

**Technology Transfer Final Report** 

**STRIDE Project K5** 

## A Better Understanding of Shopping Travel in the US

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# **STRIDE** Southeastern Transportation Research, Innovation, Development and Education Center

#### THE STRIDE CENTER

The STRIDE Center is the 2016 USDOT Region 4 (Southeast) University Transportation Center (UTC) housed at the University of Florida Transportation Institute (UFTI). Our mission is to develop novel strategies for Reducing Congestion. The Center has nine partners, representing seven states in the Southeastern U.S. The UFTI and its partners in the STRIDE Center are recognized leaders at state, regional, national, and international levels. The STRIDE Center is focused on assembling and integrating research projects throughout the region in a way that maximizes contributions to solving current and future transportation problems as well as strengthening expertise and developing new technologies. For more information see <a href="https://stride.ce.ufl.edu/">https://stride.ce.ufl.edu/</a>.

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#### 1. Project Overview

This project provided a better understanding of how far people drive to go shopping, using survey data from the Research Triangle region of North Carolina. This is an important question as e-shopping becomes more prevalent: how do the transport impacts of e-shopping and delivery compare to those of in-person shopping? The answer to this question is not well understood, because of how much shopping occurs on the way to or from another location. If a person drives 15 miles from work to the grocery store, and then 5 more miles home, it is not clear how much of that travel was to support shopping as opposed to commuting.

Existing research has primarily estimated shopping travel in one of two ways. First, some researchers estimated shopping travel by assuming every shopping trip generated a round trip from home to the store. This greatly overestimates shopping travel, as it doesn't account for any shopping trips being chained with other trips—whether multiple shopping stops in one outing, or shopping on the way to or from another location. Some authors modify this method by multiplying by a correction factor to account for trip chaining. This has the potential to improve the results, but determining the correction factor is difficult.

The other common approach is to sum up the total length of all trips that ended at a store. This could either over- or under-estimate shopping travel. In the case of a round-trip shopping trip, it will underestimate due to not counting the trip home. In a chained trip, it may overestimate – for instance, a trip of 19 miles from work to the store and one more mile home would be recorded as 19 miles of shopping travel.

This project estimated how much travel supports shopping by calculating the difference between how much they did travel and estimates of how much they would have traveled if they had not gone shopping, based on detailed latitude/longitude coordinates from a travel survey.

#### 2. Research Goals

- Understand how much shopping supports travel
- Understand the accuracy research based on other methods of shopping travel estimation
- Develop correction factors for round-trip distance estimates in a Sun Belt metropolitan area

#### 3. Findings

We found that households in the Research Triangle average 12 km (7 mi) of shopping travel each day. This is only about 25% higher than the distance estimated by summing the distances of all trips to the store. This is coincidental, but suggests that existing research using that methodology is not extremely far off the mark. It is slightly less than half of the distance that would be traveled to support round trips from home to each store. This is slightly lower than the correction used by previous research to adjust round-trip travel estimates to actual travel estimates, possibly due to regional differences or survey administration differences.



#### **Performance Metrics** 4.

Metric	# Completed
OUTPUTS	
<pre>Product(s): Number of new or improved tools, technologies,</pre>	1
products, methods, practices, and processes created or	
improved	
Technical Report: Number of client-based technical reports	1
published	
OUTCOMES	
Body of Knowledge: Number of trainings for transportation	1
professionals	
Professionals Trained: Number of professionals participating in	16
trainings	
IMPACTS	
Stakeholders: Number of stakeholders you met with to	1
encourage adoption or implementation of product(s)	
Adoption/Implementation: Number of incidences outputs of	0
research have been implemented or adopted	

#### 5. Product

#### Shopping travel methodology improvements and results

This project demonstrated, extended, and applied a relatively new methodology for estimating the amount of travel in the US that supports shopping activities (to the best of our knowledge, this type of methodology has only previously been applied in an unpublished study of data from California). The STRIDE report, code, and future publications provide a documented demonstration of this methodology that can be applied elsewhere. Furthermore, the results of this project provide information about how much people travel for shopping, which can be applied in transportation forecasting and modeling.

### 6. Who benefits/will benefit from your product(s)?

- Transportation planners and forecasters •
- Transportation researchers
- The traveling public, indirectly through improved planning and forecasting

### 7. Body of Knowledge & Professionals Trained

1) STRIDE Webinar: "A better understanding of shopping travel in the US" presented by Matthew Bhagat-Conway, Ph.D. on December 7, 2022. (16 Attendees) Recording: https://youtu.be/h3gdxkwVgfI

#### 8. Journal Publications, Conference Presentations, & Posters

None yet (planned for future)



#### 9. Stakeholder Engagement

	MEETING DETAILS	NARRATIVE DESCRIPTION
STRIDE rep.	Matt Bhagat-Conway	Dr. Bhagat-Conway met with Dr. Huntsinger
		and discussed the Triangle Regional travel
Date of Activity	3/3/2022	demand model, including how this project could be integrated in the future. Dr. Huntsinger expressed a willingness to have the regional model used for research, and provided background on the history of the model and the upcoming Generation 2
Type of Activity	Choose an item.	
Location	Institute for Transportation Research	
	and Education, NC State	
Stakeholder(s)	Leta Huntsinger, Institute for	
	Transportation Research and	model. Investigating the integration of the
	Education	results of this project with the model will be
		one focus of STRIDE Project J6.

### **10. Adoption/Implementation**

#### Shopping travel methodology improvements and results

The main opportunity for the adoption and implementation of this project will occur through future research. This research provides a baseline estimate of how much travel supports shopping. Researchers modeling e-shopping can use these baselines to better understand the effects of e-shopping on travel, something that will be useful in practice. This would in turn improve the quality of travel forecasts, better-aligning infrastructure investments with needs. We plan to publish the findings in academic journals and present them at conferences in order to disseminate the findings to those who can use them.

#### **11. Broader Impacts**

Most impacts of this research are long-term, but short-term impacts could include using results to calibrate travel demand models. Longer-term impacts will result as more research is built upon the findings of this project. These findings will positively impact transportation by providing better understanding of the effects of e-shopping on transportation. This can lead to decreased costs through better travel forecasts and better-targeted infrastructure investments. The project results (and results of research that builds on this project) can be transferred to the government. The results can support planning and, in particular, policymaking around e-shopping.