

Factors Influencing the Usage of an Automated Transportation System

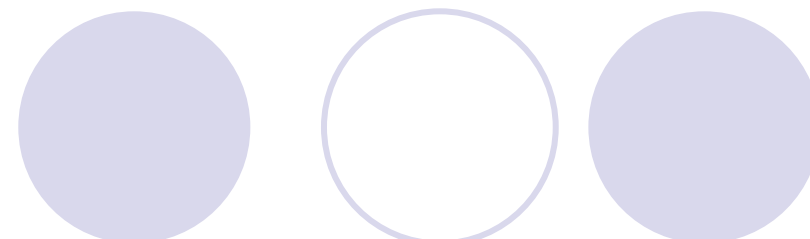
Vishakha Maskey, Ph.D.,
West Liberty State College
West Liberty, West Virginia
vmaskey@westliberty.edu





Project team

Michael Strager, Ph.D.,
Claudia Bernasconi, MA
Michael Hasenmyer, MLA
Division of Resource
Management
West Virginia University

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- This paper is a part of larger study on the PRT design characteristics and aesthetics.
 - This presentation specifically looks at the demographic aspect of the PRT use.

Outline

- Introduction
- Background
- Objectives
- Methods
- Results
- Conclusions



Introduction



- Automated personal transportation systems
 - offer an efficient,
 - convenient mode of public transit,
 - on-demand, and
 - nonstop connectivity on a network of exclusively-built guideways.
- Initiated to decrease the congestion caused by individual autos, address environmental concerns, and to provide more sustainable living.

A decorative graphic consisting of two groups of three circles. The first group on the left has a solid light purple circle on the left, a white circle with a light purple outline in the middle, and a solid light purple circle on the right. The second group on the right has a solid light purple circle on the left, a white circle with a light purple outline in the middle, and a solid light purple circle on the right.

Research need

- Information regarding behavior and attitudes toward ridership at operational sites are crucial in guiding future systems.
- One of the PRT operational sites is Morgantown PRT at West Virginia University (WVU).

Background: Morgantown PRT



- An automated transportation system at WVU in Morgantown, WV.
 - Operating for 35 years,
 - with 5 stations, total of 8.7 miles of guideways,
 - 70 vehicles in the system, serving up to 12,000 passengers per day
 - each car with the capacity to hold 20 people, 8 seating and 12 standing.
 - vehicles are powered by electric rails and have rubber tires.



Background cont.

A decorative graphic consisting of six circles arranged in two rows. The top row has three circles: a solid light purple circle on the left, an outlined light purple circle in the middle, and a solid light purple circle on the right. The bottom row has three circles: a solid light purple circle on the left, an outlined light purple circle in the middle, and a solid light purple circle on the right.

- Information on:
 - demographics,
 - user behavior, and
 - attitudes.
- Identifying the driving forces behind preferences of urban transportation can aid in creating socially acceptable system.



Objectives

- Evaluate attitudinal and behavioral responses towards PRT system with respect to individual's socio-demography
- Investigate relationship between individual characteristics and the degree of PRT use



Methodology

- Data Collection:

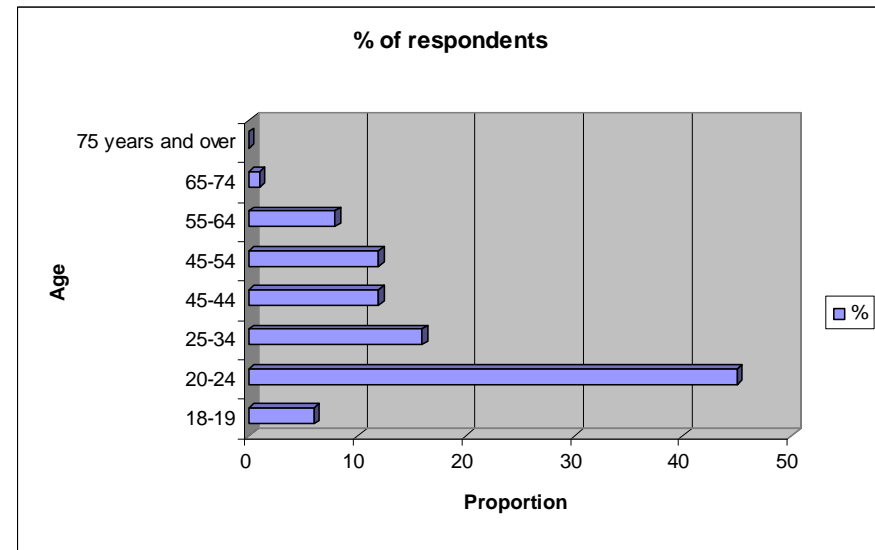
- A convenience survey of around 300 population (both users and non-users) was performed
- There were total of 182 usable surveys

- Data Analyses:

- Correlation analysis
- Econometric analysis using Ordered Probit Model

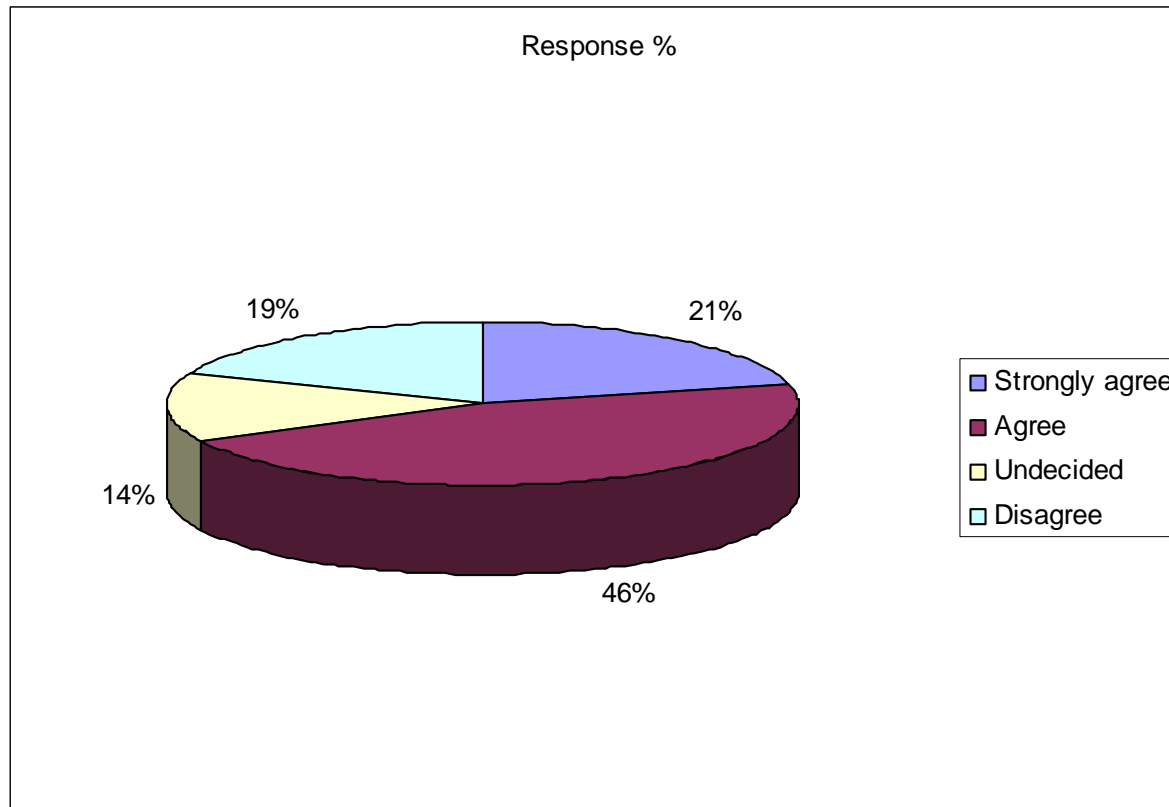
Respondents profile

- 53% female and 47% male
- 44% of the respondents have Bachelor's degree and above
- majority (56%) of respondents were students.
- More than half of the respondents lived in the MORGANTOWN area for more than three years.



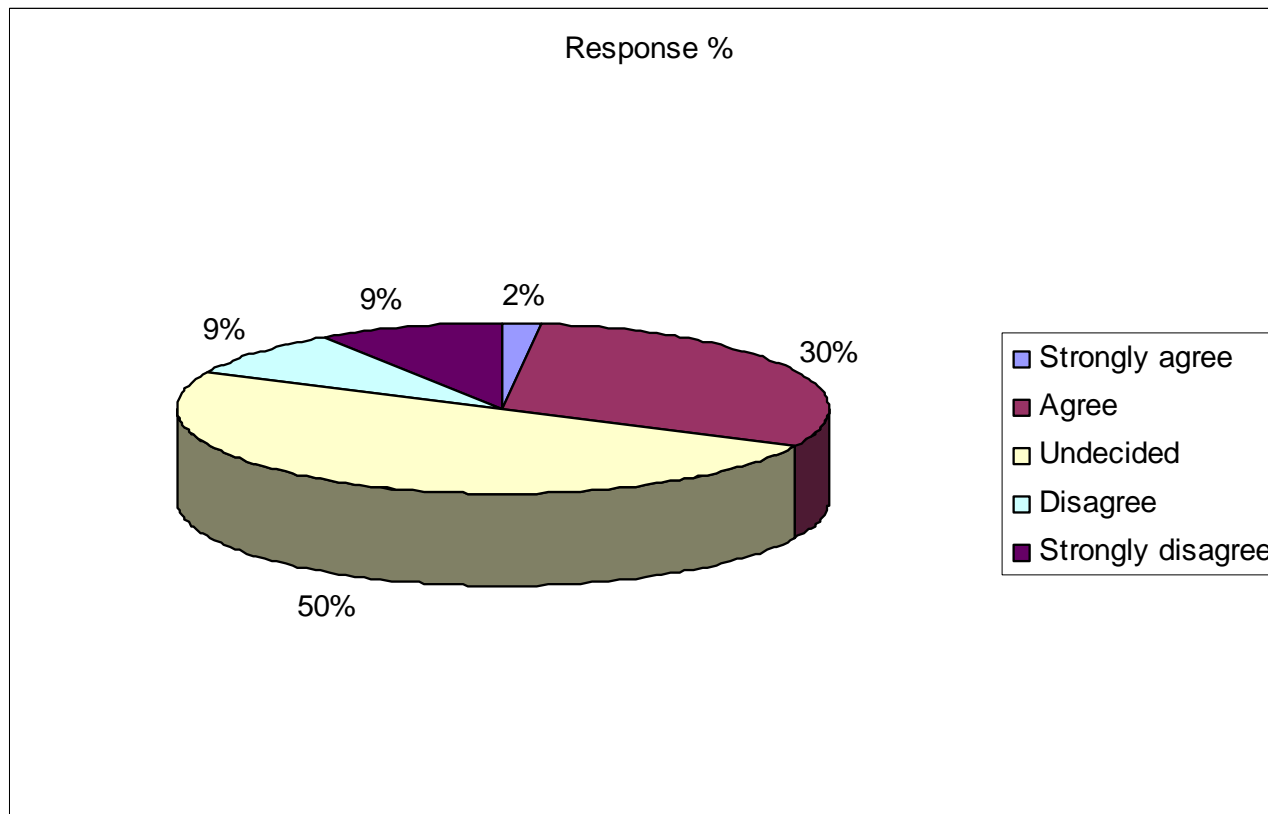
Summary of survey responses

- *PRT system is convenient mode of transportation*
(n=182)



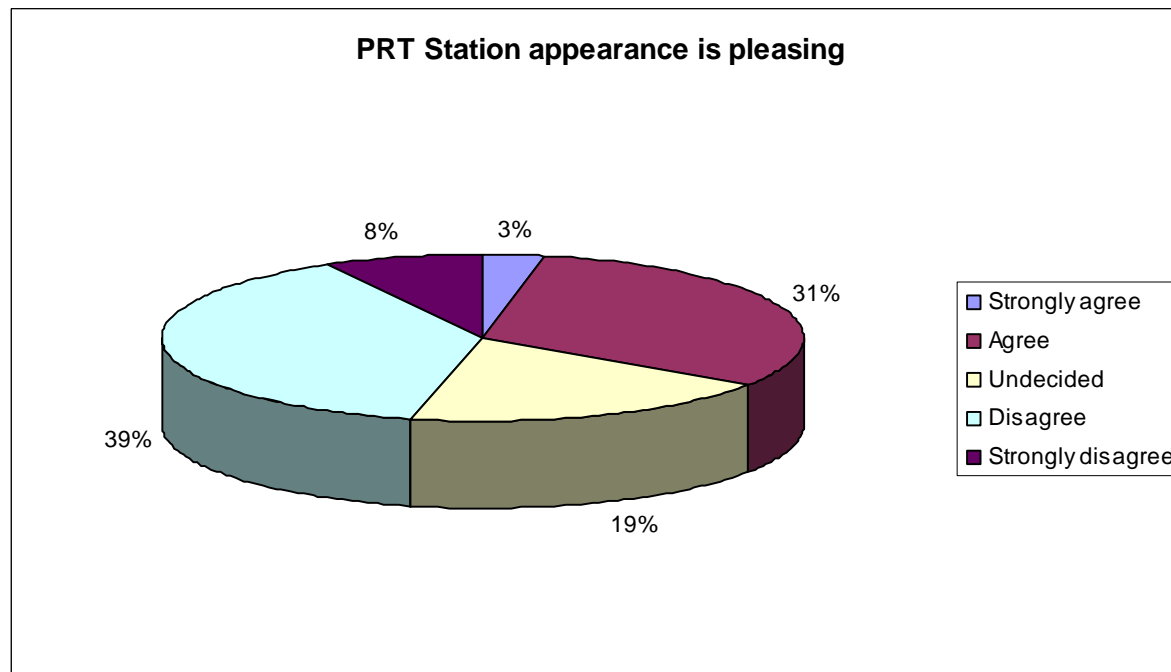
Summary of Responses cont.

- *PRT helps reduce transportation problem (n=182)*



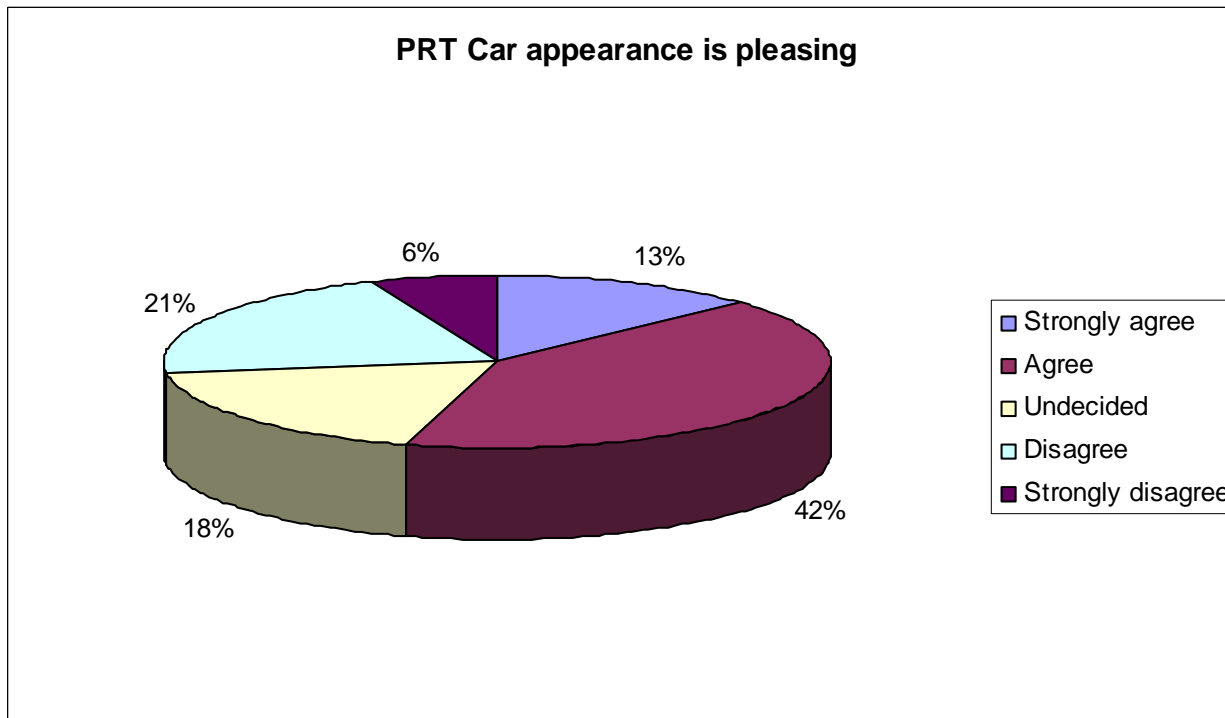
Summary of Responses cont.

- *Appearance of PRT station is pleasing (n=182)*



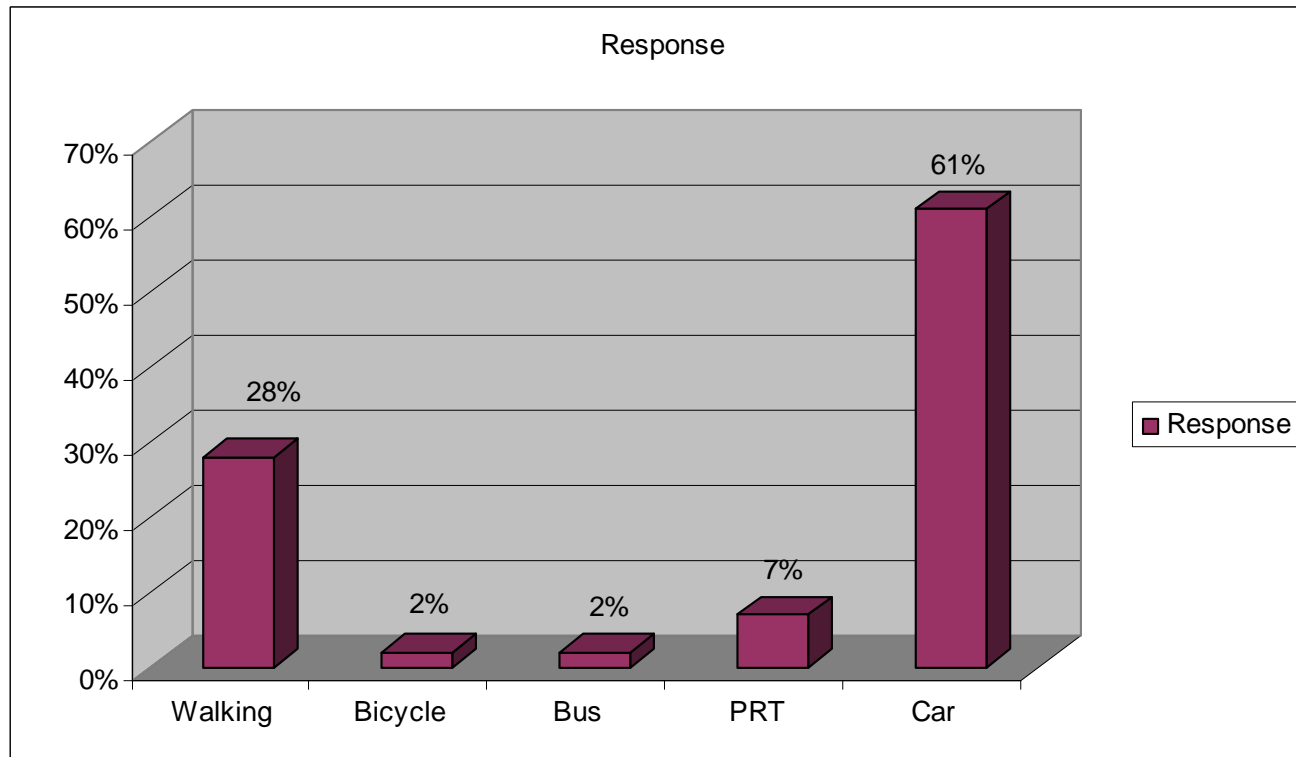
Summary of Responses cont.

- *The appearance of the PRT car is pleasing (n=182)*



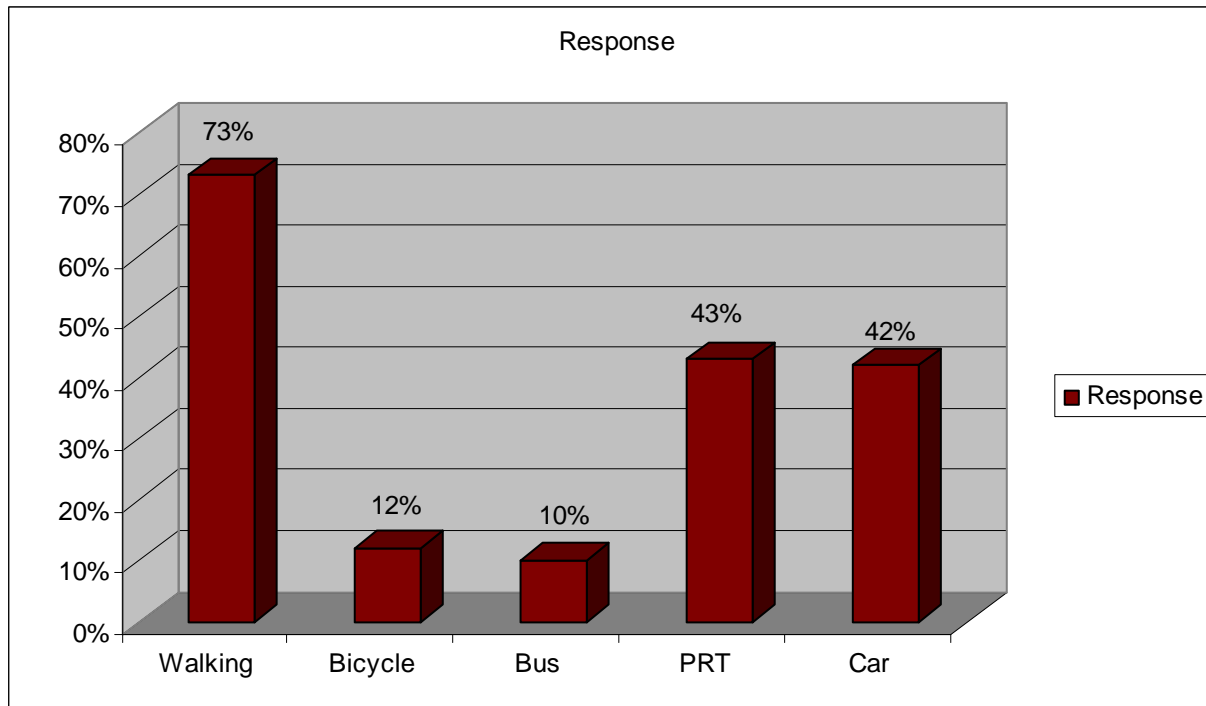
Summary of survey responses cont.

- *Most preferred mode of transportation (n=182)*



Summary of survey responses cont.

Second preferred choice of transportation (n=182)





Results: Correlation Analysis

- Student's attitude was negative towards:
 - car appearance,
 - station appearance,
 - belief that PRT reduces traffic problem, and
 - is a convenient mode of transportation
- Higher education was positively correlated with:
 - station appearance,
 - car appearance, and
 - belief that PRT reduces congestion.



Correlation results cont.

- WVU employees and individuals with longer residence in Morgantown revealed positive relationship towards:
 - Belief that PRT car and station appearance was pleasing,
 - PRT is convenient mode of transportation, and
 - Reduces traffic problems.

Ordered Probit Model:

- *Dependent variable: Number of trips taken using PRT*

- None=0
- 1-4 trips=1
- 5-8 trips=2
- More than 8 trips=3



Results: Ordered Probit Model

Variables	Estimates	P-value
<i>Constant</i>	0.85 (0.69)	0.222
Convenient	0.58 (0.23)	0.012
Car Appearance	-0.35 (0.20)	0.089
Traffic Reduction	0.21 (0.27)	0.438
Student	0.72 (0.29)	0.014
Gender	0.63 (0.19)	0.748
Age	-0.21 (0.10)	0.828
Education	0.13 (0.07)	0.063
Period of Residence	-0.22 (0.08)	0.017



Conclusions

- PRT as a convenient mode of transportation increases the probability of use frequency.
- Belief that PRT car appearance was not pleasing reduces the probability of number of trips.
- Being student increased the probability of number of trips taken.
- Highly educated individuals has a greater probability to use PRT.
- Longer residence in Morgantown reduces probability of frequency of PRT use.

Conclusions cont.



- WVU employee and higher educated individuals had positive attitude but used less PRT system.
- Since students are the primary users of the system, their concerns and attitude towards the system need to be addressed.
- The empirical findings confirm that PRT system is indeed a convenient mode of transportation and is consistent with the idea of PRT advancement.
- However, negative attitude towards car appearance in the degree of use in Morgantown also provides some policy implication for ongoing maintenance.



Open ended suggestions in the comments section:

- Additional stations and stops
- Additional cars
- Increased maintenance
- Park and Ride expansions
- Benches at stations
- Enhancing the aesthetics of the car and guideways



Future research

- Prioritize improvements to enhance quality of ride
 - Operational maintenance
 - Improved aesthetics
- Increase public participation
 - More stations to preferred location
 - Park and ride

Future Implications:



- What we learn from this analysis can improve the future planning of Morgantown PRT.
- User assessment, provision for expansion, park and ride option etc can be utilized.
- Similar topography that condenses our roads and traffic (hills, river) and high density population as WVU has potential for PRT planning.
- Provides regional implications for development patterns (reversal of exurban growth or fringe development, stressed infrastructure, energy, closer commutes, sustainable communities).