Analyzing Multimodal Connectivity: Usefulness of Various Data, Tools

More than 724 million tons of freight move through Indiana each year, underscoring Indiana's "Crossroads of America" designation and the importance of optimizing freight movement for the efficient delivery of goods around the world.

Conexus Indiana, HNTB and the Indiana Department of Transportation (INDOT) analyzed 23 different datasets and tools for freight connectivity and uncovered several new tools and datasets that could be added to INDOT's current data suite. These tools can improve freight connectivity and collaboration with other agencies or private groups, and they can support multimodal-specific performance measures.

The examined tools fall within a spectrum from standalone datasets and datasets with limited analysis capability, to data-tool combinations and ready-for-use tools, as well as pre-market (academic/research-level) tools.

INDOT relies on data to ensure Indiana's transportation infrastructure enhances quality of life, drives economic growth and accommodates new modes of transport. INDOT has historically leveraged datasets, including TREDIS 6 for large-scale planning and Wejo data, for research studies through the Joint Transportation Research Program (JTRP). Recent research conducted by Conexus Indiana and HNTB analyzes additional datasets and tools that could be useful in INDOT's ongoing work. The timing of this analysis coincides with the increasing availability of technologies that collect data directly from vehicles (referred to as probe vehicle data) to better evaluate freight and mobility issues.

Key Study Highlights:

1. While there are many commercially and publicly available tools for collecting and analyzing data, there are many overlaps in capabilities, data source inputs and outputs. However, there are nuanced differences and unique reasons to use a tool for specific cases.
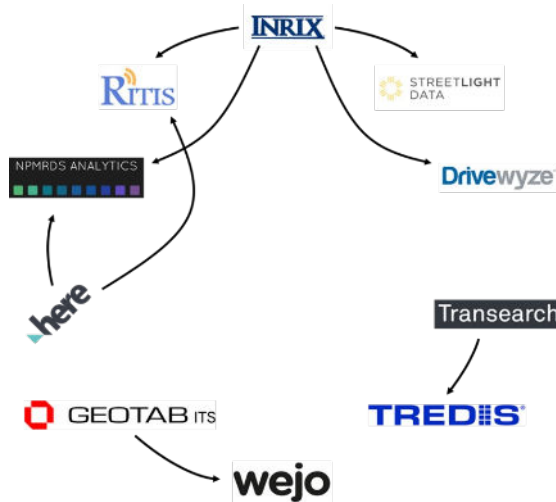
Known relationships between data providers (as of publication date)

2. The study analyzed various implementations of these tools at transportation agencies across the country, revealing several compelling use cases for INDOT to consider.

- Location specific freight planning
- Inter-agency collaboration
- O-D/travel pattern analysis
- Traffic analysis
  - Real-time and retrospective
  - Trajectory
  - Hard-braking
  - Speed
  - Crash
  - Parking
  - Weigh station bypass
  - Weight/inspection enforcement
  - Economic impacts
  - Project or industry specific demand

3. Two datasets (Geotab, Replica) and two tools (TREDIS: TREDPLAN and FDOT: Freight Operations Exchange) emerged as the four most promising options for INDOT to add to its existing resources. Benefits of these tools include:

- Robust, real-world freight vehicle data that can be used to perform analyses on bottlenecks, parking, last-mile, origin-destination pairs (O-D), and corridors.
- Modeling capabilities to predict freight data in areas with less vehicle-level data availability.
- Improved data storage capabilities that simplify sharing data between and across multiple agencies to improve multimodal practices.
- Detailed freight insight details that can be used for scenario analyses.

Conclusion:

This evaluation illuminated opportunities for INDOT to look beyond its core responsibilities for "roads and bridges" to prioritize investment and leverage grant opportunities in infrastructure data and analytics to address road safety, freight connectivity, policy enforcement and more.

As many of these tools (and the technologies that use them) are emerging and ever evolving, it will be critical to ask the right questions around applicability to Indiana throughout the project lifecycle, dataset penetration rates, industry coverage, and integration with other data and insights.

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