

TOMNET and D-STOP USDOT Tier 1 University Transportation Centers present
The ABCs (Attitudes – Behaviors – Choices) of Future Mobility

Exploring Willingness to Pay for Autonomous Vehicles

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Introduction

- Automated Vehicles (AVs) defining the future of transportation
 - Collision avoidance systems enhance traffic safety
 - Enhanced mobility for those who cannot drive
 - Convenience for those who can drive, but would rather not
- Success of automated mobility depends on consumer adoption and willingness-to-pay (WTP)

Autonomous Vehicle Definition

An **Autonomous Vehicle (AV)** is a vehicle that drives itself without human supervision or control. It picks up and drops off passengers including those who do not drive (e.g., children, elderly), goes and parks itself, and picks up and delivers laundry, groceries, or food orders on its own. When AVs become available, ridehailing companies (e.g., Uber and Lyft) will use them to provide rides without a human driver in the vehicle. When answering the questions in this section, please assume a future in which **autonomous vehicles (AVs) are widely adopted, but human-driven vehicles are still present.**



SAE J3016™ LEVELS OF DRIVING AUTOMATION

	SAE LEVEL 0	SAE LEVEL 1	SAE LEVEL 2	SAE LEVEL 3	SAE LEVEL 4	SAE LEVEL 5
What does the human in the driver's seat have to do?	You are driving whenever these driver support features are engaged – even if your feet are off the pedals and you are not steering.	You must constantly supervise these support features; you must steer, brake or accelerate as needed to maintain safety.		When the feature requests, you must drive.	These automated driving features will not require you to take over driving.	You are not driving when these automated driving features are engaged – even if you are seated in "the driver's seat."
What do these features do?	These are driver support features			These are automated driving features		
	These features are limited to providing warnings and momentary assistance.	These features provide steering OR brake/acceleration support to the driver.	These features provide steering AND brake/acceleration support to the driver.	These features can drive the vehicle under limited conditions and will not operate unless all required conditions are met.		This feature can drive the vehicle under all conditions.
Example Features	• automatic emergency braking • blind spot warning • lane departure warning	• lane centering OR • adaptive cruise control	• lane centering AND • adaptive cruise control at the same time	• traffic jam chauffeur	• local driverless taxi • pedals/steering wheel may or may not be installed	• same as level 4, but feature can drive everywhere in all conditions

Recent Survey Findings in Literature

- Average WTP **\$3,252** with a human-driven-vehicle mode option or **\$2,783** without it (Quarles and Kockelman, 2019)
- **26.3%** unwilling to pay extra for the AV version of the vehicle (Liua et al, 2019)
- **36%** willing to maintain basic vehicle utilization. Average WTP varied from **\$652** for basic vehicles, to **\$1,769** for fully automated (Asgari and Jin, 2019)
- Average WTP (dynamic rideshare without additional time) in the US is \$0.74/mile during the day, \$0.87 during the night (Gurumurthy and Kockelman, 2020)

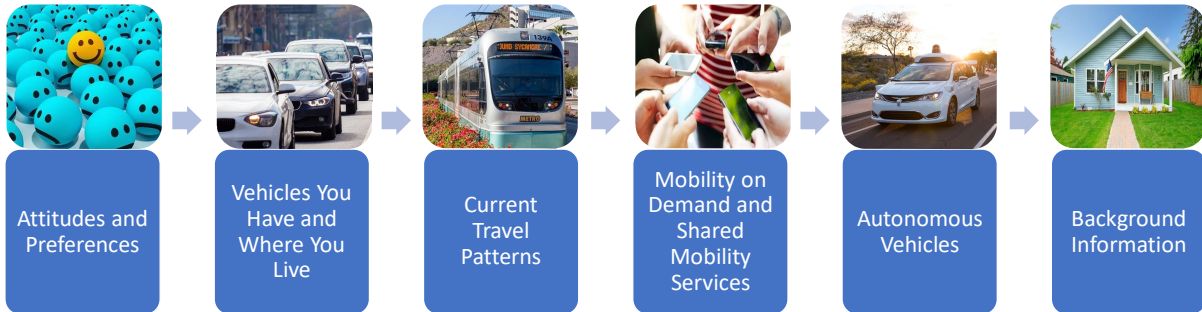
TOMNET D-STOP Transformative Technologies in Transportation Survey (T4 Survey)

- Phoenix, Atlanta, Austin, and Tampa metro areas
- Summer and Fall 2019
- Random address-based sample with online instrument
- Comprehensive attitudinal survey on MaaS and AV
- Weighted to better represent Census distributions



	Phoenix, AZ	Atlanta, GA	Austin, TX	Tampa, FL	Total
Sample Size	1,027	944	1,127	260	3,358
%	30.6%	28.1%	33.6%	7.8%	100%

Survey Instrument



Overview

Willingness to Pay

Ranked Purchase Preference

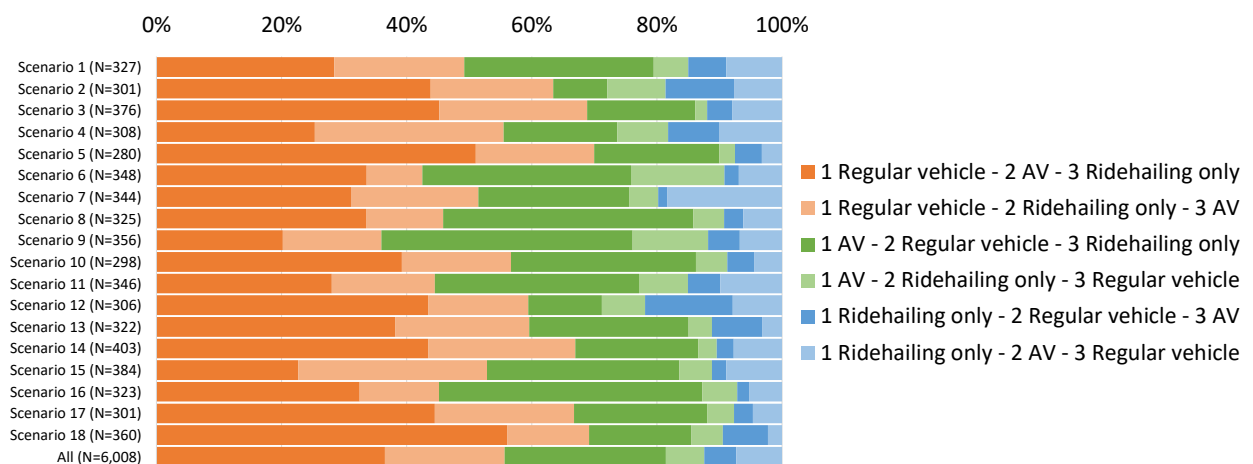
11. Suppose AVs are now available for purchase, lease/rent, or to use via automated ridehailing services, and **half of the vehicles on the streets are AVs**. What would you do when **faced with your next car purchase decision** in each of the following scenarios? Please rank the alternatives **based on your preference (1=most preferred; 3=least preferred)**. Please do not give the same rank to multiple alternatives.

Scenario 1

Options	Option A: Buy a regular vehicle	Option B: Buy an AV	Option C: Don't buy a vehicle and use AV ridehailing/rental services
Costs	\$ 500/month + \$ 0.75/mile Average wait time: 0 minutes	\$ 500/month + \$ 0.75/mile Average wait time: 0 minutes	\$ 0/month + \$ 2.25/mile Average wait time: 6 minutes
Rank	_____	_____	_____

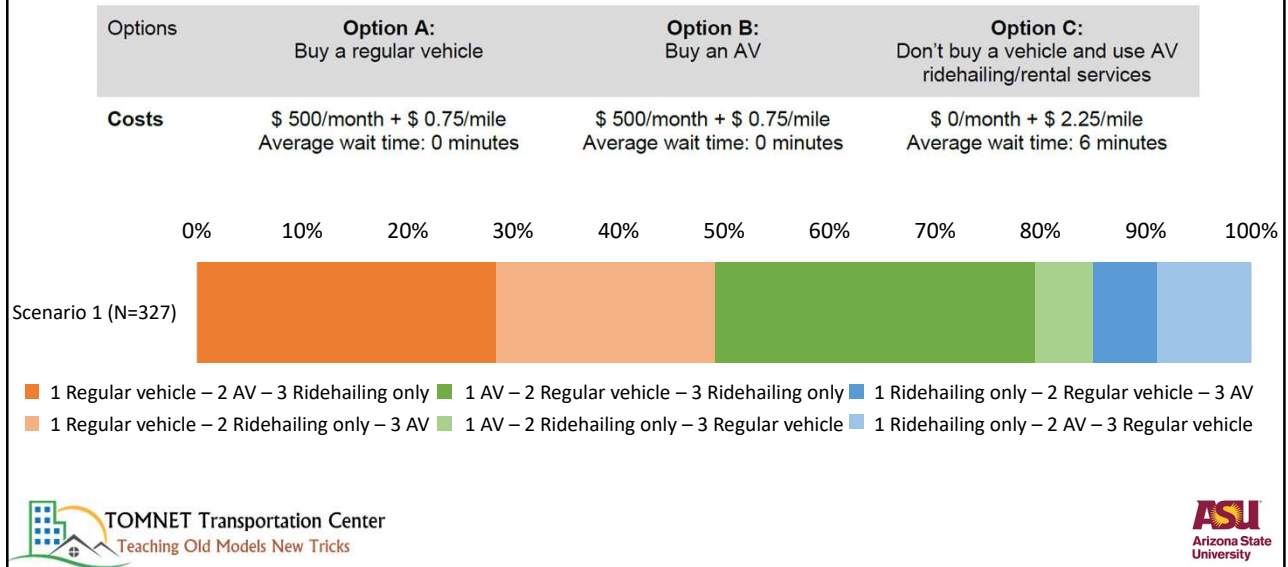
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Ranked Purchase Preference



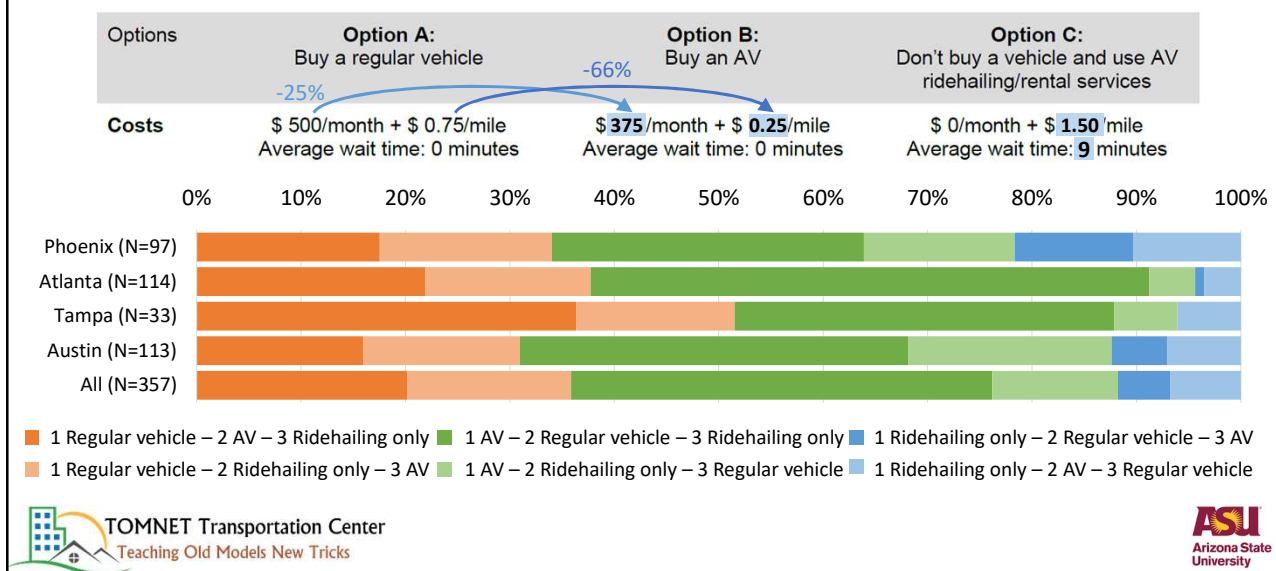
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Ranked Purchase Preference (Same Price)



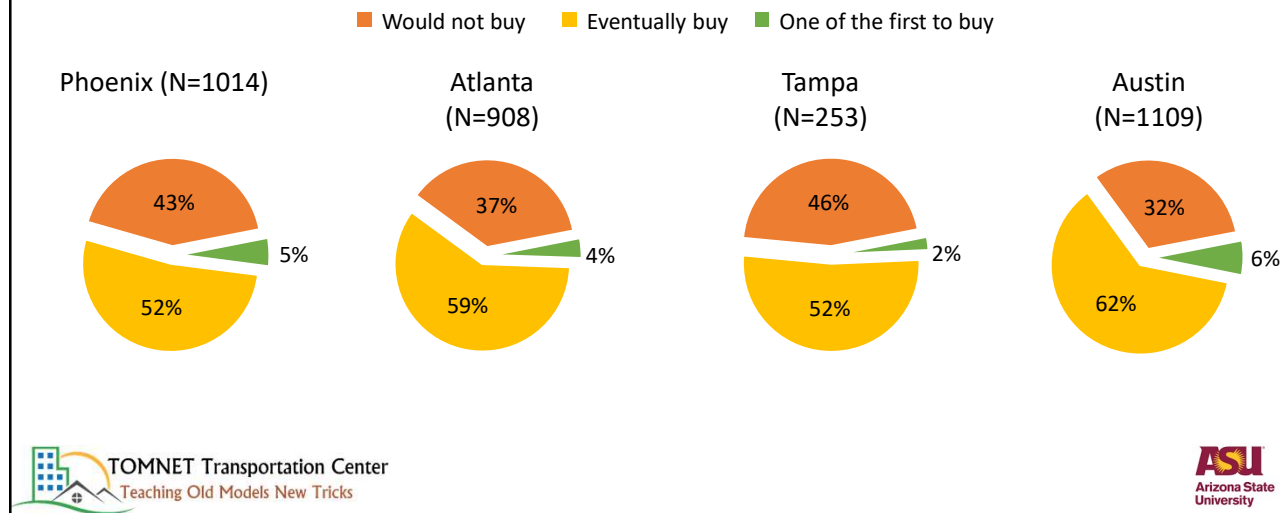
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Ranked Purchase Preference (AV Cheaper)



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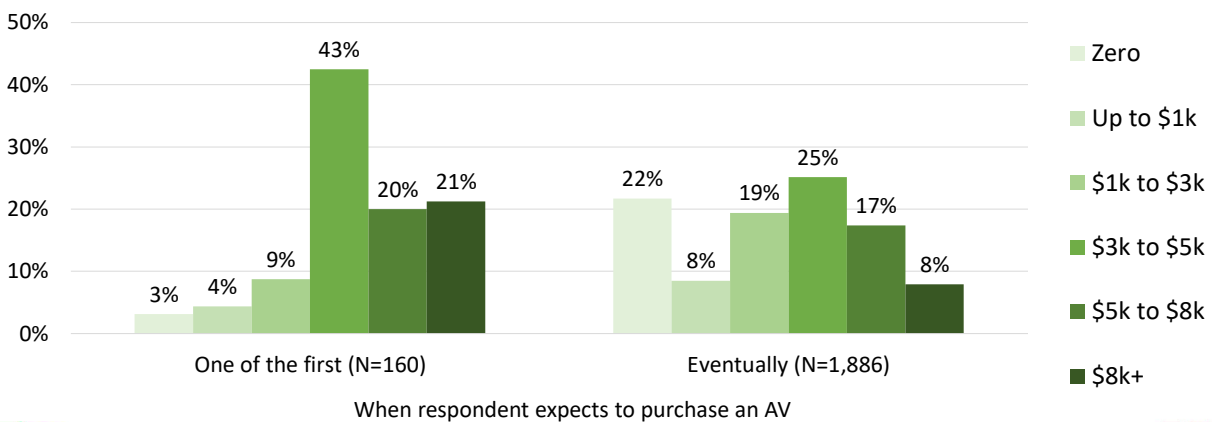
When do respondents expect to purchase an AV?



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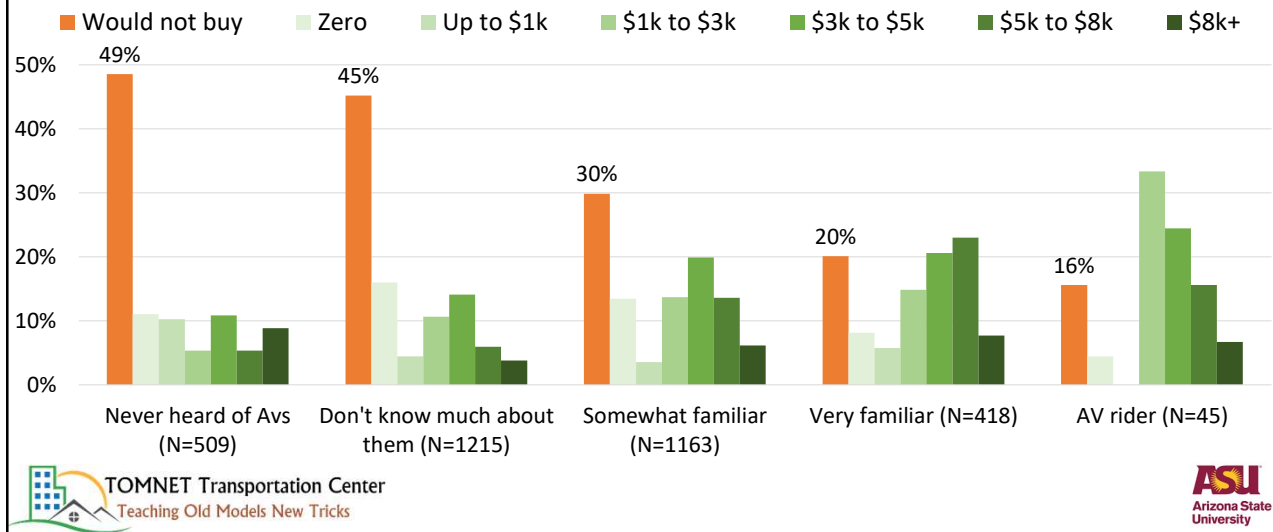
Among those who are willing to purchase an AV, how much are they willing to pay?

Additional price considering they are purchasing a new regular car of \$25,000



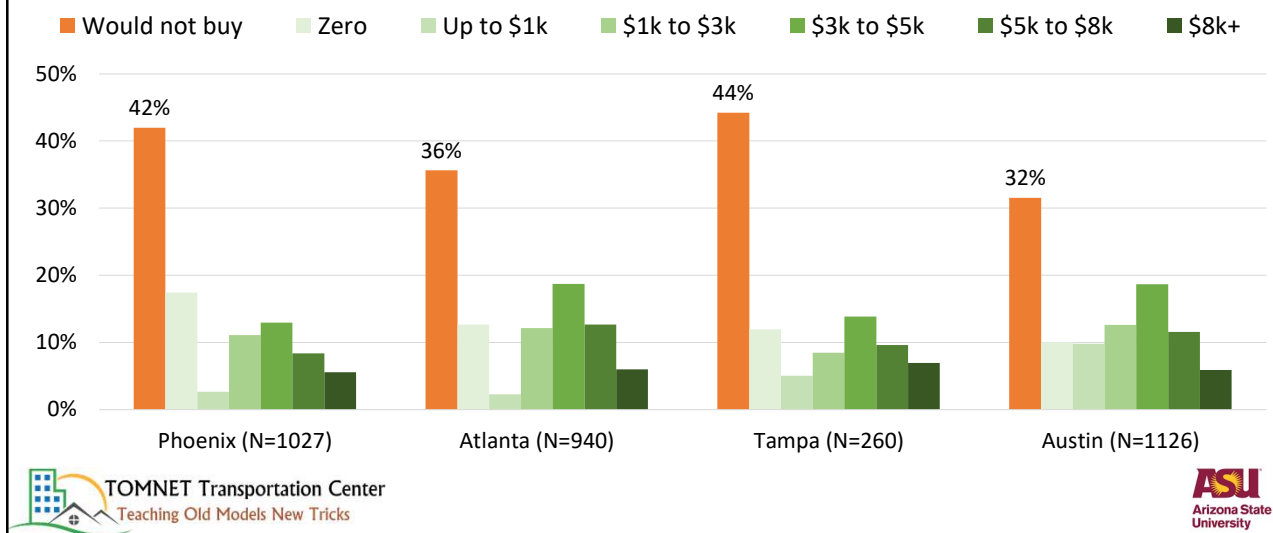
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Willingness to Pay by AV Familiarity



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Willingness to Pay by Location

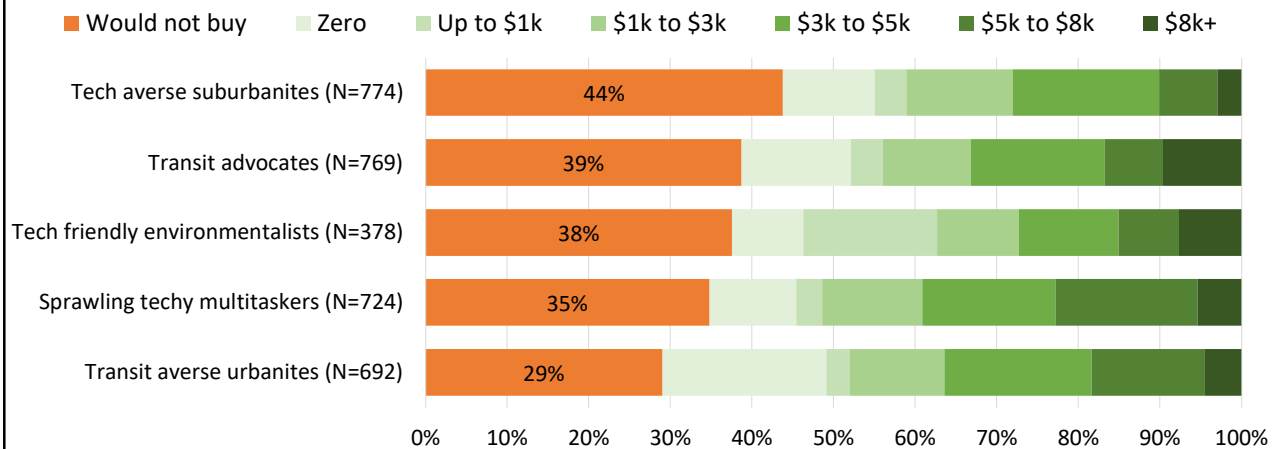


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Attitudes & *Willingness to Pay*

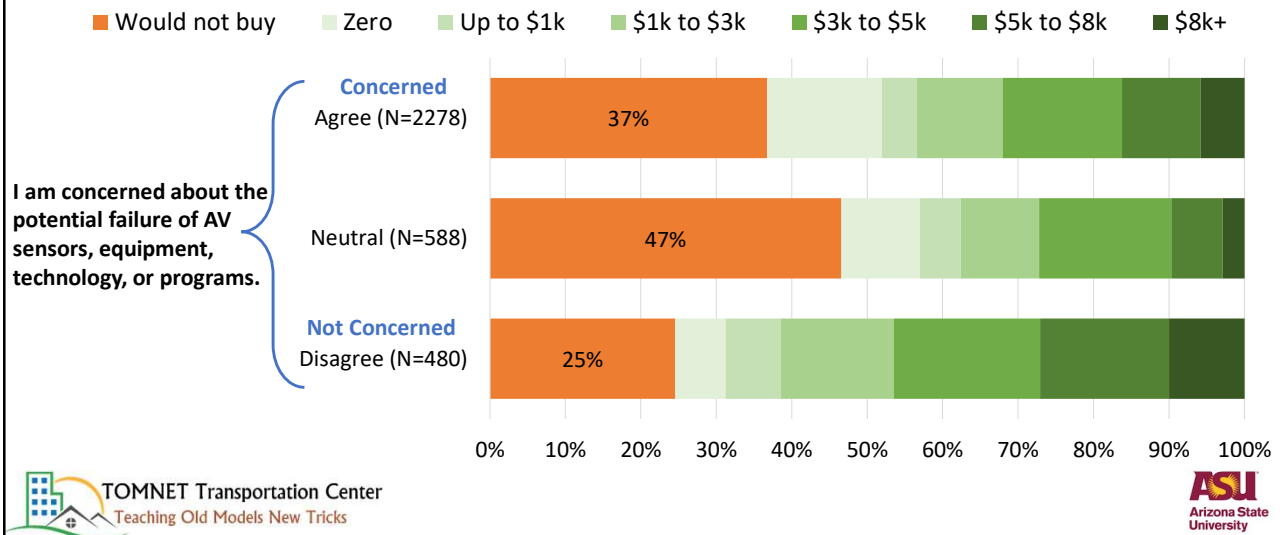
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Willingness to Pay by Attitudinal Profile



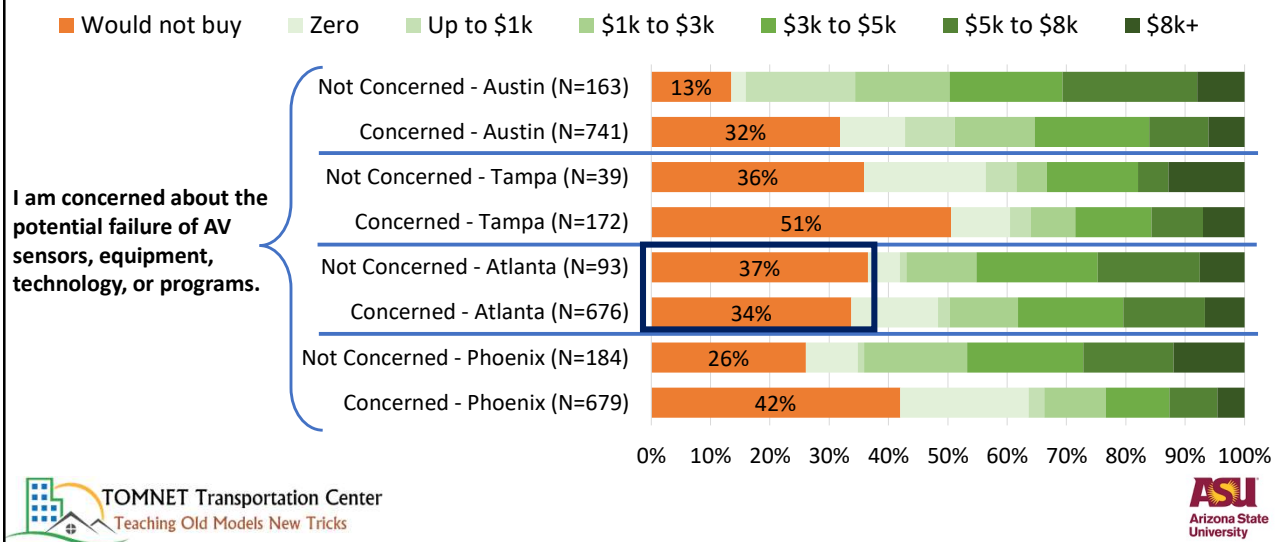
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Willingness to Pay by AV Concern



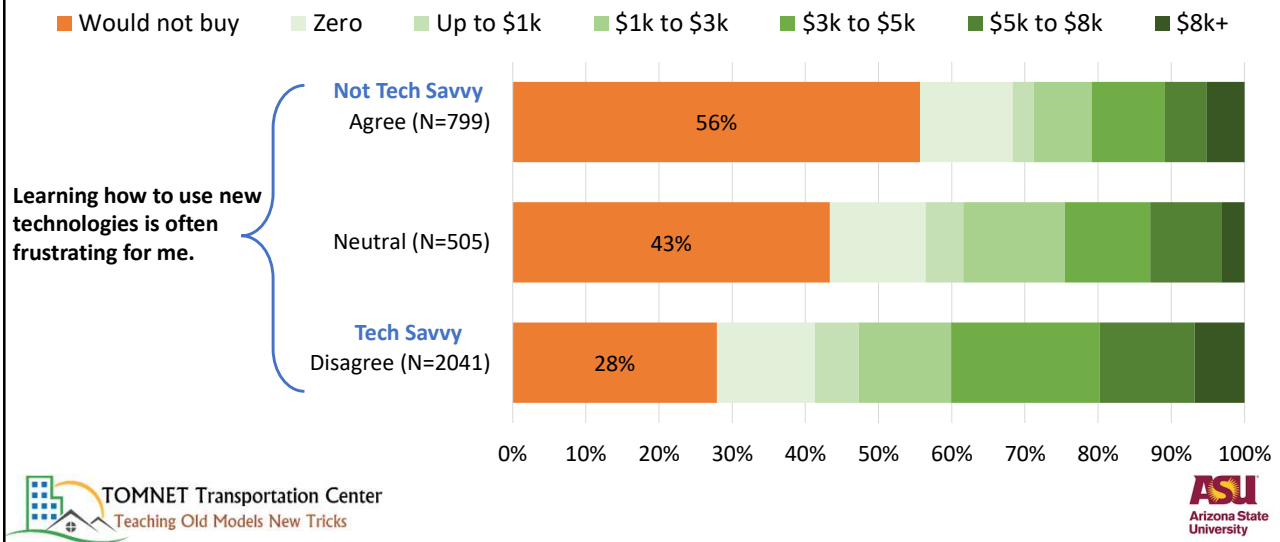
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Willingness to Pay by AV Concern



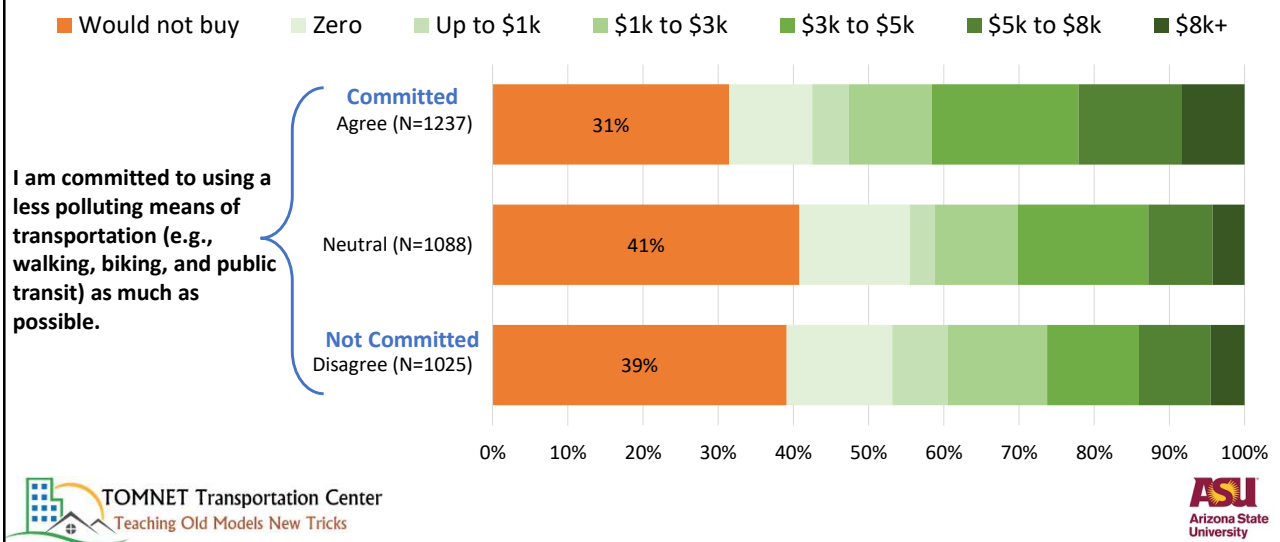
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Willingness to Pay by Technology Savviness



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WTP by Commitment to Green Transportation



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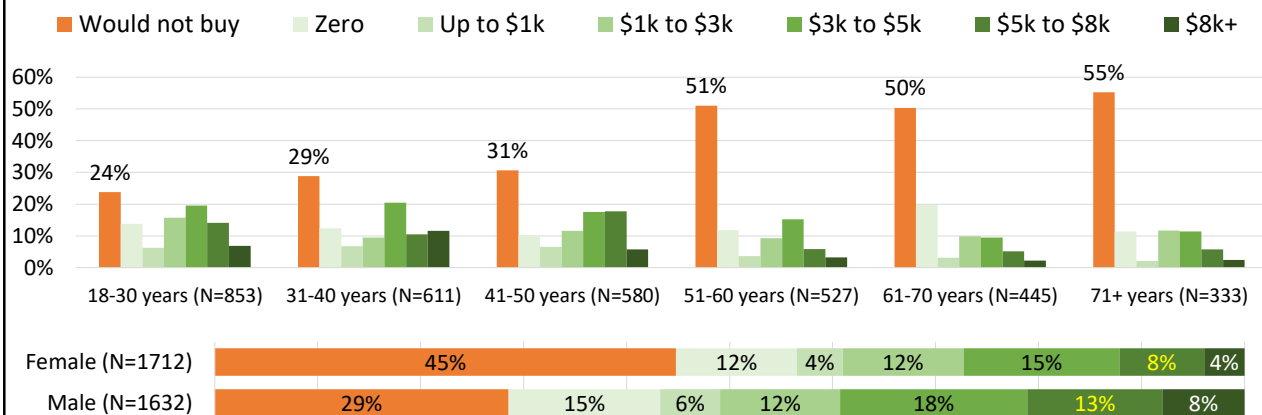
Demographics, Travel &

Willingness to Pay



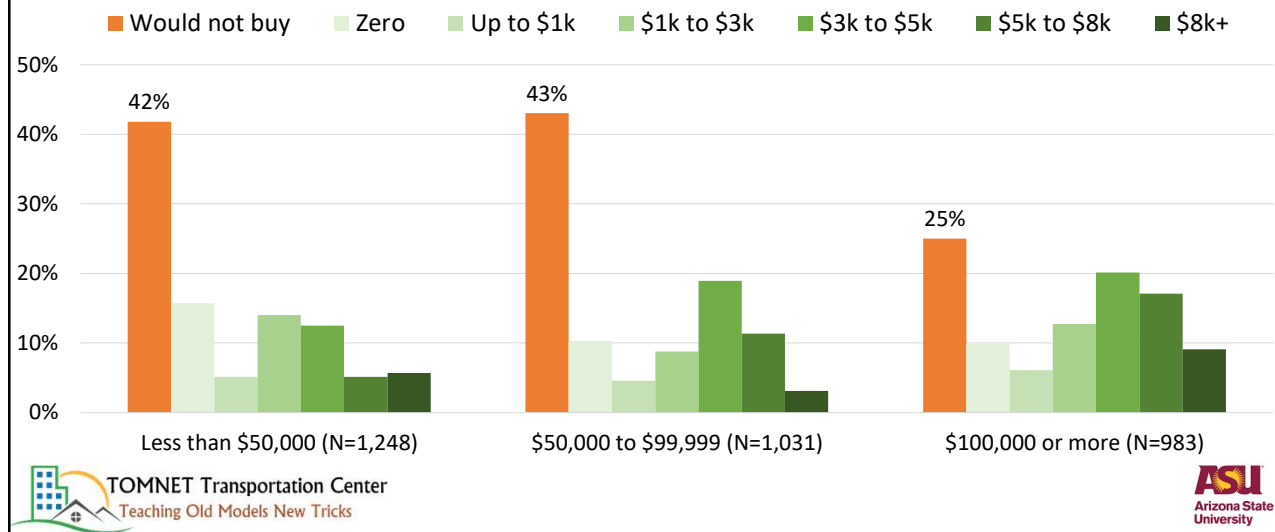
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Willingness to Pay by Age and Gender



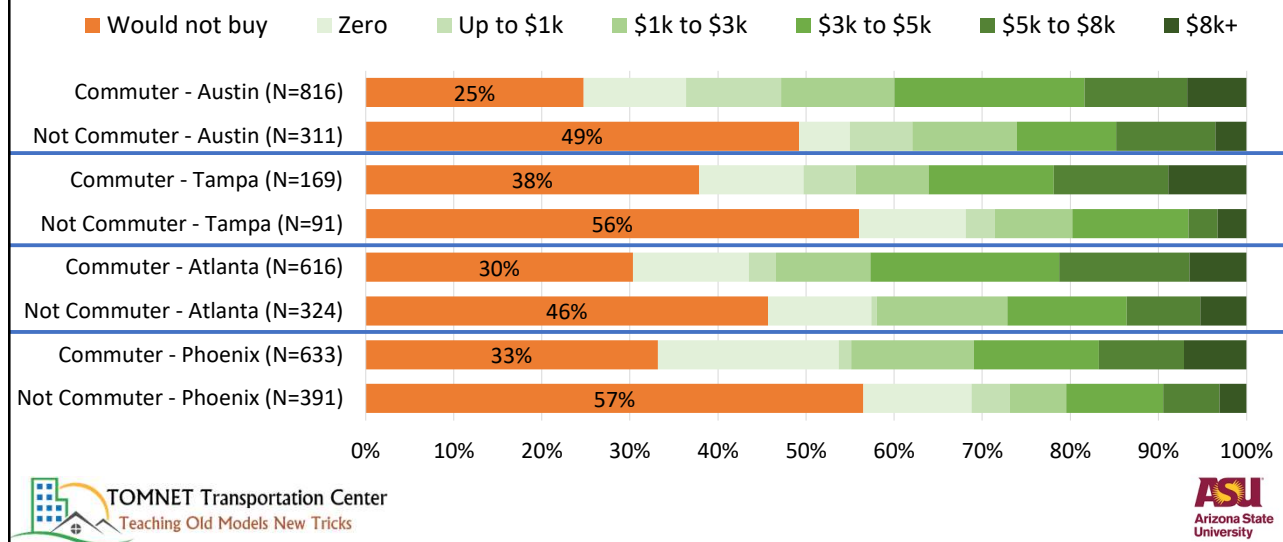
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Willingness to Pay by Household Income



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Willingness to Pay by Commuter Status



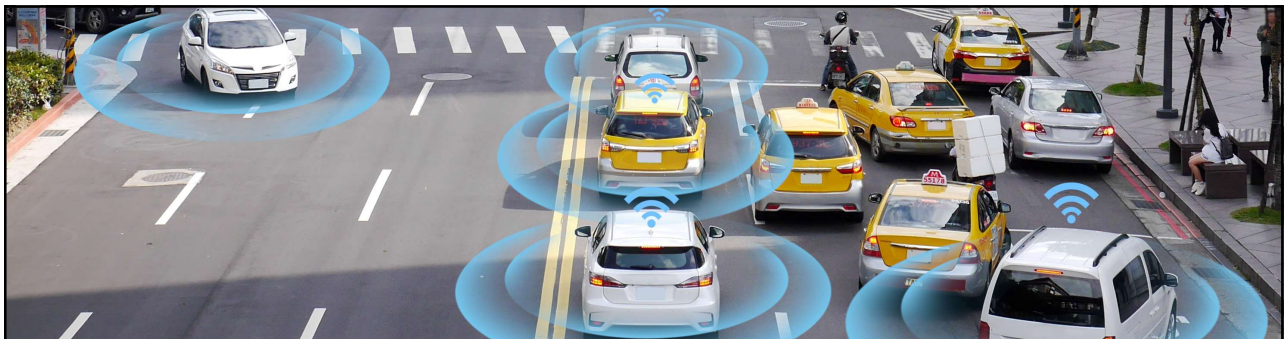
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Key Findings

- **Interest in purchasing AVs is mixed:** 38% would never buy an AV even when AVs are cheaper than regular vehicles (a significant share of respondents prefer a regular vehicle)
- **Results across jurisdictions are fairly similar.** Tampa has the lowest willingness to pay for and buy AVs.
 - High(er) willingness to pay was observed in Austin and Phoenix
- **Attitudes matter:** Those who are tech savvy, driving-oriented, and multi-taskers are more prone to pay higher amounts for AVs
- **Women and older individuals are less interested** in purchasing an AV and are less willing to pay a premium for it



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Thank you!

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