Feasibility of Electric Autonomous Shuttles in Easton

Taylor Berschel, William Boorn, Nathan Kleshefinski, Kiera Kratovile, Jordan Lempke

Abstract
As the winner of the United States Department of Transportation’s Smart City Challenge, Columbus, Ohio plans to deploy six electric autonomous vehicles (EAVs) throughout the Easton Town Center/Morse Rd. area. These EAVs will act as shuttles, and address the first-mile/last-mile issue involving lack of transport to a destination from a public transit drop-off point. This report employs a survey to determine the feasibility of EAV adoption - which has found implementation to be beneficial for Columbus. Additionally, five EAV companies were researched to identify which is best for the Easton area. This research found a small American EAV, which carries twelve people, would best fit Easton and bring with it possible economic opportunity.

Introduction and Methods

Goal: Gain insight into the feasibility of implementing EAVs in Easton based off people’s wants and needs.

For this analysis, a survey was conducted in the Easton Town Center/Morse Rd area to determine the likelihood of EAV adoption. Survey questions were carefully crafted in collaboration with the City of Columbus and the U.S. Department of Transportation, these questions allowed for respondents to provide valuable feedback relating to transportation habits and driverless-vehicle trust levels. Survey respondents consisted of a mixture ages, genders, races, and Easton guests and employees. A limitation of the survey showed that many people felt too un-educated on driverless vehicles to trust them. People also felt that they would be more inclined to ride the shuttle after it had been publicly demonstrated.

User Adoption

- Surveying current COTA users (Figure 1) and those using other modes of transportation to reach the Easton area (Figure 2), shows a surprising disconnect in potential adoption rates.
- Adoption is significantly lower amongst COTA users. This could be for a variety of reasons including: dissatisfaction with existing public transportation system, lack of willingness to pay, lack of familiarity with EAV technology, etc.

Mode of Transportation | Average Income
---|---
COTA Users | $34,285.00
Other Transportation | $85,768.33

Chart 1: Average income levels of transportation users.

Demographics
- Income Level and Race: no direct patterns were identified as they relate to EAV trust.
- Gender: 55% of men trusted the technology, while only 41% of women shared this trust.
- Age: Younger age groups display more trust in EAVs whereas older groups are less trusting of EAVs (Figure 3).
- Gender: 55% of men trusted the technology, while only 41% of women shared this trust.

EAV Trust Scenarios
- 33% of surveyed people did not trust driverless vehicles.
- 56% of respondents would feel safer riding in the shuttle if it had a steering wheel (Figure 7).
- 74% of surveyed individuals would feel safer if there was a trained professional monitoring the vehicle (Figure 7).

Conclusions and Recommendations
- For workers to get to/from a bus stop for work, they often walk the first-mile/last-mile. Additionally, shoppers who visit multiple destinations in Easton often drive themselves if their destination is not within the mall and surrounding area. This means that Easton would highly benefit from EAV implementation.
- Potential EAV users are still skeptical of the technology (shown more in older users rather than younger users) and would like to test ride before full commitment. This indicates that multiple days should be dedicated to having an EAV demonstration in Easton.
- A trained professional should be inside the vehicle when first implemented, and should remain in the vehicles until a higher level of trust is established with the vehicle. There should also be a steering wheel inside of the EAV. If more entertainment consumers are going to use the EAV, a higher emphasis should be placed on related EAV routes.
- EAVs should remain a free service at first, and charge a small fee or be accessible by a COTA pass in the future. This is due to the majority of shoppers having a lower WTP and workers having a higher WTP.
- Surveyed EAVs include: EasyMile, Induct, Innovia EV, Local Motors, and Navya.
- Would recommend Easton use Local Motors Olli (Graphic 2) - an American EAV, which carries 12 people, and is equipped with IBM’s IoT Watson, allowing users to communicate with the EAV.
- Local Motors has the ability to create the EAV in a “micro-factory” which they can 3D print vehicles. A potential Columbus based micro-factory can bring economic opportunity to the city.
- In 2018, EAVs will have wireless charging for their shuttles, and extended battery life for long hours of operation.

Contact Information
- Taylor Berschel.1@osu.edu: International Development: (740) 644-3485
- William Boorn.3@osu.edu: Community Development: (740) 577-0390
- Nathan Kleshefinski.2@osu.edu: (Project Lead): Sustainability and Business: (740) 963-4324
- Kiera Kratovile.3@osu.edu: Sustainability and Business: (740) 814-4186
- Jordan Lempke.2@osu.edu: Sustainability and Business: (490) 814-3157

Biography