated on private property and may be managed through a lease.
Volunteer park-and-rides	Shared-use facilities with limited or no compensation from the transit agency, that offer access to local bus routes.
Commercial park-and-rides	These are facilities that provide access to local bus routes through small, shared-use facilities with compensation from or agreement with the transit agency.

Besides parking expansion, transit agencies are also thinking on how they can manage parking to increase transit ridership (Widener, Farber, Neutens, & Horner, 2013). Some of the most common policies include pricing, supply and demand management, shared parking, and preferential treatment for specific groups. Additionally, other agencies have considered integrating carsharing with parking policies. The short-term automobile use or carsharing is one transportation strategy that agencies can consider in their efforts towards a reduction in vehicle-miles traveled (VMT) and support carbon emission mitigation efforts (Shaheen et al., 2003).

5. SUMMARY OF FINDINGS, CONCLUSIONS, AND RECOMMENDATIONS

In the U.S., the development of a nationwide intercity passenger and high-speed rail network has been suggested as a promising and sustainable passenger

transport solution associated with many economic, social, and environmental benefits, such as business growth, mobility, and connectivity improvements, and energy consumption and greenhouse gas emissions reductions. Since 2013, the Hoosier State line faced the probability of discontinuation many times. In 2015, after many unfruitful attempts and many obstacles, INDOT reached a separate agreement with IPH, in addition to the existing agreement with Amtrak, forming a very unique (first of a kind in the U.S.) public-private partnership, with a shared vision to improve on-time performance; improve speed and maintain a reliable schedule; increase ridership; and provide better onboard amenities. This study conducted a survey of riders' opinions in a bid to evaluate the opportunities to enhance the HST ridership. The survey was conducted on nine days over a time-span of three weeks (mid-November until early December). The target population included passengers of HST older than eighteen years who were

not employees of Amtrak or IPH. Lastly, approximately 1,070 people were asked to participate and 908 completed responses were collected, which corresponds to a response rate of 85%. The survey findings (discussed in the next section) can be implemented to evaluate the effectiveness of the changes in amenities introduced in 2015, and assess the potential impact on ridership of future planned improvements of the services. The survey results can also provide insights into the groups of people that would be more likely to ride the train and inform future marketing efforts.

5.1 Summary of Findings

The summary of findings is mainly based on the results presented in Chapters 2 and 3 of the report, and includes a brief description of the survey participants, a summary of the significant changes between 2015 and 2016 survey, and new findings based on the 2016 survey.

- *Who took the train?*
 - The distribution of respondents by gender, employment situation, and household income was similar in the 2015 and 2016 surveys.
 - The distribution of respondents by age was fairly similar with the exception of the range between 25 and 34 years and 45 and 54 years; there were fewer respondents in both categories in 2016 compared to 2015.
 - A significant increase in single household riders was identified in the 2016 survey compared to the 2015 survey. In both 2015 and 2016 surveys, most of the respondents did not report any children in their household.
 - A higher percentage of riders who did not own a vehicle was observed in 2016 comparing to 2015 (35% and 14%, respectively). This change was significant at the 1% level (p value < 0.01). People who owned three or more vehicles were still riding the train.
 - More riders used the HST train more than once in the year before the 2016 survey than in the previous year to the 2015 survey.
- *Where did riders live and what were their travel patterns?*
 - HST impacts not only Indiana counties with a station, but also counties without a station.
 - In 2016, respondents traveled from different counties, such as Hamilton, Boone, Monroe, Hendricks and Howard, as it was also shown in the 2015 survey.
 - One out of five respondents reported that they traveled more than 30 miles to reach a station. In addition, more than half of respondents were dropped off or drove to access the train station. A similar proportion of respondents got a ride or drove a car from the train station.
- *What were riders' thoughts about the train?*
 - In 2016, the respondents agreed to a greater degree that the interaction with the ticketing system of the HST is easy and understandable ($p < 0.01$).
 - A similar percentage of respondents found it unlikely that taking the HST would enable them to reach their destination faster in both 2015 and 2016 surveys.

- In 2016, respondents indicated a stronger intention to ride the train in the short run and long run compared to fall 2015.
- Of all respondents, 43% fell into the economical active age range of 25 to 54 and stated a stronger intention to travel in the near future than any other age group.
- No statistical differences were found between female and male respondents' intention to ride the train in the short or long run. However, the changes in the intention to ride the HST in the long run were more significant for male respondents than female respondents.
- A greater proportion of respondents belonging to single person households participated in the 2016 survey compared to the 2015 survey. This demographic group also stated a stronger intention to take the HST in the short and long run than the other household size groups. The percentage of disagreement about a future trip on the HST was lower in 2016 than in 2015 for respondents belonging to a two- or three-person household as well.
- *What are the factors affecting mode choice for a medium-distance trip?*
 - For medium distance trips, it was found that taking an intercity train and driving alone were the most preferred alternatives.
 - It was found that intercity train is the most favorable mode for riders who traveled less than two miles to access a station. This finding implies that people who traveled less to access a station would be more likely to take the train, if they had the chance to do so.
 - In 2016, reliability, safety and ease of use were ranked as the most important attributes in mode choice decisions across all the modes. Safety, reliability and convenience were ranked as the most important attributes across all the modes in 2015. Safety, amenities, and cost were the most important attributes when choosing to travel on an intercity train for the 2016 respondents, while comfort, cost and safety were the most important attributes for taking the train according to the 2015 survey.

5.2 Conclusions, Limitations, and Recommendations

The findings summarized in the previous sections suggested different issues that can be addressed to enhance ridership. One of those issues was a gap in the first and last mile travel to reach or leave a station. In addition, the most important factors affecting the use of the intercity train as a mode of short distance travel were identified. The following points describe the recommendations based on those findings.

5.2.1 Factors Affecting the Use of Intercity Train

Some of the attributes perceived as the weak points of passenger rail service are among the most important factors for the riders (i.e., reliability, flexibility, and convenience). Setting higher goals and enhancing the on-performance time of the HST could improve the reliability of the service. As explained in the Benefit

Cost Analysis for the HST (CDM Smith, 2013), there is a potential for significant schedule time savings if there are infrastructure improvements along the line or if Amtrak could operate on CSX tracks between Dyer and Chicago. Providing services to enhance access to the train stations could improve flexibility (i.e., ease to reach a desired destination). Lastly, convenience, which refers to flexibility in the schedule, could be addressed by reconsidering the current service. This could potentially allow passengers to reach and leave the station by public transportation and that would be particularly important for passengers boarding the train in Indianapolis.

On the other hand, some of the factors that were important for riders, such as safety and comfort, were ranked higher for intercity rail. Those factors, along with the availability of onboard amenities, can inform marketing efforts in order to retain and attract new passengers from all five stations in Indiana. For Rensselaer station, another strategy could be the promotion of the train to college students to enhance ridership.

5.2.2 Intercity Rail Strategies and Best Practices

A possible gap into the FMLM travel options for intercity rail riders was identified through the survey results. Alternatives to fill this gap vary from micro-transit to ridesharing services. Each of the options presents some advantages and drawbacks. Due to the characteristics of the HST, strategies, such as ridesharing and carsharing, would be preferred to solve the FMLM problem for the urban areas with a train station. According to the survey results of 2016, around 23% of respondents lived outside a county with a station. Because of that, parking availability becomes an important factor to consider when improvements to the service are going to be implemented. Park-and-ride facilities could offer a significant opportunity for the HST to attract ridership from customers who live in counties without stations. Micro-transit could be another good strategy to implement and provide service to counties further away from the stations, where the demand would justify such an investment.

Providing a detailed accessibility analysis for each station to identify potential FMLM issues were beyond the scope of this project. This is a topic INDOT might need to consider for future research. Nevertheless, now, that the train is fully operated by Amtrak, HST passengers can take advantage of the discounts that Amtrak offers for new Lyft riders when they book their tickets through the Amtrak app. Data about the actual use of this discount has not been released yet; assessing the benefits derived from such a partnership could be also part of future work.

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APPENDICES

APPENDIX A PILOT SURVEY

The Hoosier State train (that is, the Amtrak train that runs four times per week between Indianapolis and Chicago, with stops in Indianapolis, Crawfordsville, Lafayette, Rensselaer, Dyer, and Chicago) is a joint partnership between Iowa Pacific Holdings, Indiana Department of Transportation, Amtrak, and the Cities of Crawfordsville, Lafayette, West Lafayette/Tippecanoe County and Rensselaer since 2015. The joint partnership has resulted in improvements in train performance, reliability, and in onboard amenities, such as Wi-Fi, hot meal services, snacks and beverages. Please take a few minutes to tell us what you think about the Hoosier State train.

THERE ARE NO RIGHT OR WRONG RESPONSES; WE ARE MERELY INTERESTED IN YOUR PERSONAL OPINIONS. IN YOUR RESPONSES TO THE FOLLOWING QUESTIONS, PLEASE SHARE THE THOUGHTS THAT COME IMMEDIATELY TO MIND.

SECTION 1

1.1 TRIP CHARACTERISTICS AND EXPERIENCE WITH THE HOOSIER STATE TRAIN

1. In which station did you board the Hoosier State train? _____

2. Approximately how many miles did you travel to reach the train station? _____mi

3a. How did you reach the station?

- | | |
|--|--|
| <input type="checkbox"/> Drove to the station | <input type="checkbox"/> Someone dropped me off at the station |
| <input type="checkbox"/> Rode a bus | <input type="checkbox"/> Rode a bicycle |
| <input type="checkbox"/> Walked to the station | <input type="checkbox"/> Other, please specify _____ |

3b. If you drove to reach the station, where did you park?

- | | |
|--|--|
| <input type="checkbox"/> At the station's parking lot | <input type="checkbox"/> At a friend's house |
| <input type="checkbox"/> On a street near the station | <input type="checkbox"/> At a parking garage near the station |
| <input type="checkbox"/> On a street far (more than a mile) from the station | <input type="checkbox"/> At a parking garage far (more than a mile) from the station |
| <input type="checkbox"/> Other, please specify _____ | |

4. In which station are you planning to get off the Hoosier State train? _____

5. Approximately how many miles do you need to travel from the arrival station until your final destination? _____mi

6. How do you plan to reach your final destination when you will get off the train?

- | | |
|---------------------------------------|--|
| <input type="checkbox"/> Use my car | <input type="checkbox"/> Someone will pick me up |
| <input type="checkbox"/> Ride the bus | <input type="checkbox"/> Ride a bicycle |
| <input type="checkbox"/> Walk | <input type="checkbox"/> Other, please specify _____ |

7. How many times approximately have you taken the Hoosier State train since August 15th, 2015 not including this trip (a single trip counts as one trip and a round trip counts as two trips)?

0__ 1-2__ 3-4__ 5-6__ 7-8__ 9-10__ > 10__

8. What is the purpose of your trip today?

- | | |
|--|--|
| <input type="checkbox"/> Work | <input type="checkbox"/> School |
| <input type="checkbox"/> Social/Recreational | <input type="checkbox"/> Other, please specify _____ |
-

9. Have you ever taken the train as part of a tour or a large group (boys/girls scouts, alumni association, etc.)?

Yes ___ No ___

10. Have you ever used any of the following discounts (Please select all that apply)?

- | | |
|---|--|
| <input type="checkbox"/> Kids ride discount | <input type="checkbox"/> Save on group and convention travel |
| <input type="checkbox"/> Seniors save 15% | <input type="checkbox"/> Indiana bicentennial promotion (save 15%) |
| <input type="checkbox"/> 10% off for AAA members | <input type="checkbox"/> Government employee savings (save 20%) |
| <input type="checkbox"/> 15% off student travel | <input type="checkbox"/> Save with a veterans advantage card |
| <input type="checkbox"/> Military personnel and families save 10% | <input type="checkbox"/> 10% Savings for NARP members |
| <input type="checkbox"/> Other, please specify _____ | |
-

SECTION 2

PLEASE ANSWER THE FOLLOWING QUESTIONS BASED ON YOUR PERCEPTIONS OF PASSENGER RAIL.
2.1 EASE OF USING THE HOOSIER STATE TRAIN

1. My interaction with the ticketing system of the Hoosier State train (Amtrak) is easy and understandable.

Strongly Disagree ___ Disagree ___ Neutral ___ Agree ___ Strongly Agree ___

2. My interaction with the information system (such as Amtrak app, electronic information boards and other systems providing real-time trip information) of the Hoosier State train (Amtrak) is easy and understandable.

Strongly Disagree ___ Disagree ___ Neutral ___ Agree ___ Strongly Agree ___

3. It is easy for me to reach the closest Hoosier State station from my house.

Strongly Disagree ___ Disagree ___ Neutral ___ Agree ___ Strongly Agree ___

4a. It is easy for me to park my personal vehicle (car, motorcycle, etc.) near the Hoosier State train station.

Not applicable (I do not own a personal vehicle) ___ Strongly Disagree ___ Disagree ___ Neutral ___ Agree ___
Strongly Agree___

4b. There is enough parking availability near the Hoosier State train station that I use.

Not applicable (I do not own a personal vehicle) ___ Strongly Disagree ___ Disagree ___ Neutral ___ Agree ___
Strongly Agree___

5a. It is easy for me to access the platform at the Hoosier State train station.

Strongly Disagree ___ Disagree ___ Neutral ___ Agree___ Strongly Agree___

5b. The platform is easily accessible for passengers with disabilities.

Strongly Disagree ___ Disagree ___ Neutral ___ Agree ___ Strongly Agree___

6. It is easy for me to travel with the essentials for my trip purposes (carry-on luggage, etc.).

Strongly Disagree __ Disagree __ Neutral __ Agree __ Strongly Agree __

7. There is enough available space to store my luggage on the train.

Strongly Disagree __ Disagree __ Neutral __ Agree __ Strongly Agree __

8. The changes in the amenities (e.g., Wi-Fi, hot meal services, snacks and beverages) in the Hoosier State train make my trip more pleasant.

Strongly Disagree __ Disagree __ Neutral __ Agree __ Strongly Agree __

9. It is easy for me to find brochures related to Indiana destinations at the Hoosier State train station.

Strongly Disagree __ Disagree __ Neutral __ Agree __ Strongly Agree __

10 Traveling with the Hoosier State train is easy for me.

Strongly Disagree __ Disagree __ Neutral __ Agree __ Strongly Agree __

2.2 USEFULNESS OF THE HOOSIER STATE TRAIN

1. Using the Hoosier State train would enable me to reach my destination faster.

Very Unlikely __ Unlikely __ Neutral __ Likely __ Very Likely __

2. Taking the Hoosier State train would make my trip safer.

Very Unlikely __ Unlikely __ Neutral __ Likely __ Very Likely __

3. Using the Hoosier State train would enable me to use the time it takes to reach my destination more productively.

Very unlikely __ Unlikely __ Neutral __ Likely __ Very Likely __

4. When I am traveling, using the Hoosier State train to reach my destination would cost me less.

Very Unlikely __ Unlikely __ Neutral __ Likely __ Very Likely __

5. When I am traveling with a group (family, friends, etc.), using the Hoosier State train to reach my destination would cost me less.

Very Unlikely __ Unlikely __ Neutral __ Likely __ Very Likely __

6. I find the Hoosier State train useful for my traveling purposes.

Strongly Disagree __ Disagree __ Neutral __ Agree __ Strongly Agree __

2.3 YOUR THOUGHTS ABOUT THE HOOSIER STATE TRAIN

1. If more people used the Hoosier State train, it would be good for the environment.

Strongly Disagree __ Disagree __ Neutral __ Agree __ Strongly Agree __

2. If more people used the Hoosier State train, it would contribute to the reduction of traffic congestion in Indiana.

Strongly Disagree __ Disagree __ Neutral __ Agree __ Strongly Agree __

3. If more people took the Hoosier State train, it would enhance economic development in Indiana.

Strongly Disagree __ Disagree __ Neutral __ Agree __ Strongly Agree __

4. The State of Indiana should invest funding to support the Hoosier State service.

Strongly Disagree __ Disagree __ Neutral __ Agree __ Strongly Agree __

5. How likely is it that the Hoosier State schedule will be convenient for your travel purposes?

Very Unlikely __ Unlikely __ Neutral __ Likely __ Very Likely __

6. How likely is it that you can reach your destination on time using the Hoosier state train?

Very Unlikely __ Unlikely __ Neutral __ Likely __ Very Likely __

2.4 USING THE HOOSIER STATE TRAIN IN THE FUTURE

1. I intend to travel with the Hoosier State train in the next month.

Strongly Disagree __ Disagree __ Neutral __ Agree __ Strongly Agree __

2. I expect to travel with the Hoosier State train in the foreseeable future.

Strongly Disagree __ Disagree __ Neutral __ Agree __ Strongly Agree __

3. Higher gas prices would make it more likely that I would take the Hoosier State train in the future.

Strongly Disagree __ Disagree __ Neutral __ Agree __ Strongly Agree __

4. Higher parking costs would make it more likely that I would take the Hoosier State train in the future.

Strongly Disagree __ Disagree __ Neutral __ Agree __ Strongly Agree __

5. I would take the Hoosier State train if I could take my pet with me.

Strongly Disagree __ Disagree __ Neutral __ Agree __ Strongly Agree __

6. I would take the Hoosier State train if a bike-car was available.

Strongly Disagree __ Disagree __ Neutral __ Agree __ Strongly Agree __

SECTION 3 3.1 MODE CHOICE

In the following table, please place a check mark on the level of importance each attribute has when choosing a transportation mode for a medium-distance trip [between 3-5 hours travel].

Attribute	Not at all Important	Slightly Important	Moderately Important	Very Important	Extremely Important
a. Cost					
b. Travel time					
c. Comfort					
d. Safety					
e. Amenities (Wi-Fi, food, etc.)					
f. Flexibility of travel (be able to go wherever I want to go)					
g. Convenient/flexible schedule					
h. Reliability (not being late)					
i. Ease of traveling (minimize the effort required to travel)					

Now, please imagine that you are trying to choose between driving alone, carpool (sharing ride), intercity bus, intercity train (such as the Hoosier State train), or airplane for a medium-distance trip [between 3-5 hours travel]. In the following table, please rate with a score from 1 to 5 these transportation modes with respect to each of the following attributes. The scores indicate that the mode is:

(1) poor, (2) fair, (3) good, (4) very good, and (5) excellent with respect to this attribute.

Attribute	Automobile-Drive Alone	Automobile-Carpool	Intercity Bus (e.g., Greyhound)	Intercity Train (e.g., Amtrak)	Airplane
a. Cost	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
b. Travel time	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
c. Comfort	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
d. Safety	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
e. Amenities (Wi-Fi, food, etc.)	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5

f. Flexibility of travel (be able to go wherever I want to go)	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
g. Convenient/flexible schedule	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
h. Reliability (not being late)	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
i. Ease of traveling (minimize the effort required to travel)	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5

1. Whether I go to work or go shopping, I almost always travel by car.

Strongly Disagree __ Disagree __ Neutral __ Agree __ Strongly Agree __

SECTION 4

4.1 NOW A FEW LAST DEMOGRAPHIC QUESTIONS

1. Are you male __ or female __?

2. Do you have a disability (or impairment) that may affect your travel needs or experience?
Yes __ No __

3. What is your age range? 18-24 __ 25-34 __ 35-44 __ 45-54 __ 55-64 __ 65 and over__

4. What describes best your employment situation?

Work full time__ Work part time__ Currently unemployed __ Student__ Retired __Other, please specify _____

5. Please indicate your approximate annual household income before taxes. (Include total income of all adults living in your household.)

Under \$25,000__ \$25,001-\$49,999__ \$50,000-\$74,999__ \$75,000-\$99,999__ \$100,000-\$149,999__ \$150,000 and over__

6. What is your highest level of education?

Some high school__ High school graduate __ Some college __ College graduate __
Postgraduate/professional __

7. Including yourself, how many persons are in your household? One__ Two__ Three__ Four__
Five or more__

8. Please indicate the number of children in your household under the age of 18.

None __ One __ Two __ Three __ Four or more__

9. How many personal vehicles (including cars, trucks, motorcycles, etc.) does your household have access to or own?

None __ One __ Two __ Three __ Four or more__

10. In a typical week, how many miles do you drive your personal vehicle?

I do not own a personal vehicle __ 5-99 __ 100-299 __ 300-499 __ 500-1,000 __ More than 1,000 __

11. Do you live in Indiana? Yes__ No__

If no, which state do you live in? _____

12. In which Indiana county is your house located?

I do not live in Indiana__ Jasper__ Lake__ Marion__ Montgomery__ Tippecanoe__

Bartholomew __ Hamilton __ Hancock __ Hendricks __ Johnson __ Madison __ Monroe __ Morgan __ Newton
__ Porter __ Putman __ If other, please specify _____

13. In which city is your house located?

I do not live in Indiana __ Crawfordsville __ Dyer __ Indianapolis __ Lafayette or West Lafayette __ Rensselaer
__ Other __

If other, please specify _____

Thank you for your participation!

APPENDIX B
FINAL SURVEY

The Hoosier State train (that is, the Amtrak train that runs four times per week between Indianapolis and Chicago, with stops in Indianapolis, Crawfordsville, Lafayette, Rensselaer, Dyer, and Chicago) is a joint partnership between Iowa Pacific Holdings, Indiana Department of Transportation, Amtrak, and the Cities of Crawfordsville, Lafayette, West Lafayette/Tippecanoe County and Rensselaer since 2015. The joint partnership has resulted in improvements in train performance, reliability, and in onboard amenities, such as Wi-Fi, hot meal services, snacks and beverages. Please take a few minutes to tell us what you think about the Hoosier State train.

☐ Business Class ☐ Coach Class

SECTION 1

1.1 TRIP CHARACTERISTICS AND EXPERIENCE WITH THE HOOSIER STATE TRAIN

1. In which station did you board the Hoosier State train?

- | | | |
|---|-------------------------------------|----------------------------------|
| <input type="checkbox"/> Indianapolis | <input type="checkbox"/> Lafayette | <input type="checkbox"/> Dyer |
| <input type="checkbox"/> Crawfordsville | <input type="checkbox"/> Rensselaer | <input type="checkbox"/> Chicago |

2. Approximately how many miles did you travel to reach the train station? _____mi

3a. How did you reach the station?

- | | |
|--|--|
| <input type="checkbox"/> Drove private car / rental car to the station | <input type="checkbox"/> Someone dropped me off at the station |
| <input type="checkbox"/> Rode a bus | <input type="checkbox"/> Rode a bicycle |
| <input type="checkbox"/> Walked to the station | <input type="checkbox"/> Took a taxi or ride-sharing service (Uber, Lyft, etc) |
| <input type="checkbox"/> Other, please specify _____ | |

3b. If you drove to reach the station, where did you park?

- | | |
|--|--|
| <input type="checkbox"/> At the station's parking lot | <input type="checkbox"/> At a friend's house |
| <input type="checkbox"/> On a street near the station | <input type="checkbox"/> At a parking garage near the station |
| <input type="checkbox"/> On a street far (more than a mile) from the station | <input type="checkbox"/> At a parking garage far (more than a mile) from the station |
| <input type="checkbox"/> Other, please specify _____ | |

4. In which station are you planning to get off the Hoosier State train?

- | | | |
|---|-------------------------------------|----------------------------------|
| <input type="checkbox"/> Indianapolis, | <input type="checkbox"/> Lafayette | <input type="checkbox"/> Dyer |
| <input type="checkbox"/> Crawfordsville | <input type="checkbox"/> Rensselaer | <input type="checkbox"/> Chicago |

5. Approximately how many miles do you need to travel from the station that you will arrive at to reach your final destination? _____mi

6. How do you plan to reach your final destination when you will get off the train?

- | | |
|---|--|
| <input type="checkbox"/> Drive private car / rental car | <input type="checkbox"/> Someone will pick me up |
| <input type="checkbox"/> Ride the bus | <input type="checkbox"/> Ride a bicycle |
| <input type="checkbox"/> Walk | <input type="checkbox"/> Take a taxi or ride-sharing service (Uber, Lyft, etc) |
| <input type="checkbox"/> Other, please specify _____ | |

7. How many times approximately have you taken the Hoosier State train since August 15th, 2015 not including this trip (a single trip counts as one trip and a round trip counts as two

trips)?

0 _____ 1-2 _____ 3-4 _____ 5-6 _____ 7-8 _____ 9-10 _____ > 10 _____

8. What is the purpose of your trip today?

☐ Work

☐ School

☐ Social/Recreational

☐ Other, please specify _____

9. Have you ever taken this train as part of a tour or a large group (boys/girls scouts, alumni association, etc.)?

Yes _____ No _____

10. Have you ever used any of the following discounts (Please select all that apply)?

☐ Kids ride discount

☐ Save on group and convention travel

☐ Seniors save 15%

☐ Indiana bicentennial promotion (save 15%)

☐ 10% off for AAA members

☐ Government employee savings (save 20%)

☐ 15% off student travel

☐ Save with a Veterans Advantage card

☐ Military personnel and families save 10%

☐ 10% Savings for NARP members

☐ Other, please specify _____

SECTION 2

PLEASE ANSWER THE FOLLOWING QUESTIONS BASED ON YOUR PERCEPTIONS OF PASSENGER RAIL. THERE ARE NO RIGHT OR WRONG RESPONSES; WE ARE MERELY INTERESTED IN YOUR PERSONAL OPINIONS. IN YOUR RESPONSES TO THE FOLLOWING QUESTIONS, PLEASE SHARE THE THOUGHTS THAT COME IMMEDIATELY TO MIND.

2.1 EASE OF USING THE HOOSIER STATE TRAIN

1. My interaction with the ticketing system of the Hoosier State train (Amtrak) is easy and understandable.

Not applicable (Did not buy the ticket by myself) _____ Strongly Disagree _____ Disagree _____ Neutral _____ Agree _____ Strongly Agree _____

2. My interaction with the information system (such as Amtrak app, electronic information boards and other systems providing real-time trip information) of the Hoosier State train (Amtrak) is easy and understandable.

Strongly Disagree _____ Disagree _____ Neutral _____ Agree _____ Strongly Agree _____

3. It is easy for me to reach the closest Hoosier State station from my house.

Strongly Disagree _____ Disagree _____ Neutral _____ Agree _____ Strongly Agree _____

4a. It is easy for me to park my personal vehicle (car, motorcycle, etc.) near the Hoosier State train station.

Not applicable (I do not own a personal vehicle) _____ Strongly Disagree _____ Disagree _____ Neutral _____ Agree _____ Strongly Agree _____

4b. There is enough parking availability near the Hoosier State train station that I use.

Not applicable (I do not own a personal vehicle) _____ Strongly Disagree _____ Disagree _____ Neutral _____ Agree _____ Strongly Agree _____

5a. It is easy for me to access the platform at the Hoosier State train station.

Strongly Disagree __ Disagree __ Neutral __ Agree __ Strongly Agree __

5b. The platform is easily accessible for passengers with disabilities.

Not applicable (I do not have an opinion) __ Strongly Disagree __ Disagree __ Neutral __ Agree __
Strongly Agree __

6. It is easy for me to travel with the essentials for my trip purposes (carry-on luggage, etc.).

Strongly Disagree __ Disagree __ Neutral __ Agree __ Strongly Agree __

7. There is enough available space to store my luggage on the train.

Strongly Disagree __ Disagree __ Neutral __ Agree __ Strongly Agree __

8. The changes in the amenities (e.g., Wi-Fi, hot meal services, snacks and beverages) in the Hoosier State train make my trip more pleasant.

Strongly Disagree __ Disagree __ Neutral __ Agree __ Strongly Agree __

9. It is easy for me to travel with my pet on the Hoosier State train

Not applicable (I do not have a pet) __ Strongly Disagree __ Disagree __ Neutral __
Agree __ Strongly Agree __

10. It is easy for me to find travel brochures related to Indiana destinations at the Hoosier State train stations.

Strongly Disagree __ Disagree __ Neutral __ Agree __ Strongly Agree __

11 Traveling with the Hoosier State train is easy for me.

Strongly Disagree __ Disagree __ Neutral __ Agree __ Strongly Agree __

2.2 USEFULNESS OF THE HOOSIER STATE TRAIN

1. Using the Hoosier State train would enable me to reach my destination faster.

Very Unlikely __ Unlikely __ Neutral __ Likely __ Very Likely __

2. Taking the Hoosier State train would make my trip safer.

Very Unlikely __ Unlikely __ Neutral __ Likely __ Very Likely __

3. Using the Hoosier State train would enable me to use the time it takes to reach my destination more productively.

Very Unlikely __ Unlikely __ Neutral __ Likely __ Very Likely __

4. When I am traveling alone, using the Hoosier State train to reach my destination would cost me less.

Very Unlikely __ Unlikely __ Neutral __ Likely __ Very Likely __

5. When I am traveling with a group (family, friends, etc.), using the Hoosier State train to reach my destination would cost me less.

Very Unlikely __ Unlikely __ Neutral __ Likely __ Very Likely __

6. I find the Hoosier State train useful for my traveling purposes.

Strongly Disagree __ Disagree __ Neutral __ Agree__ Strongly Agree__

2.3 YOUR THOUGHTS ABOUT THE HOOSIER STATE TRAIN

1. If more people used the Hoosier State train, it would be good for the environment.

Strongly Disagree __ Disagree __ Neutral __ Agree__ Strongly Agree__

2. If more people used the Hoosier State train, it would contribute to the reduction of traffic congestion in Indiana.

Strongly Disagree __ Disagree __ Neutral __ Agree__ Strongly Agree__

3. If more people took the Hoosier State train, it would enhance economic development in Indiana.

Strongly Disagree __ Disagree __ Neutral __ Agree__ Strongly Agree__

4. The State of Indiana should invest funding to support the Hoosier State service.

Strongly Disagree __ Disagree __ Neutral __ Agree__ Strongly Agree__

5. How likely is it that the Hoosier State schedule will be convenient for your travel purposes?

Very Unlikely __ Unlikely __ Neutral __ Likely __ Very Likely __

6. How likely is it that you can reach your destination on time using the Hoosier state train?

Very Unlikely __ Unlikely __ Neutral __ Likely __ Very Likely __

2.4 USING THE HOOSIER STATE TRAIN IN THE FUTURE

1. I intend to travel with the Hoosier State train in the next month.

Strongly Disagree __ Disagree __ Neutral __ Agree__ Strongly Agree__

2. I expect to travel with the Hoosier State train in the foreseeable future.

Strongly Disagree __ Disagree __ Neutral __ Agree__ Strongly Agree__

3. Higher gas prices would make it more likely that I would take the Hoosier State train in the future.

Strongly Disagree __ Disagree __ Neutral __ Agree__ Strongly Agree__

4. Higher parking costs would make it more likely that I would take the Hoosier State train in the future.

Strongly Disagree __ Disagree __ Neutral __ Agree__ Strongly Agree__

5. The availability of a bike-car would make it more likely that I would take the Hoosier State train in the future.

Not applicable (I do not have a bike) __ Strongly Disagree __ Disagree __ Neutral __ Agree__
Strongly Agree__

SECTION 3 3.1 MODE CHOICE

In the following table, please place a check mark on the level of importance each attribute has when choosing a transportation mode for a medium-distance trip [between 3-5 hours travel].

Attribute	Not at all Important	Slightly Important	Moderately Important	Very Important	Extremely Important
j. Cost					
k. Travel time					
l. Comfort					
m. Safety					
n. Amenities (Wi-Fi, food, etc.)					
o. Flexibility of travel (be able to go wherever I want to go)					
p. Convenient/flexible schedule					
q. Reliability (not being late)					
r. Ease of traveling (minimize the effort required to travel)					

Now, please imagine that you are trying to choose between driving alone, carpool (sharing ride), intercity bus, intercity train (such as the Hoosier State train), or airplane for a medium-distance trip [between 3-5 hours travel]. For each of the following transportation modes, rate each attribute by using a score from 1 to 5 where 1 = poor, 2 = fair, 3 = neutral, 4 = good, and 5 = very good.

Attribute	Automobile-Drive Alone	Automobile-Carpool	Intercity Bus (e.g., Greyhound)	Intercity Train (e.g., Amtrak)	Airplane
j. Cost	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
k. Travel time	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
l. Comfort	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
m. Safety	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
n. Amenities (Wi-Fi, food, etc.)	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5

o. Flexibility of travel (be able to go wherever I want to go)	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
p. Convenient/flexible schedule	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
q. Reliability (not being late)	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
r. Ease of traveling (minimize the effort required to travel)	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5

- Whether I go to work or go shopping, I almost always travel by car.

Strongly Disagree __ Disagree __ Neutral __ Agree __ Strongly Agree __

SECTION 4

4.1 NOW A FEW LAST DEMOGRAPHIC QUESTIONS

1. Are you male __ or female __?

2. Do you have a disability (or impairment) that may affect your travel needs or experience?

Yes __ No __ I prefer not to answer __

3. What is your age range? 18-24 __ 25-34 __ 35-44 __ 45-54 __ 55-64 __ 65 and over __

4. What describes best your employment situation?

Work full time __ Work part time __ Currently unemployed __ Student __ Retired __ Homemaker __

Other, please specify _____

5. Please indicate your approximate annual household income before taxes. (Include total income of all adults living in your household.)

Under \$25,000 __ \$25,000-\$49,999 __ \$50,000-\$74,999 __ \$75,000-\$99,999 __ \$100,000-\$149,999 __ \$150,000 and over __

6. What is your highest level of education?

Grade school or less __ Some high school __ High school graduate __ Technical training beyond high school __

Some college __ College graduate __ Graduate school __

7. Including yourself, how many persons are in your household? One __ Two __ Three __ Four __

Five or more __

8. Please indicate the number of children in your household under the age of 18.

None __ One __ Two __ Three __ Four or more __

9. How many personal vehicles (including cars, trucks, motorcycles, etc.) does your household have access to or own?

None __ One __ Two __ Three __ Four or more __

10. In a typical week, how many miles do you drive your personal vehicle?

I do not own a personal vehicle__ 5-99__ 100-299__ 300-499__ 500-1,000__ More than 1,000__

11. Do you live in Indiana? Yes__ No__

If no, which state do you live in? _____

12. In which Indiana county is your house located?

I do not live in Indiana__ Jasper__ Lake__ Marion__ Montgomery__ Tippecanoe__

Bartholomew__ Hamilton__ Hancock__ Hendricks__ Johnson__ Madison__ Monroe__ Morgan__
Newton__ Porter__ Putman__ If other, please specify _____

13. In which city is your house located?

I do not live in Indiana__ Crawfordsville__ Dyer__ Indianapolis__ Lafayette or West Lafayette__
Rensselaer__

Other, please specify _____

Thank you for your participation!

APPENDIX C

Riders traveled from different cities across Indiana to reach a station. A list of these cities is provided below along with the total number of trips and trip frequency.

C1. Total trips from cities without a station

County	Cities	Total Number of Trips
Tippecanoe	Battle Ground, Warsaw	9
Marion	Beach Grove	4
Montgomery	Waynetown	2
Hamilton	Carmel, Fishers, Noblesville, Westfield	2
Lake	Gary, Hammond, Hobart, Munster, Saint John, Schererville	3
Monroe	Bloomington	3
Boone	Lebanon, Sheridan, Thorntown, Whitestown, Zionsville	2
Hendricks	Avon, Brownsburg, Pittsboro, Plainfield	5
Hancock	Greenfield, McCordsville, New Palestine	1
Johnson	Franklin, Greenwood, New Whiteland, Whiteland	2
Jasper	De Motte, Remington	2
Bartholomew	Columbus, Hope	4
Howard	Greentown, Hammond, Kokomo	1
Delaware	Muncie	3
Clay	Brazil	6
Parke	Rockville	3
Putman	Cloverdale, Greencastle	13
Sullivan	Graysville, Sullivan	3
Clinton	Frankfort, Rossville	1
Porter	Valparaiso	5
Vigo	Terre Haute	2
White	Monticello	9
Madison	Anderson	1
Morgan	Martinsville, Mooresville	11
Shelby	Shelbyville	2
Fountain	Attica	9
Brown	Nashville, Rural Brown	16

County	Cities	Total Number of Trips
Fountain	Attica	9
Brown	Nashville, Rural Brown	16
Harrison	Crandall, Lanesville	1
Rush	Manilla, Rushville	3
Floyd	New Albany	2
Pulaski	Waveland	1
Jackson	Seymour	8
Dubois	Otwell	4
Grant	Marion	7
Allen	Fort Wayne	2
Starke	North Judson	15
Henry	Newcastle	8
Adams	Geneva	1
Lagrange	Lagrange	1

C2. Trip Frequency across riders by household location

Household location	Trip Frequency						
	0	1-2	3-4	5-6	7-8	9-10	>10
I do not live in Indiana	111	98	45	19	13	4	19
Tippecanoe	64	46	17	3	6	3	14
Marion	47	34	12	7	5	3	2
Montgomery	4	10	6	2	1	0	5
Hamilton	14	3	1	2	0	2	0
Lake	7	5	2	1	0	0	2
Boone	10	2	3	0	0	0	0
Hendricks	5	7	3	0	0	0	0
Monroe	2	3	5	2	2	0	1
Hancock	4	5	1	0	0	1	0
Johnson	3	6	2	0	0	0	0
Bartholomew	3	3	4	0	0	0	0
Jasper	1	5	1	0	2	0	1
Delaware	6	2	0	0	0	0	0

Household location	Trip Frequency						
	0	1-2	3-4	5-6	7-8	9-10	>10
Howard	3	2	0	0	2	1	0
Clay	1	6	0	0	0	0	0
Parke	5	1	0	1	0	0	0
Sullivan	4	1	0	0	0	0	0
Porter	0	0	1	0	2	0	1
Putman	1	1	1	0	0	0	1
Clinton	4	0	0	0	0	0	0
Fountain	2	1	0	0	0	0	0
Madison	2	1	0	0	0	0	0
Shelby	2	1	0	0	0	0	0
White	2	1	0	0	0	0	0
Morgan	3	0	0	0	0	0	0
Rush	1	0	1	0	0	0	0
Vigo	1	1	0	0	0	0	0
Floyd	0	1	1	0	0	0	0
Pulaski	2	0	0	0	0	0	0
Harrison	2	0	0	0	0	0	0
Jackson	1	0	1	0	0	0	0
Brown	1	0	0	0	0	0	0
Dubois	1	0	0	0	0	0	0
Henry	0	0	0	1	0	0	0
Grant	0	1	0	0	0	0	0
Allen	0	1	0	0	0	0	0
Starke	0	1	0	0	0	0	0
Adams	1	0	0	0	0	0	0
Lagrange	0	0	1	0	0	0	0

About the Joint Transportation Research Program (JTRP)

On March 11, 1937, the Indiana Legislature passed an act which authorized the Indiana State Highway Commission to cooperate with and assist Purdue University in developing the best methods of improving and maintaining the highways of the state and the respective counties thereof. That collaborative effort was called the Joint Highway Research Project (JHRP). In 1997 the collaborative venture was renamed as the Joint Transportation Research Program (JTRP) to reflect the state and national efforts to integrate the management and operation of various transportation modes.

The first studies of JHRP were concerned with Test Road No. 1 — evaluation of the weathering characteristics of stabilized materials. After World War II, the JHRP program grew substantially and was regularly producing technical reports. Over 1,600 technical reports are now available, published as part of the JHRP and subsequently JTRP collaborative venture between Purdue University and what is now the Indiana Department of Transportation.

Free online access to all reports is provided through a unique collaboration between JTRP and Purdue Libraries. These are available at: <http://docs.lib.purdue.edu/jtrp>

Further information about JTRP and its current research program is available at: <http://www.purdue.edu/jtrp>

About This Report

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