Ohio Department of Transportation Research Project Fact Sheet

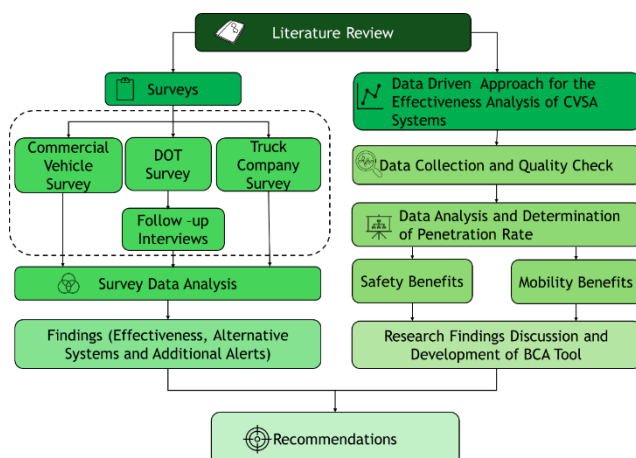| Determining the Effectiveness of Commercial Vehicle Safety Alerts	
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Problem Statement

The Ohio Department of Transportation (ODOT) has partnered with Drivewyze to provide real-time safety and mobility alerts to commercial motor vehicle (CMV) drivers through electronic logging devices (ELDs). Despite the potential of real-time alerts to enhance safety and mobility in highway systems, a literature review showed that no data-driven analysis quantifies the benefits of commercial vehicle safety alert (CVSA) systems on highways. It is crucial to conduct a data-driven analysis and utilize the outcomes to make well-informed investment decisions in the system.

Research Approach

Research approach workflow

Sudden slow down ahead alert

This project evaluated the effectiveness of the Drivewyze alert system, particularly its congestion and sudden slowdown alerts, in enhancing safety and mobility on Ohio's interstate freeways. Additionally, the project assessed the broader scope of Drivewyze services beyond these alerts. To achieve these objectives, the research utilized a combination of surveys and a data-driven approach. Surveys were distributed to gather feedback and opinions on available alternative CVSA systems and their effectiveness in mobility and safety. Specifically, three surveys were distributed targeting CMV drivers, truck companies, and Department of Transportation agencies (DOTs). Moreover, follow-up interviews with state DOTs were conducted to gather additional information on in-house CVSA systems and their effectiveness. A data-driven analysis was conducted using historical alert data from Drivewyze, crash data, and INRIX speed/travel time data to evaluate Drivewyze alerts' impact on congestion-related and secondary crashes. The analyses involved estimating safety and mobility benefits based on the pre- and post-implementation of Drivewyze.

Findings

- The survey results indicated that Drivewyze is the most popular alert system among CMV drivers, with a penetration rate of 28.25%. This driver's proportion uses Drivewyze either exclusively or alongside other technologies for alerts.

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- On the other hand, 59.42% of CMV drivers use other CVSA systems (Garmin, Rand McNally, Motive, etc.) while 12.33% indicated not using any CVSA systems.
- About 35.29% of DOTs that responded to the agency survey are partnering or conducting a pilot project with Drivewyze and 17.65% of DOTs use other CVSA systems. Some DOT agencies indicated using PrePass, QuickMap, and 511 systems (mobile applications) to send geo-targeted alerts in real-time.
- 24 different companies responded to the survey conducted for trucking companies. 12.5% indicated using Drivewyze only, and 16.67% of responses use Drivewyze and other systems for mobility and safety alerts. 54.17% of companies use other CVSA systems while 16.67% of the responses indicated that they are not using any CVSA.
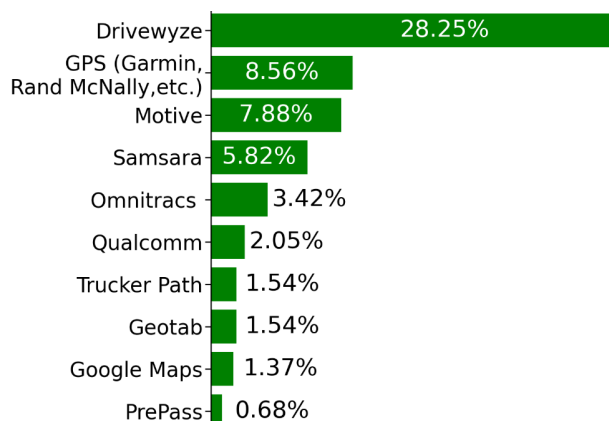
Technologies popular among CMV drivers

- The data-driven analyses used data from 2018 to 2019 for the before period and 2022 to 2023 for the after period excluding 2020 and 2021 data due to the impact of the COVID-19 pandemic on travel patterns.
- Using the cost incurred by ODOT to invest in the Drivewyze system, the analysis of the benefit-cost ratio (BCR) yielded a value of 22.56 for CMV congestion-related crashes. This estimated BCR indicates a return on investment, suggesting that for every dollar invested in the Drivewyze system, there is a return of $22.56.
- The estimate of BCR considered only ODOT cost and user costs were not included in the analysis.

- The analysis of secondary crashes showed an average decrease of 10 crashes in the after period compared to the before period, with reductions in all injury categories except serious injury cases.
- For mobility effectiveness analysis, the benefits were quantified by calculating the reduction in upstream delay for the after scenario compared to the before scenario of congestion-related crashes. The Drivewyze system is associated with reducing delays by 20.5 hours per mile on average in the after periods. It is important to note that Drivewyze currently provides alerts to CMV drivers without offering specific actions to improve mobility and safety including suggesting alternative routes to avoid congestion. As a result, directly linking the benefits of Drivewyze alerts to freeway mobility improvements is challenging.

Recommendations

- **Maintain a cooperative partnership with Drivewyze and INRIX.** ODOT may consider continuing its partnership with Drivewyze and INRIX to provide beneficial mobility and safety alerts to CMV drivers, given the positive impact on reducing congestion-related crashes.
- **Enhance the effectiveness and optimize the Drivewyze system for timely alerts and drivers' safety.** Through, reducing the impact of latency in sending out alerts and evaluating the need to increase the geo-fence radius to give drivers more time to react before reaching incident locations.
- **Regular assessment of Drivewyze system benefits (ROI).** ODOT may periodically assess the benefits of the Drivewyze system to maintain a beneficial partnership with Drivewyze and INRIX.
- **Upgrade the OHGO system and partner with neighboring state DOTs.** For other vehicle types and small trucking companies unable to afford Drivewyze, ODOT could upgrade the OHGO system and collaborate with neighboring state DOTs to develop a unified system.
- **Share data with the public for innovation and collaboration.** ODOT may consider pushing its notifications to the Situation Data Exchange (SDX) to accelerate innovation in alerting systems. Moreover, as part of its vehicle alert strategy, ODOT will be publishing a Workzone Data Exchange (WZDx) feed.