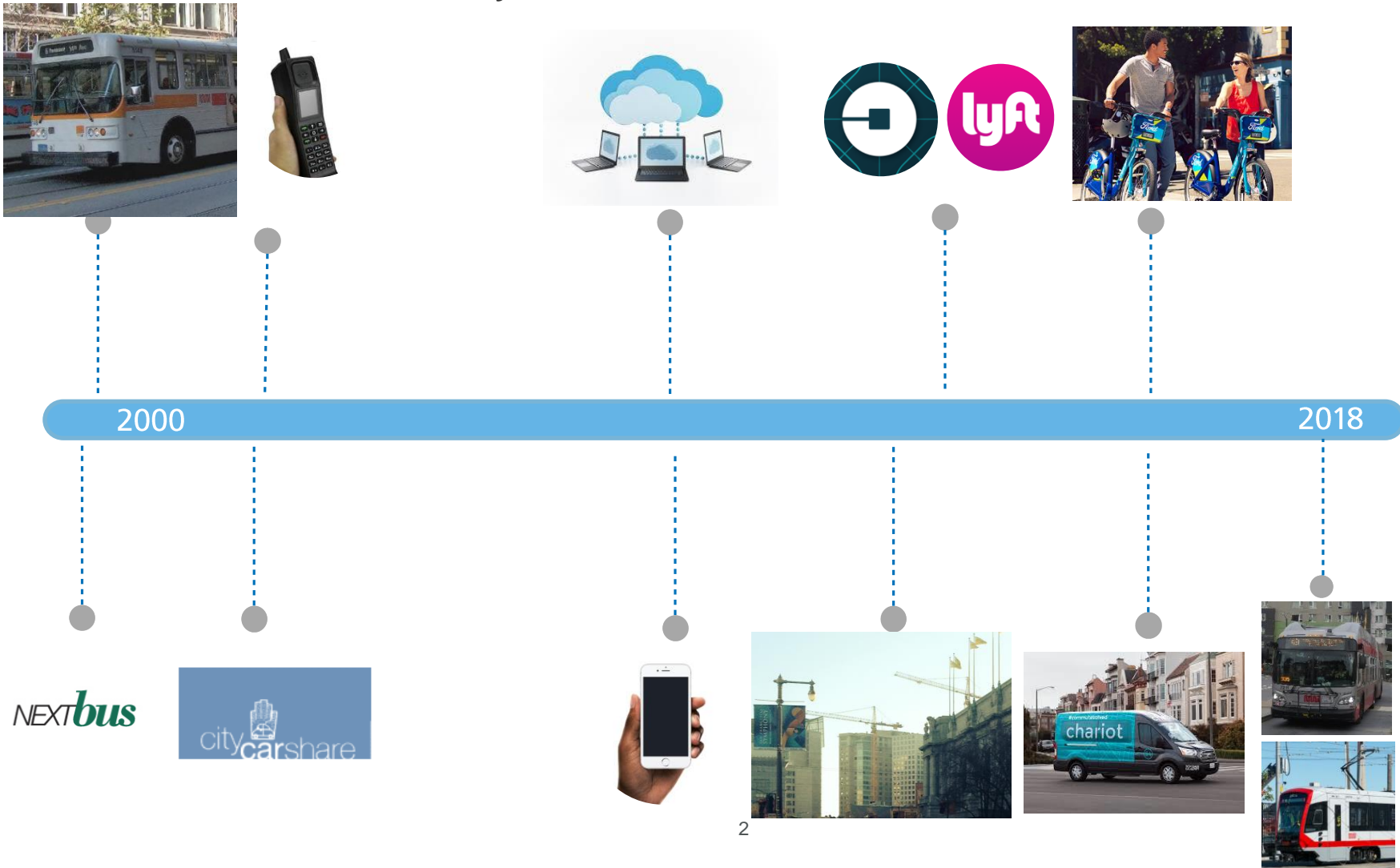# Next Generation Customer Information System

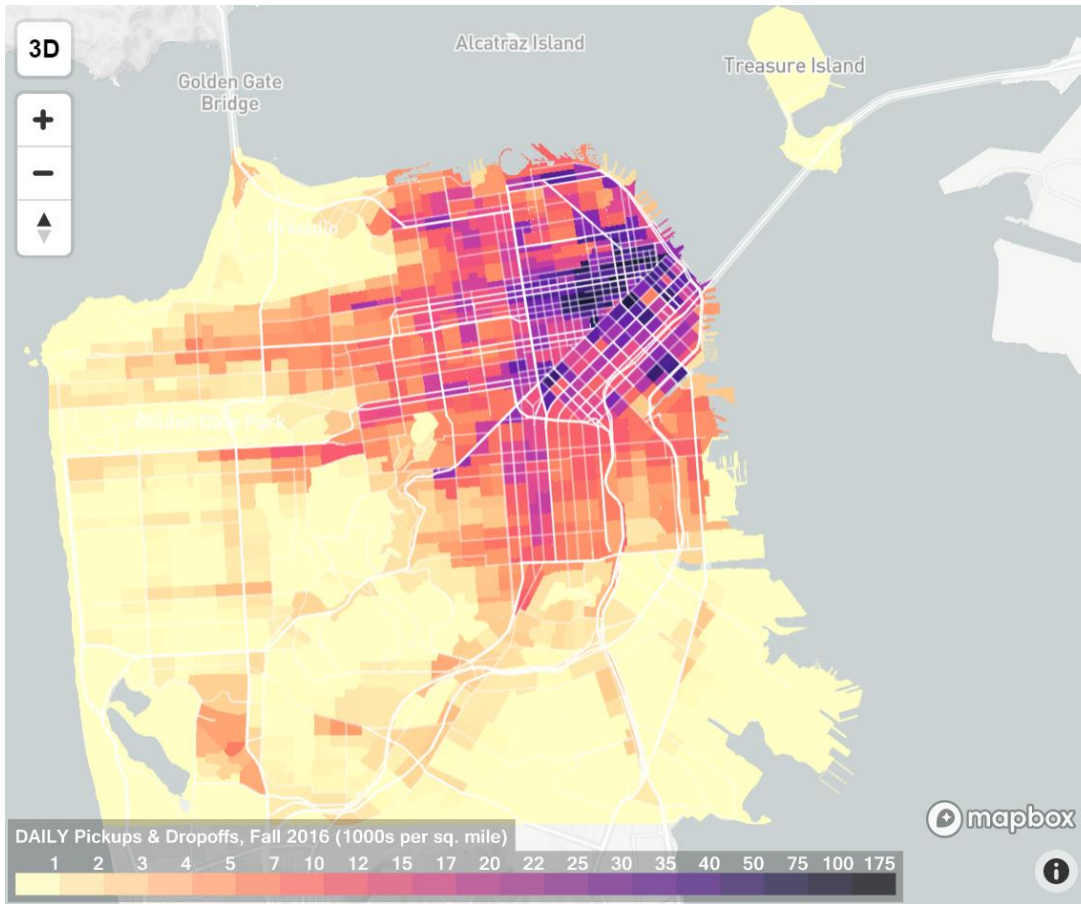Engineering, Maintenance, and Safety Committee

October 24, 2018

Why Now? – The San Francisco Context

- In 1999, San Francisco piloted the first U.S. real-time information system
- Since then, technology and transportation choices have changed rapidly
- For the first time in 15+ years, we have a chance to do a refresh

2000

2018

2

A Competitive Transportation Environment

DAILY Pickups & Dropoffs, Fall 2016 (1000s per sq. mile)
1 2 3 4 5 7 10 12 15 17 20 22 25 30 35 40 50 75 100 175

Source: *TNCs Today: A Profile of San Francisco Transportation Network Company Activity* (San Francisco County Transportation Authority)

- The Next Generation System must adapt to an environment where people today have many travel choices

- TNCs now generate 170,000 vehicle trips per day, typically with 1 to 2 passengers

- 20-26% of peak period traffic in Downtown/SOMA, which delays Muni

- Concentrated in areas with extensive Muni service

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Public Outreach

Quantitative
Comprehensive Survey (Available in English, Chinese and Spanish; online and paper upon request) 5,856 complete responses; ±1.3% margin of error at a 95% confidence level

+

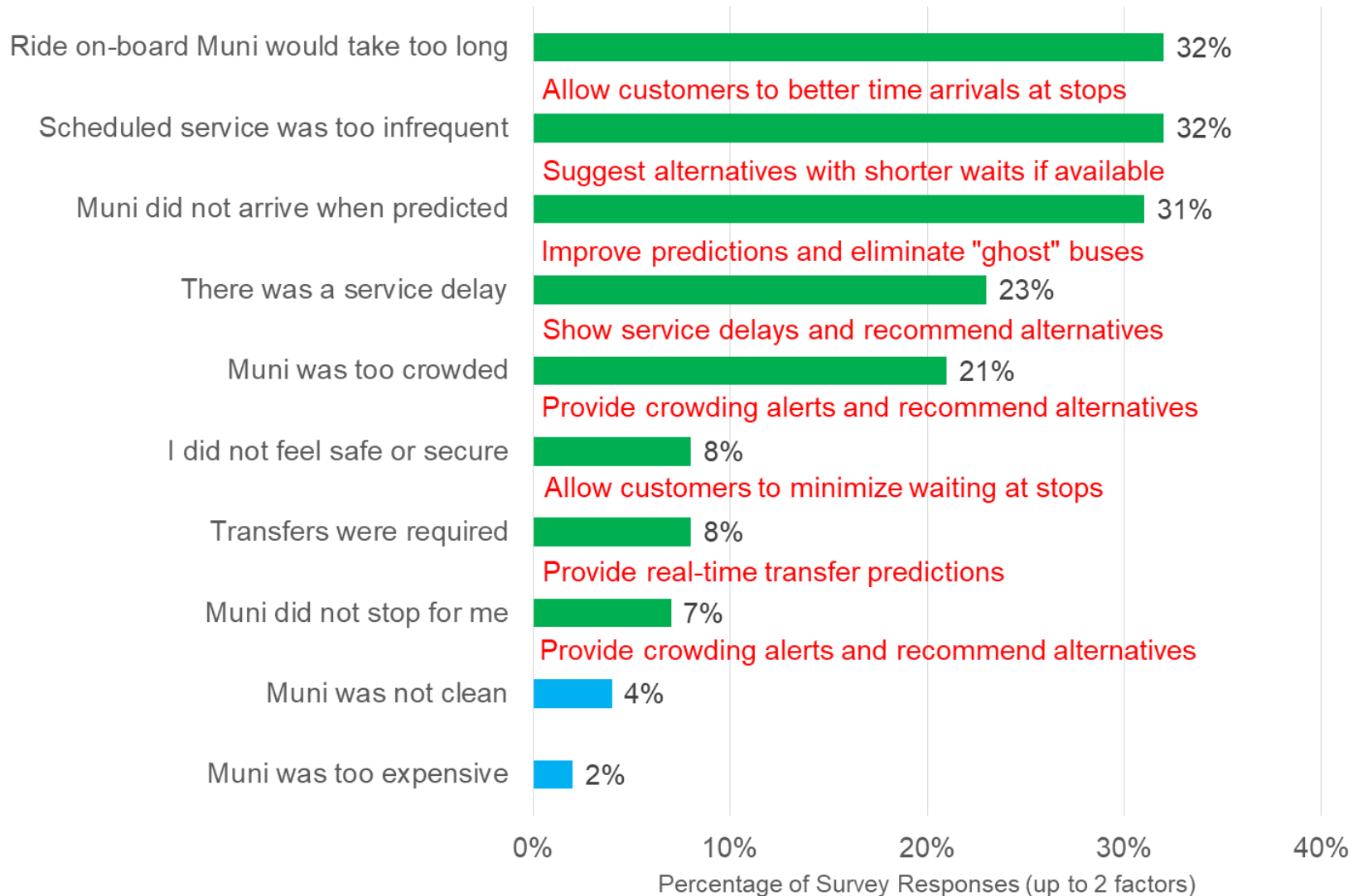| Qualitative (including outreach to underrepresented groups) |
|---|
| Concept Testing |
| Stakeholder Interviews |
| Ride-alongs |

External Stakeholder Examples

311	SF Board of Supervisors
BART	SF Travel
Chamber of Commerce	SFMTA Citizens' Advisory Council (CAC)
Chinatown Community Development Center (CCDC)	SFMTA Multimodal Accessibility Advisory Committee (MAAC)
Chinatown Tenants Association	SFMTA Policy and Governance
Hotel Council	SFUSD-Access
Independent Living Resource Center	Senior Action and Disability Network
Lighthouse for the Blind	SF Transit Riders
Mercy Housing	Youth Commission
Rebuild Potrero	The Village
Save Muni	Transbay Joint Powers Authority

How the New System Will Address Deterrents to Ridership

Deterrents to Transit Ridership

Deterrent	Percentage	Solution
Ride on-board Muni would take too long	32%	Allow customers to better time arrivals at stops
Scheduled service was too infrequent	32%	Suggest alternatives with shorter waits if available
Muni did not arrive when predicted	31%	Improve predictions and eliminate "ghost" buses
There was a service delay	23%	Show service delays and recommend alternatives
Muni was too crowded	21%	Provide crowding alerts and recommend alternatives
I did not feel safe or secure	8%	Allow customers to minimize waiting at stops
Transfers were required	8%	Provide real-time transfer predictions
Muni did not stop for me	7%	Provide crowding alerts and recommend alternatives
Muni was not clean	4%	
Muni was too expensive	2%	

Percentage of Survey Responses (up to 2 factors)

Willingness To Wait For Transit

Waiting Time Until Next Muni Vehicle	During the Day	During the Evening or At Night	When Transferring
5 min	97%	94%	93%
10 min	73%	67%	59%
15 min	35%	34%	22%
20 min	14%	15%	8%
30 min	5%	5%	3%

- Without any real-time information, customers are generally willing to wait 10 – 15 minutes

- Wait tolerance declines during the evening or at night, and when transferring

Muni Service Frequency

Rush Hour Service
(Generally every 15 minutes or better)

Late Evening Service
(Generally every 20 to 30 minutes)

Service frequency often meets customer expectations during the day, but not during the evening and other off-peak times
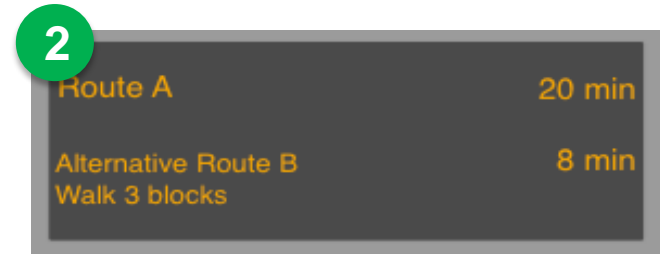
A 20-minute Wait: Four Test Scenarios

- Survey presented customers with a hypothetical 20-minute Muni wait
- Respondents answered four situational questions testing how different types of information could influence mode choice
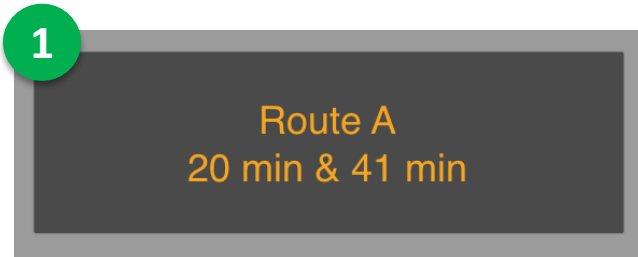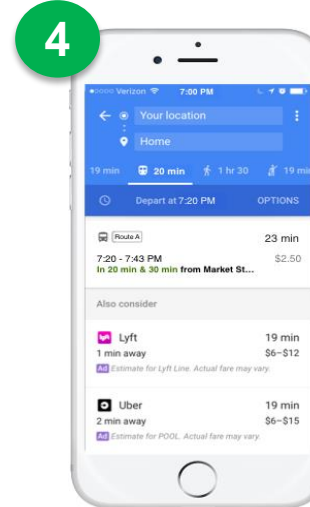

Customer arrives at shelter sign predicts a 20-minute wait

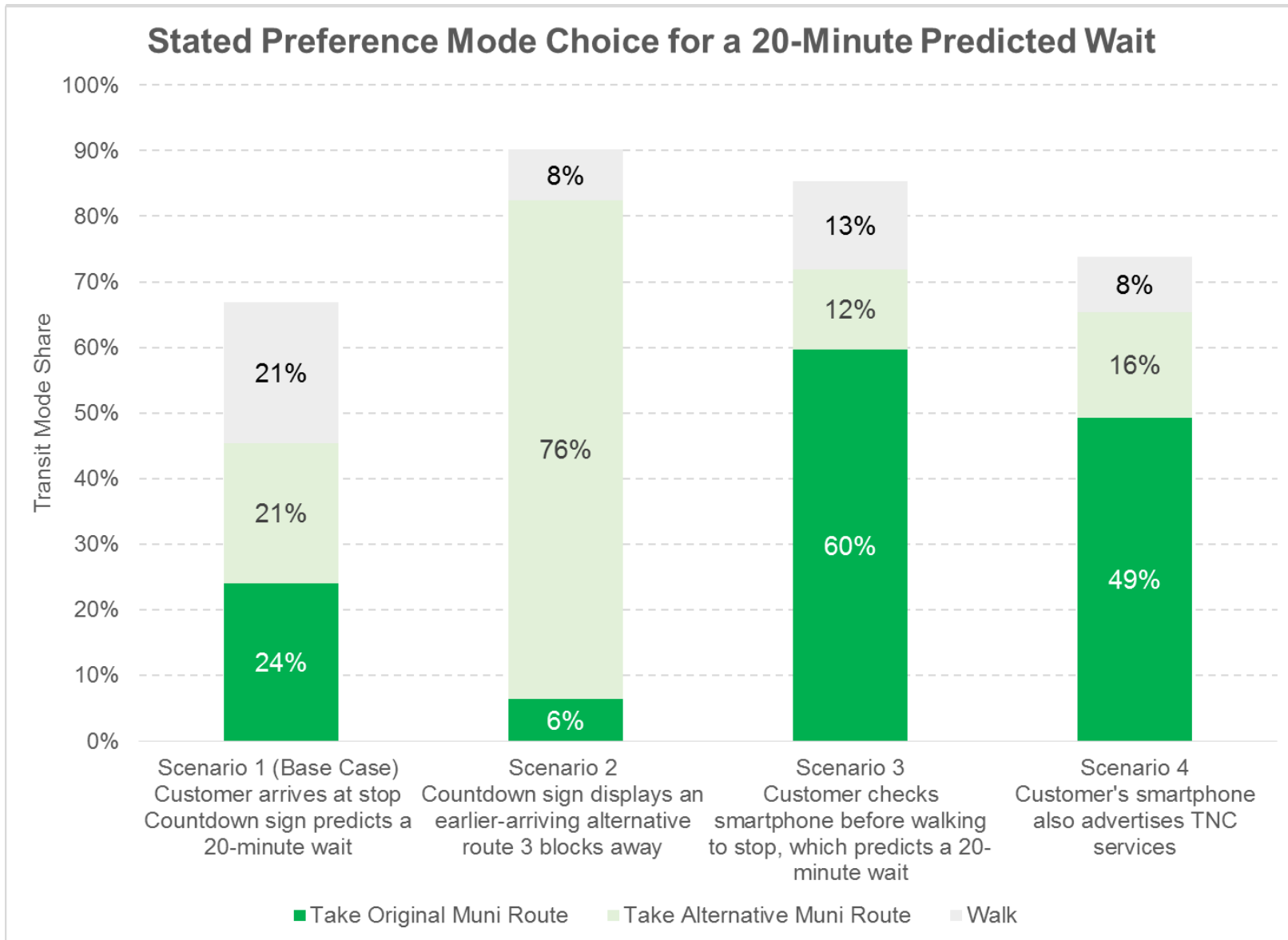Countdown sign displays an earlier-arriving alternative

Checks smartphone before walking to stop, showing a 20-minute wait

Customer's smartphone app also advertises Uber and Lyft

A 20-minute Wait: Top Level Results

Stated Preference Mode Choice for a 20-Minute Predicted Wait

Transit Mode Share

Scenario 1 (Base Case)
Customer arrives at stop
Countdown sign predicts a
20-minute wait
- Take Original Muni Route: 24%
- Take Alternative Muni Route: 21%
- Walk: 21%

Scenario 2
Countdown sign displays an
earlier-arriving alternative
route 3 blocks away
- Take Original Muni Route: 6%
- Take Alternative Muni Route: 76%
- Walk: 8%

Scenario 3
Customer checks
smartphone before walking
to stop, which predicts a 20-
minute wait
- Take Original Muni Route: 60%
- Take Alternative Muni Route: 12%
- Walk: 13%

Scenario 4
Customer's smartphone
also advertises TNC
services
- Take Original Muni Route: 49%
- Take Alternative Muni Route: 16%
- Walk: 8%

■ Take Original Muni Route   ■ Take Alternative Muni Route   ■ Walk

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Better Transit Information Reduces Income Disparities

Impact of Showing Transit Alternatives on Signs by Income (Scenario 1 vs 2) Countdown Sign Predicts a 20-Minute Wait
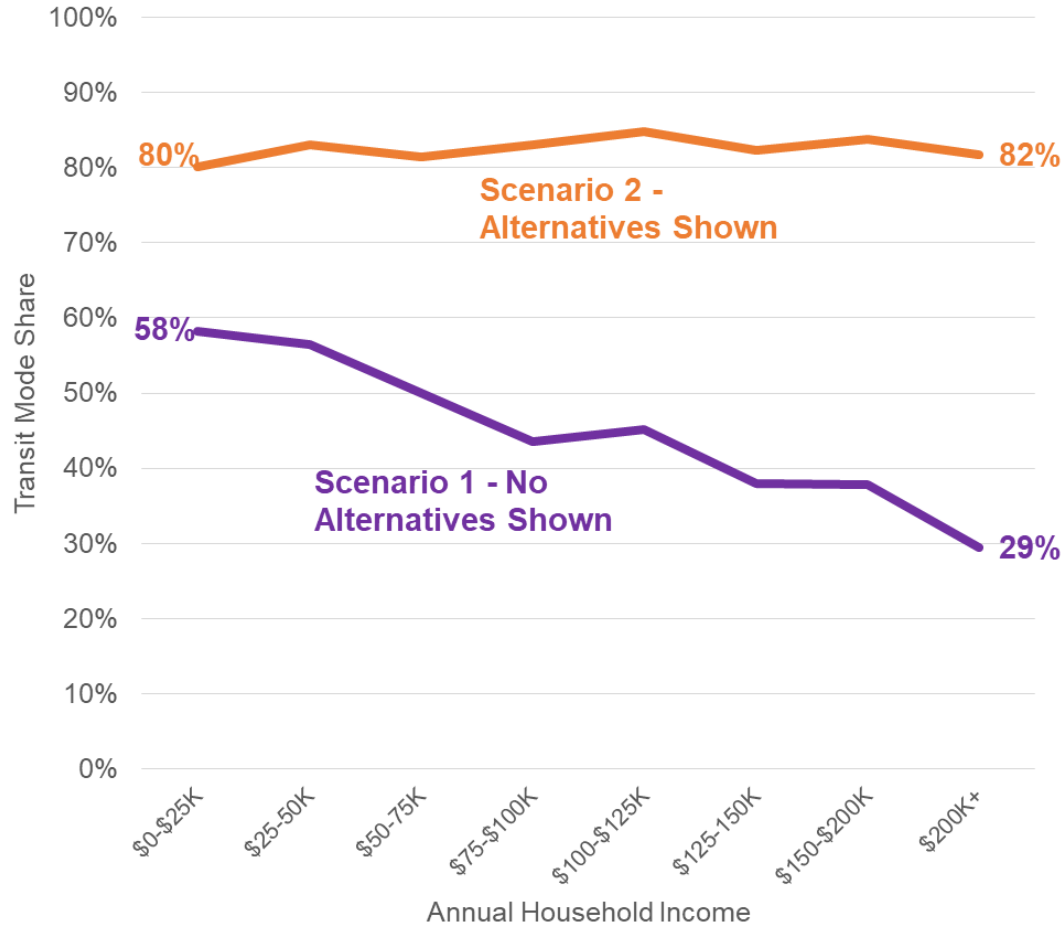
- Survey confirms disparities in median household income by gender, ethnicity and other demographic variables

- As income rises people are less willing to wait for Muni

- The status quo can further a two-tiered transportation system based on income

- With better transit information, respondents are much more likely to ride Muni across all income brackets, regardless of demographic background

Median Household Income: Female $75-100K, Male $100-125K
People of Color: $50-75K, White: $100-125K
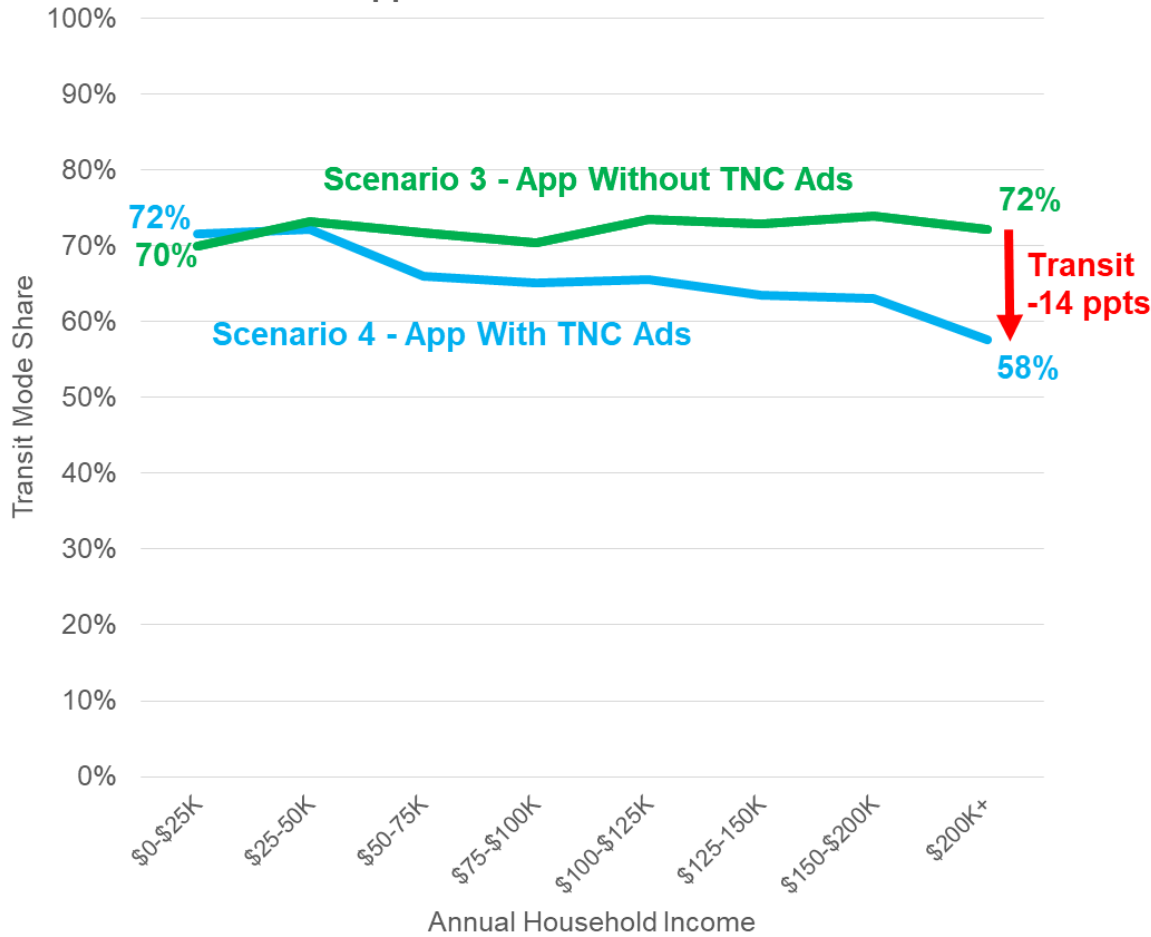
San Francisco Has Many Transit Alternatives
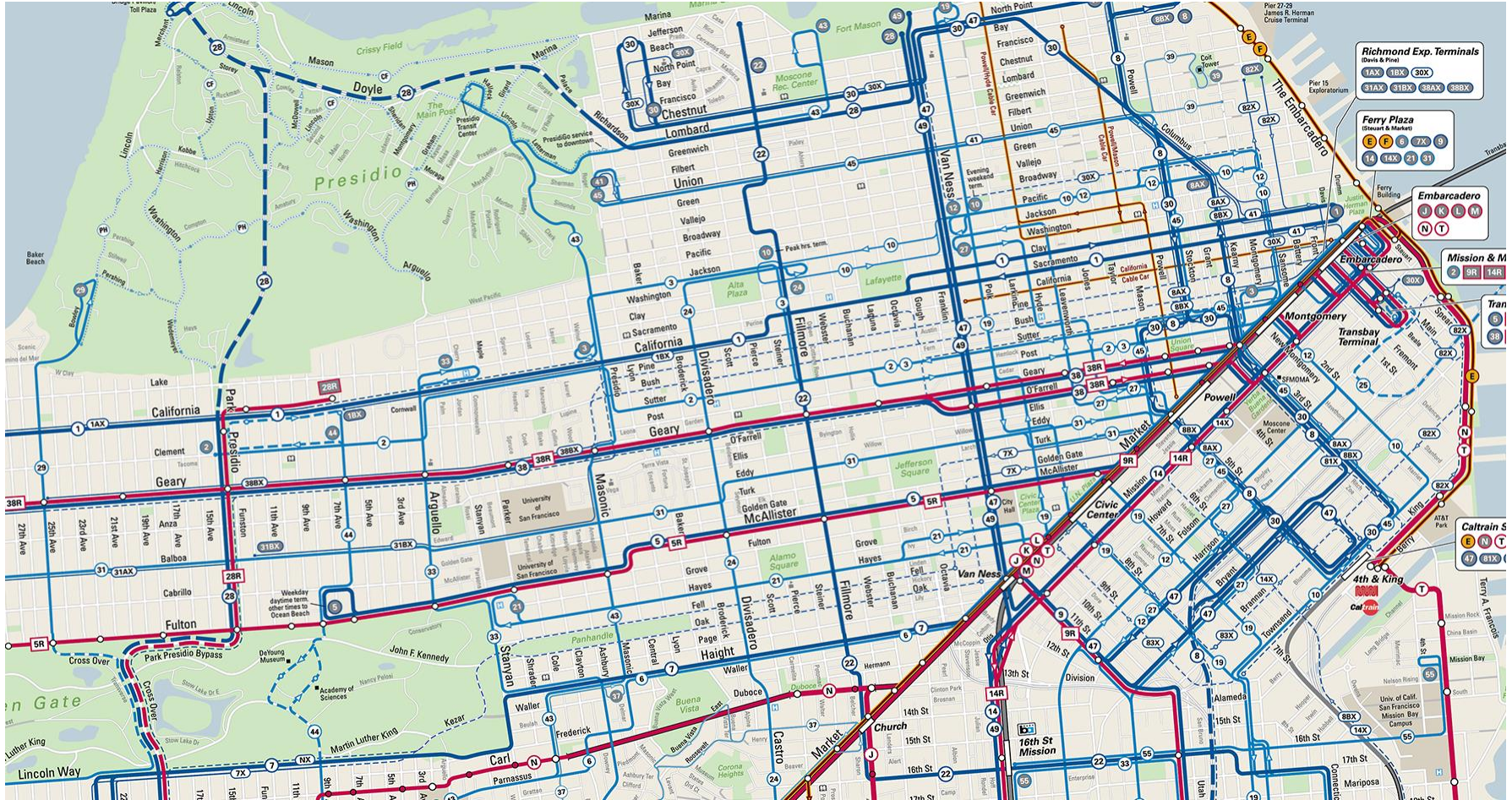
With many parallel lines, taking an alternative Muni route is viable throughout much of San Francisco

Impacts Of TNC Ads On Mobile Apps

Impact of Showing TNC Ads on Transit Apps by Income (Scenario 3 vs 4) App Predicts a 20-Minute Wait

Scenario 3 - App Without TNC Ads

Scenario 4 - App With TNC Ads

72%

70%

72%

58%

Transit -14 ppts

100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%

Transit Mode Share

$0-$25K $25-50K $50-75K $75-$100K $100-$125K $125-150K $150-$200K $200K+

Annual Household Income

On transit apps, the income gap reappears when TNC ads are shown

Median Household Income: Female $75-100K, Male $100-125K
People of Color: $50-75K, White: $100-125K

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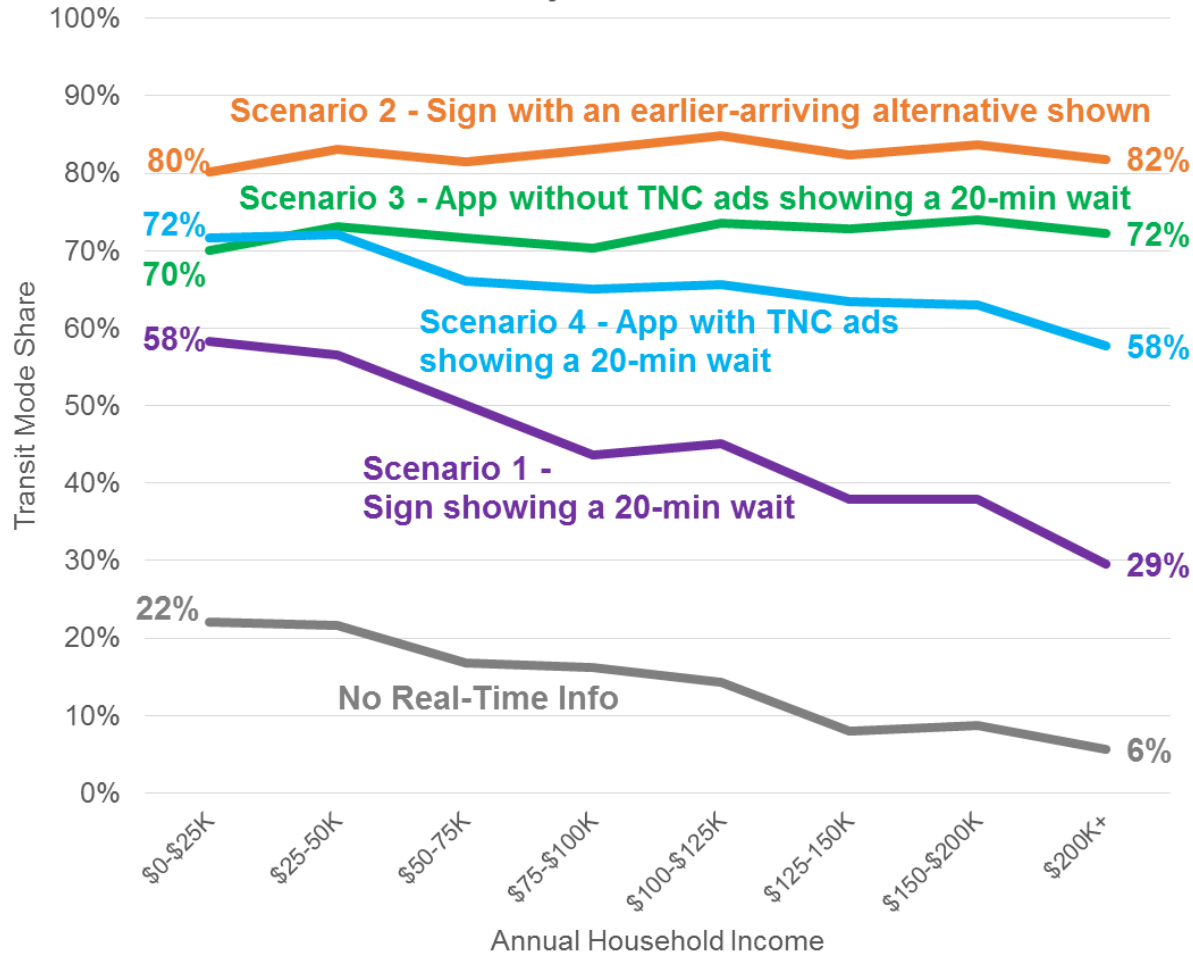# Many Apps Prioritize TNC Ads Over Transit Info
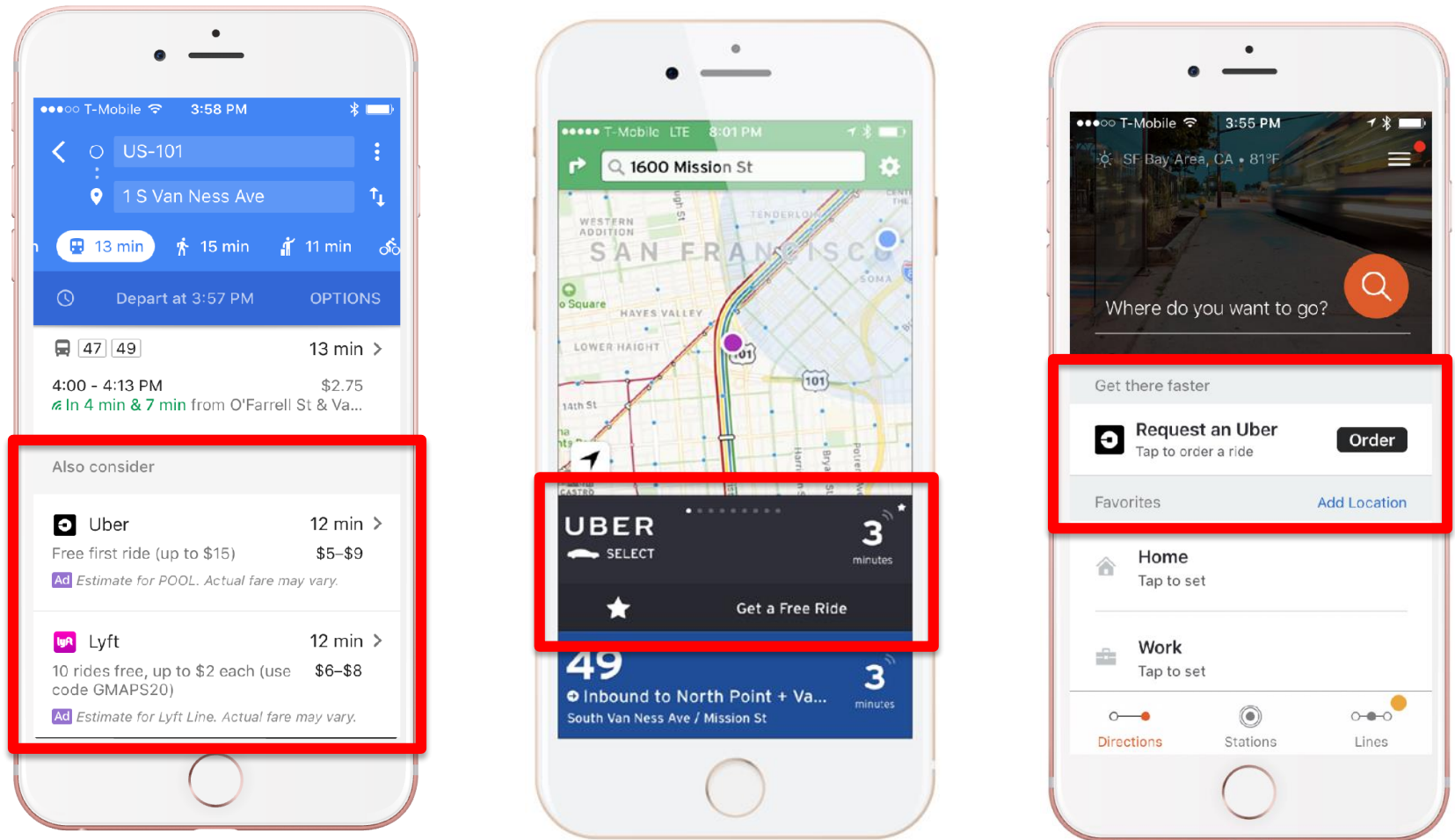
Many third-party apps (63% market share) prominently advertise TNCs when displaying transit predictions obtained through open data

Real-time Information's Influence On Mode Choice

Impact of Real-TIme Information Presentation and Content
on Transit Mode Share for a 20-Minute Wait
by Income Bracket

Scenario 2 - Sign with an earlier-arriving alternative shown

Scenario 3 - App without TNC ads showing a 20-min wait

Scenario 4 - App with TNC ads showing a 20-min wait

Scenario 1 - Sign showing a 20-min wait

No Real-Time Info

Transit Mode Share

Annual Household Income

$0-$25K, $25-50K, $50-75K, $75-$100K, $100-$125K, $125-150K, $150-$200K, $200K+

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Customers Want A Better Enroute Info Experience

On-Board Digital Signage

Solar-Powered Signage

"Have signs that work at every stop, update outages and line delays, and provide visual information on board vehicles to show transfers available at each stop...bring this very dated system into the 21st century. We live in a city of innovation...utilize it!"

"I do not own a smartphone. Please do not make the system so dependent on owning one"

"On board screens that show arrival times of connecting bus, MuniMetro, BART and Caltrain lines would be helpful. Sometimes it's not always convenient to check times on a phone when standing on a crowded bus or holding bags/handrails/kids, etc. "

"Announce expected arrival times of intersecting routes at each stop."

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System Elements

Surface Vehicle Locations
Gathers vehicle locations from CAD/AVL System

Underground Locations
Gathers vehicle locations from Automatic Train Control System

Automatic Passenger Counters
Gathers real-time ridership loads

System Software
Generates real-time vehicle predictions, monitors system status through a System Administration Tool, and displays information on customer interfaces through a Content Management System

Analytics Platform
Processes data from the System Software and Mobile Platform & Website to assist in operational and usage analysis

Stationary Digital Signage
Displays real-time arrivals, alternatives and other valuable info at rail stations, transit shelters and selected transit stops without power

On-Board Digital Signage
Provides back-end capability to display service updates, transfer connection times and other information on separately-procured on-board vehicle signs

Mobile Platform & Website
Delivers travel information in mobile and online formats; Mobile App features an enhanced Trip Planner and collects customer behavior insights to inform planning decisions

System Features

System Features	Current	Future
System Software		
Predictions Engine	✓	✓ (improved)
Crowding Level Alerts	✗	✓
Alternative Route Suggestions	✗	✓
Real-Time Temporary Service Changes	✓ (limited)	✓
Connections with other systems	✗	✓
Stationary Digital Signage		
Powered Shelters	✓	✓
Unpowered Shelters & Stops	✗	✓
On-Board Digital Signage (back-end)		
Stop Announcements	✓	✓
Connection Times	✗	✓
Service Delay & Reroute Alerts	✗	✓
Mobile Platform & Website		
Mobile App	✓ (primarily mobile ticketing)	✓ (enhanced capabilities)
Accessible Itineraries	✗	✓
Analytics Platform		
Usage Trends & Analytics	✓ (limited)	✓ (enhanced capabilities)

- Incorporates input from customers and a multi-disciplinary team from Communications, Sustainable Streets, Taxi & Accessible Services and Transit

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Timeline

Milestone	Approximate Date
RFP Issuance	September 6, 2018
Proposals Due	November 16, 2018
Contractor Selection	First Quarter, 2019
Award Date	Second Quarter, 2019
Phase I Completion (1-for-1 replacement of Existing System & signage installation at Central Subway stations)	Third Quarter, 2020
Phase II Completion (Enhancements)	Third Quarter, 2022

Contract Terms
- Initial 6-year Contract (1 year of system setup + 5 years of operations)
- Two 5-Year renewal options

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Evaluation Overview

Section	Points
Proposal	
Written Proposal	160
Conceptual Design Document	545
Performance Requirements	30
Financial Information and Subcontractor Commitment Letters	0
Cost Proposal	200
CMD Attachment 2	0
Oral Interview	65
Total	1,000

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Submittal Requirements – Written Proposal

Section	Points
Letter of Introduction & Executive Summary	0
Proposer's Team and Management Structure	35
Key Personnel	15
Proposer's Experience – *At least one project similar in size or scope to the Next Generation System*	40
Project Understanding and Approach	35
Project Implementation	25
Level of Customization	10
Total	**160**

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Submittal Requirements - Conceptual Design Document

Section	Points
1. Introduction	0
2. System Architecture	25
3. System Software	170
4. Stationary Digital Signage	85
5. On-Board Digital Signage	35
6. Mobile Platform and Website	100
7. Analytics Platform	80
8. Maintenance Services	50
Total	545

In the RFP, each element contains the following information:
- Purpose
- Existing Conditions
- Technical Requirements
- Performance Requirements

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System Software

1. **Customer Information**
- Generate customer information outputs based on a set of inputs
- Output examples include vehicle arrival predictions, terminal departures, transfers, trip planner itineraries, route alternatives, etc.
- Pushes customer information to a variety of customer interfaces

2. System Administration Tool
- Allows SFMTA staff to interface with, configure and query the system

3. Content Management System
- Create and layout informational content that can be pushed out to customer interfaces

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Stationary Digital Signage

- Provide sign hardware, installation and maintenance services
- Ensure uninterrupted service during transitions
- Ensure full ADA-compliance, including text-to-speech
- Must display the desired customer information outputs

1. Powered Shelter Signage
- Replace ~850 existing LED signs at powered shelters

2. Powered Signage at Outdoor Rail Platforms
- Replace ~50 existing LED signs at outdoor rail platforms

3. Powered Signage at Underground Stations
- Replace existing LCD signs at subway stations and install new LCD signs at Central Subway stations (~30 total)

4. Alternatively-Powered Signage
- New signs at unpowered locations

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On-Board Digital Signage

On-board digital signage hardware is <u>not</u> included in scope

1. **Signage Content**
- Generate customer information (e.g., reroutes, transfer connections) for display on future signs

2. **Text-to-Speech Functionality**
- Enable customer information to be announced

3. **Mobile Website Test Interface**
- Enables the SFMTA to test the accuracy of signage content

4. **Integration with Future Vendor**
- Able to push content to a future vendor for display on on-board digital signage

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Mobile Platform & Website

1. Mobile App
- Work with MuniMobile vendor to produce a single mobile app that replicates current mobile ticketing and provides trip planning functionality

2. Website
- Provide a responsive website with trip planning functionality

3. Integration into SFMTA Website

4. Trip Planner
- Point-to-Point Directions, Next Vehicle Arrival Times (Phase I)
- Live Trip Tracking (Phase II)
- Configurable to customer preferences

5. SFMTA Staff Interface
- Add functionality to assist with SFMTA's real-time operations management

6. Data Collection
- In compliance with regulations and industry best practices, collect and aggregate basic mobile app and website usage data

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Analytics Platform

Use data outputs from System Software and Mobile Platform & Website to provide insights into ridership patterns and factors that influence customer mode choice

1. **Analytics Platform**
- Create reporting tools and dashboards
- Provide raw transactional data for entry into SFMTA's data warehouse

2. **Data Interpretation**
- Supplements reporting tools and dashboards by providing independent and objective analysis to answer complex questions

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Maintenance Services

1. **Customer Support Services**
- Provide overall customer support to maintain operations and address incidents

2. **Stationary Digital Signage Maintenance Services**
- Install and maintain digital signage in a state of good repair
- SFMTA will pay a one-time 5 percent fee for spares
- Warranty included in cost for initial 6-year contract (5 years of operation)
- SFMTA may exercise option for an extended warranty for two optional 5-year contract renewals

3. **Software Maintenance Services**
- Provide maintenance and support services, enhancements and updates

4. **Communications Maintenance Services**
- Ensure uninterrupted service when there are communication upgrades (e.g., 3G to 4G)

SFMTA