FTA RESEARCH

FEDERAL TRANSIT ADMINISTRATION

Mobility Services for All Americans (MSAA): Case Studies in Advancing Universal Mobility

Date

Presenter Name(s)

U.S. Department of Transportation

Federal Transit Administration

Presentation Outline

Deployment of Technology to Facilitate Service Coordination

Case Studies

- Central Florida Regional Transportation Authority (LYNX) Model Orlando Regionally Efficient Travel Management Coordination Center (MORE-TMCC)
- United Cerebral Palsy (UCP) / Ride-on Transportation San Luis Obispo (SLO) County TMCC
- Regional Transportation District (RTD) Northwest Metro Denver Coordination System
- Jacksonville Transportation Authority (JTA) TransPortal

Findings and Conclusions

Identify Resources

Technology Deployment to Facilitate Service Coordination Survey

Who

- Attendees of the 2016 National Conference on Rural Public and Intercity Bus Transportation

What

- Deployment of technology to facilitate coordinated transportation

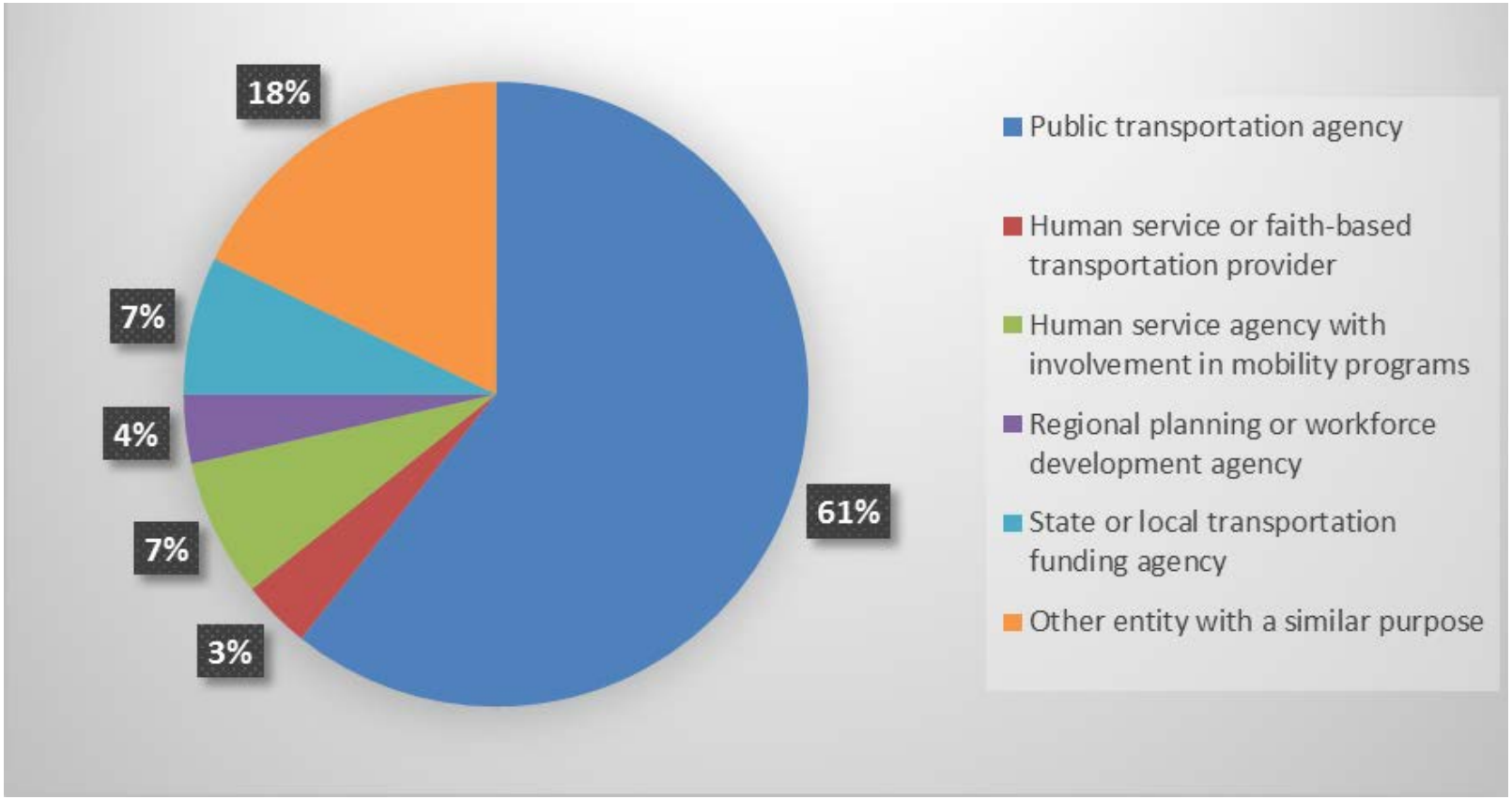
Why

- Identify how customer needs are being integrated into the Travel Management Coordination Center (TMCC) development process and the resulting system

Questions

- Characteristics of responding agency/organization
- Challenges faced by the agency in terms of service coordination
- Technologies deployed
- How needs and requirements for technology were determined prior to and validated after implementation
- How the technology was procured
- Characteristics and level of automation in stages of the service provision

Type of Organization Responding to Survey



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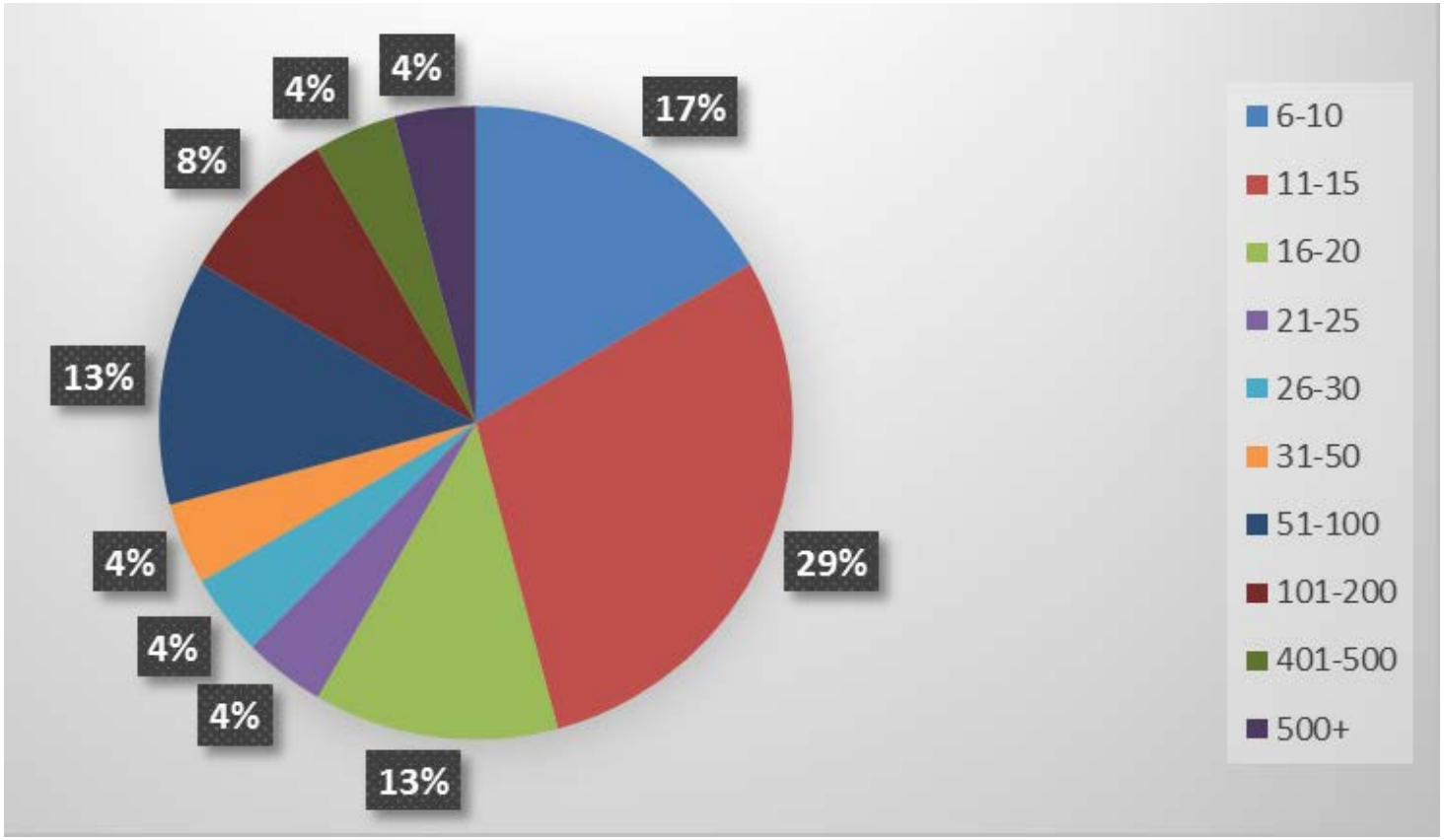
Number of Vehicles



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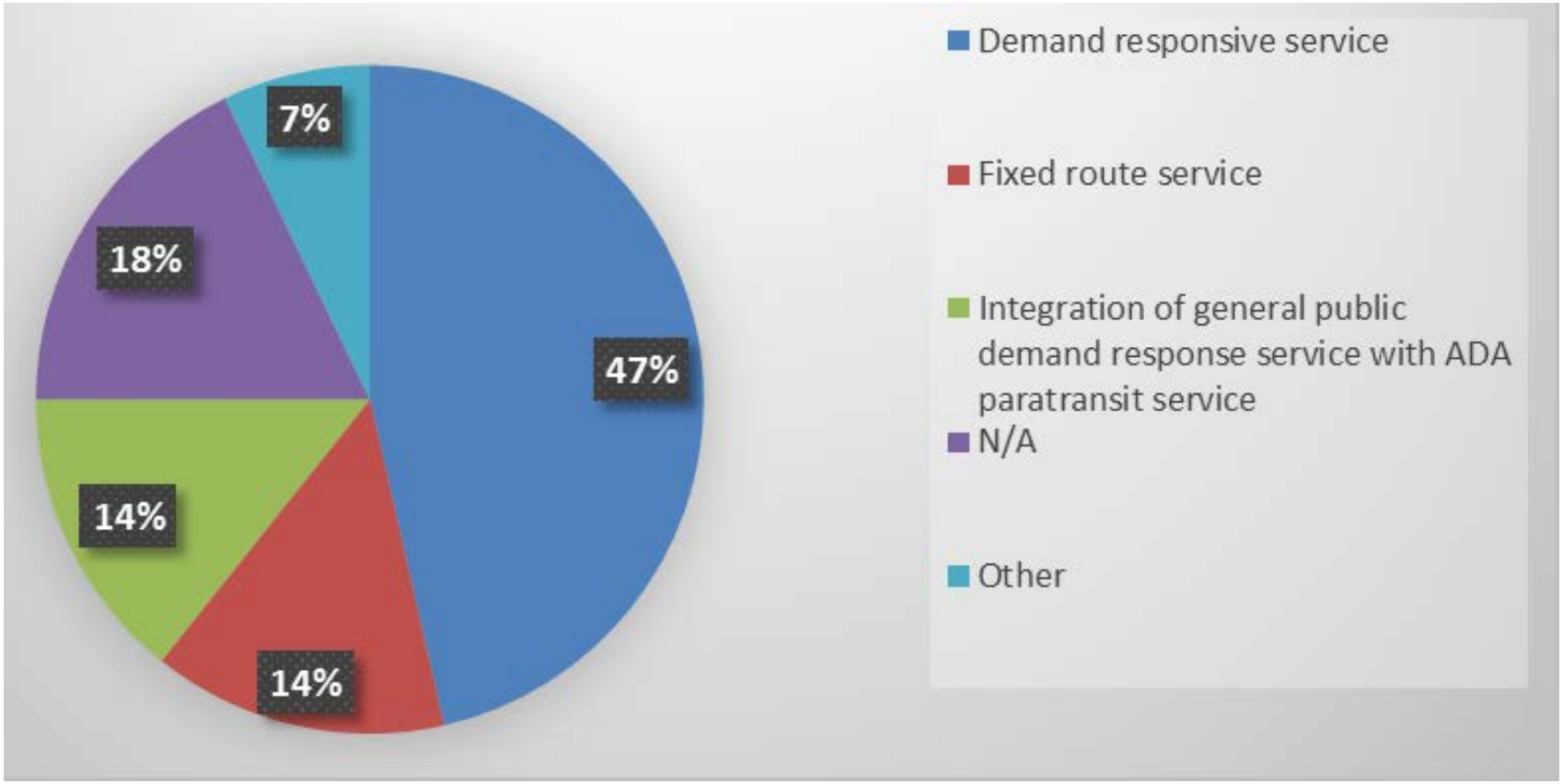
Services Provided



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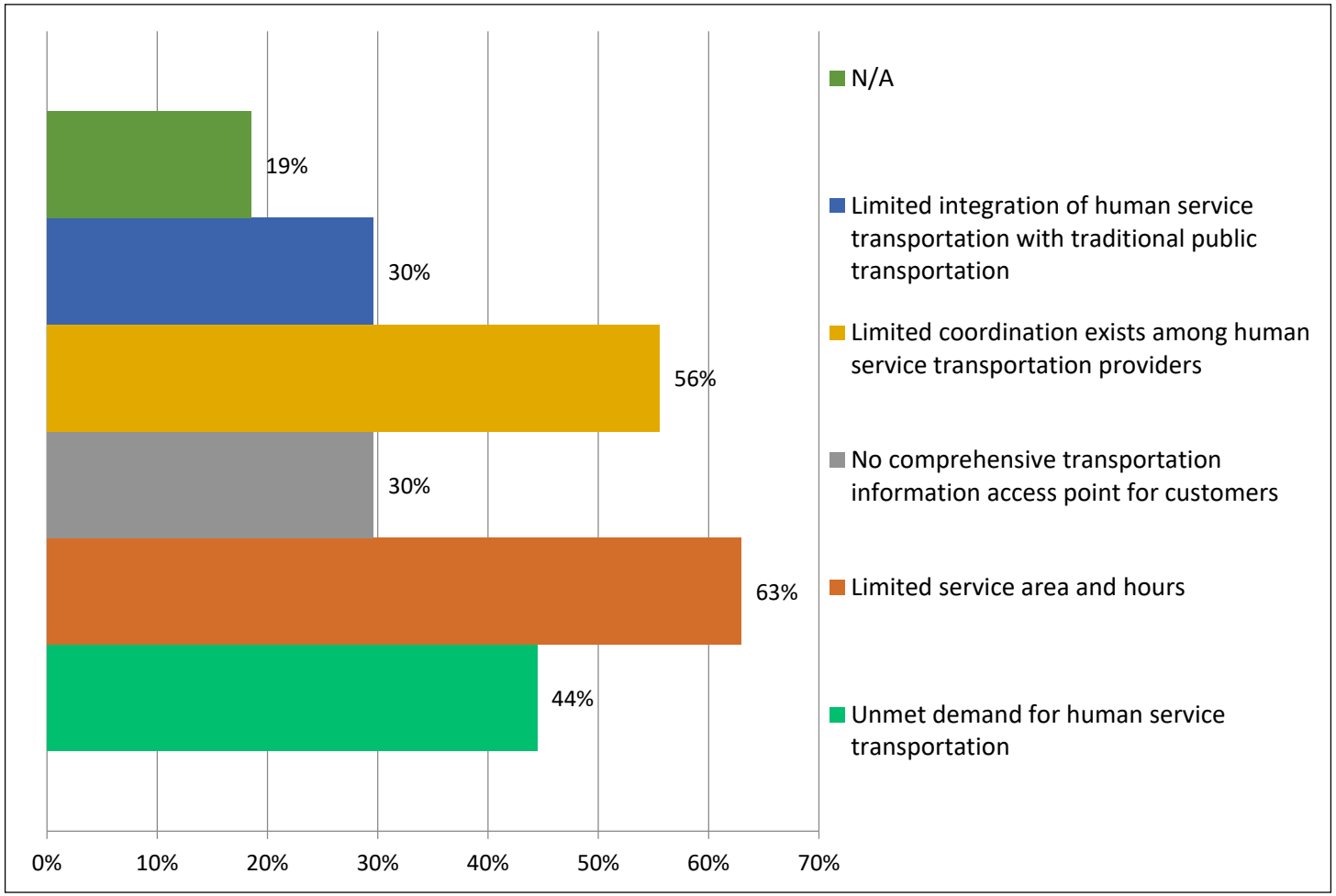
Service Coordination Challenges



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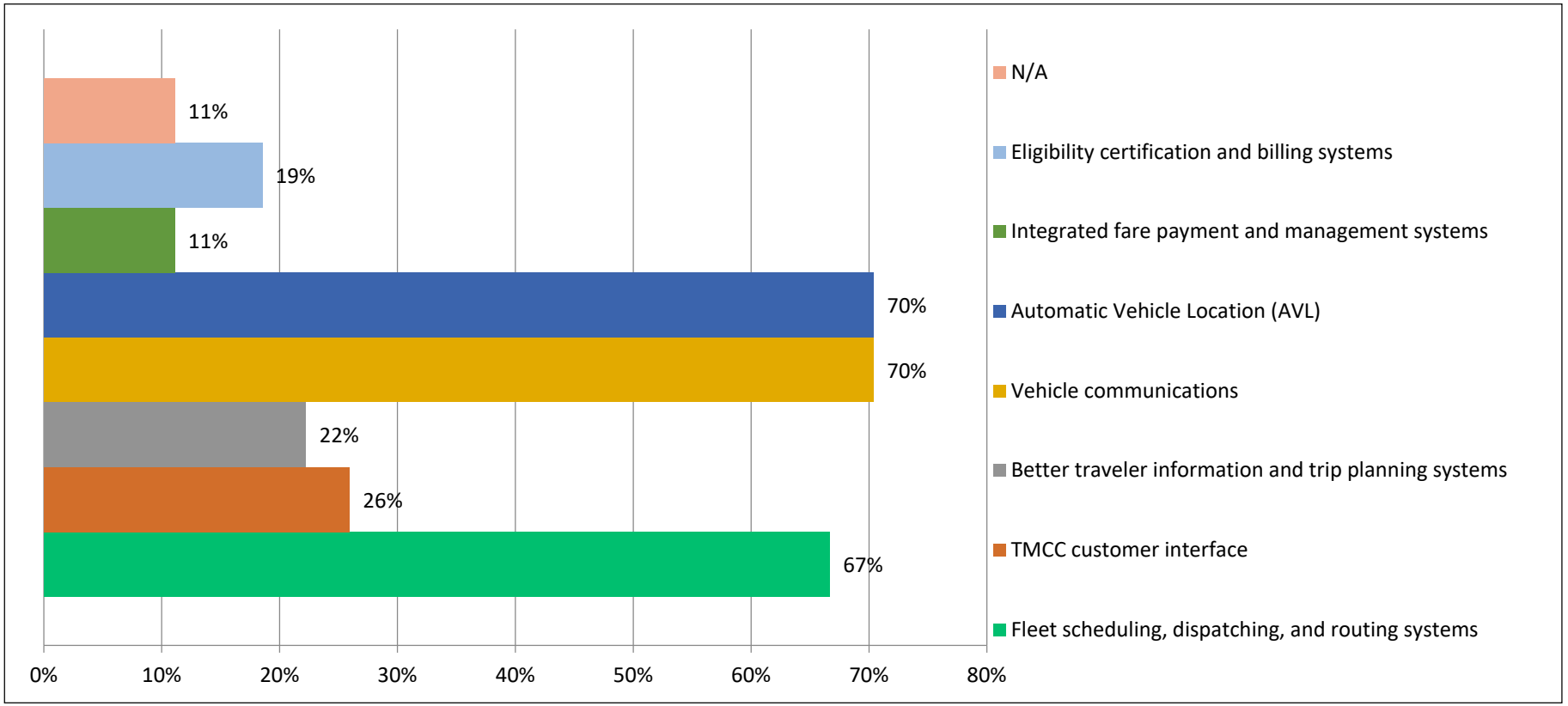
Types of Technologies Deployed



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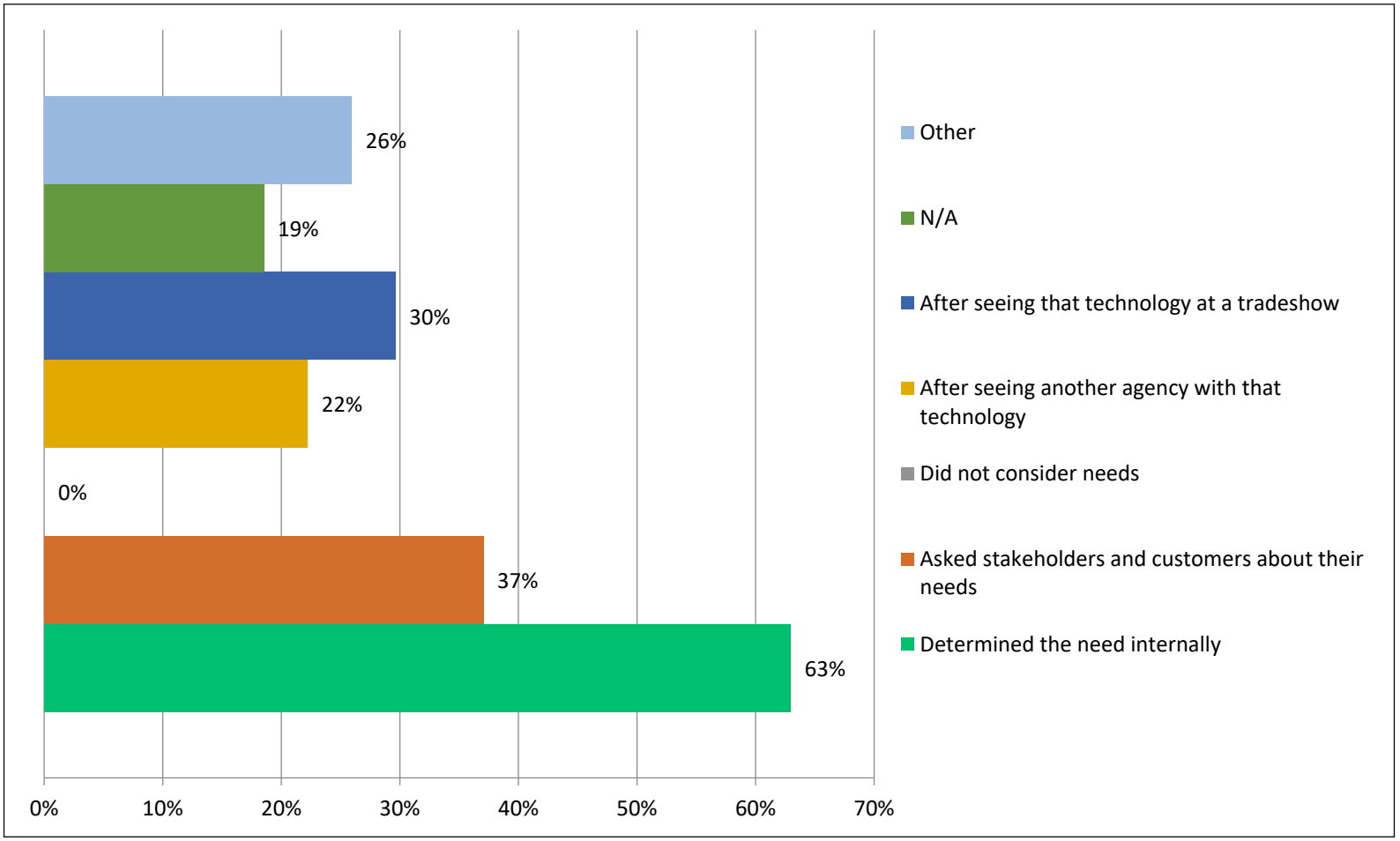
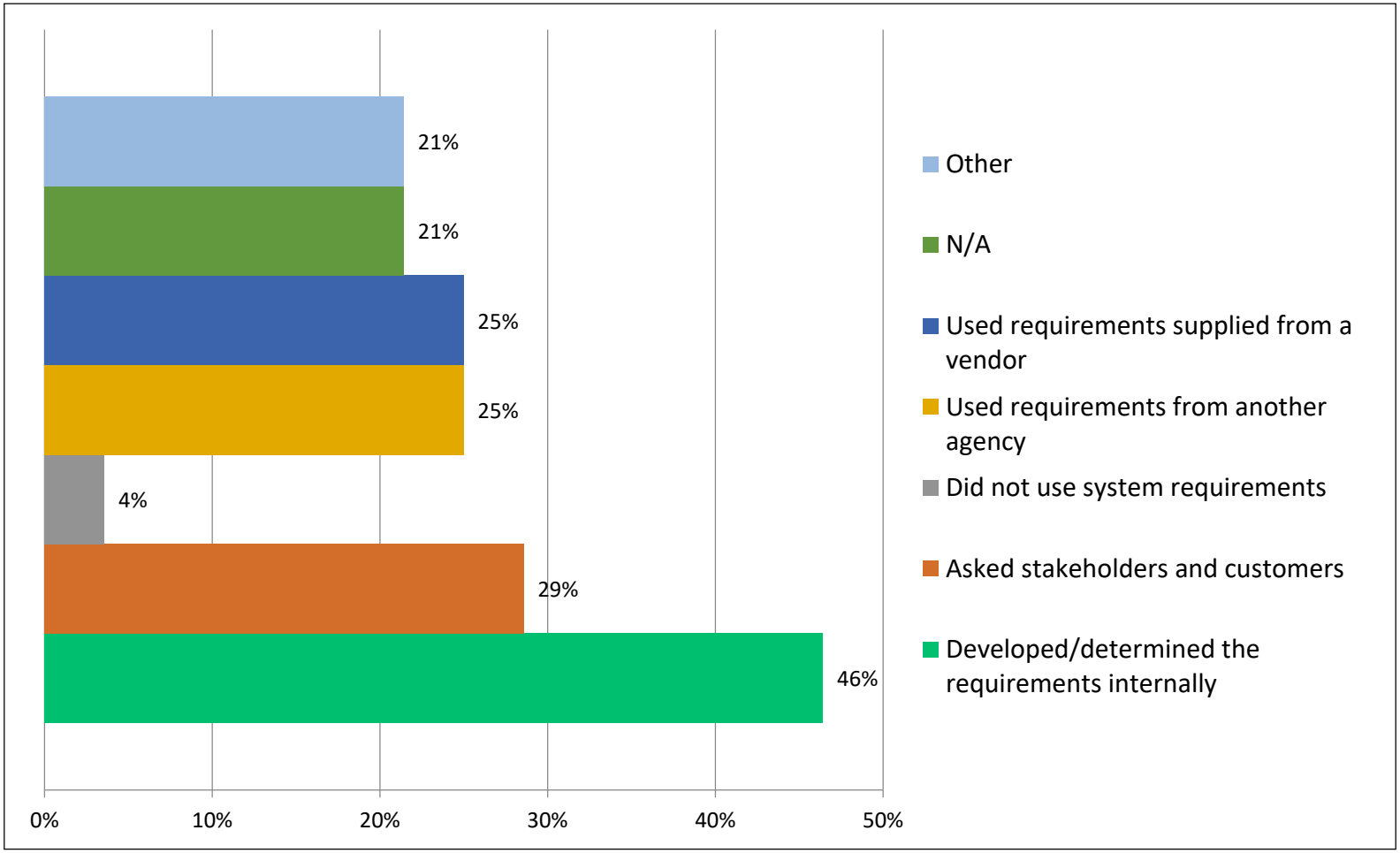
Determining Technology Needs



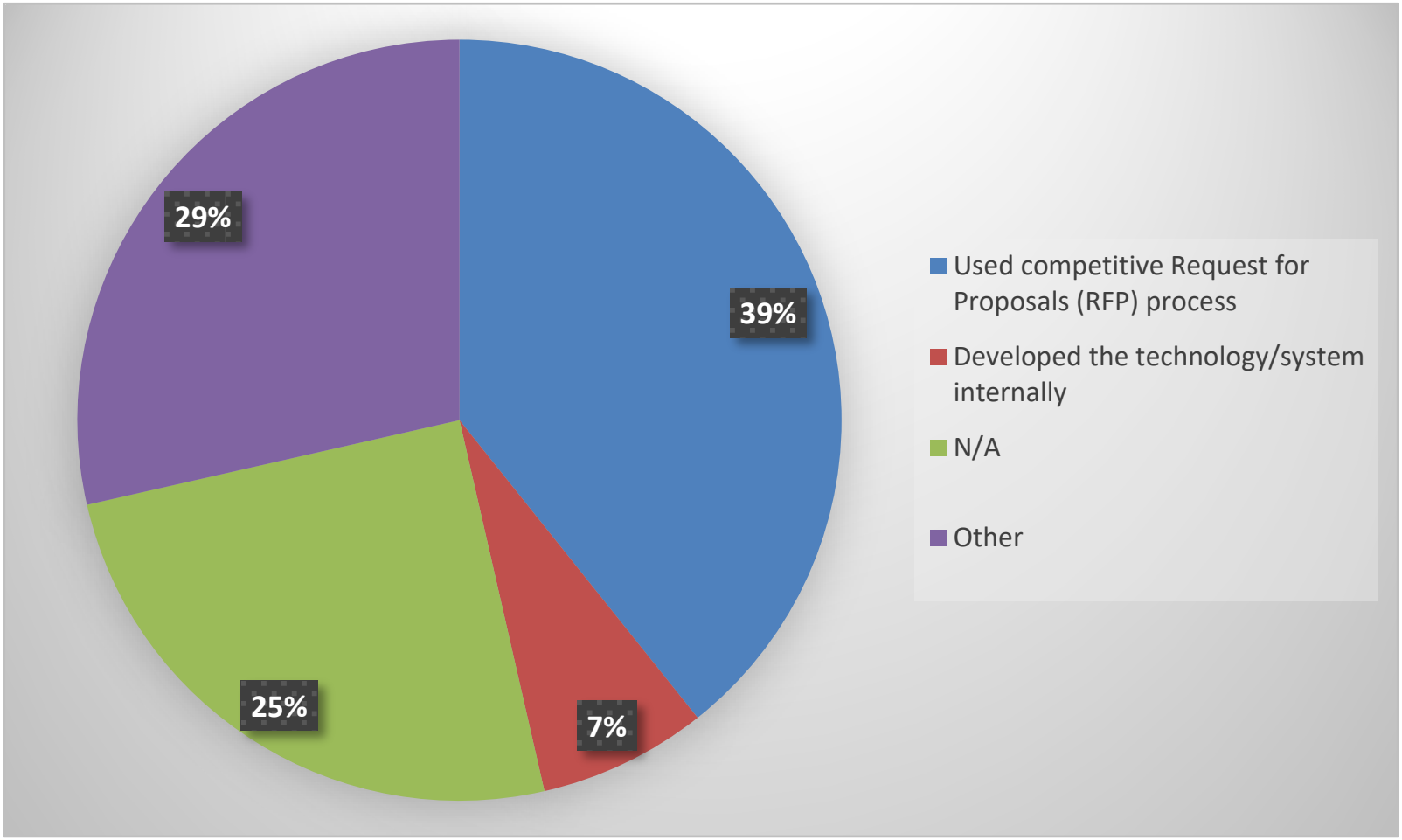
Source: Battelle

Determining Requirements



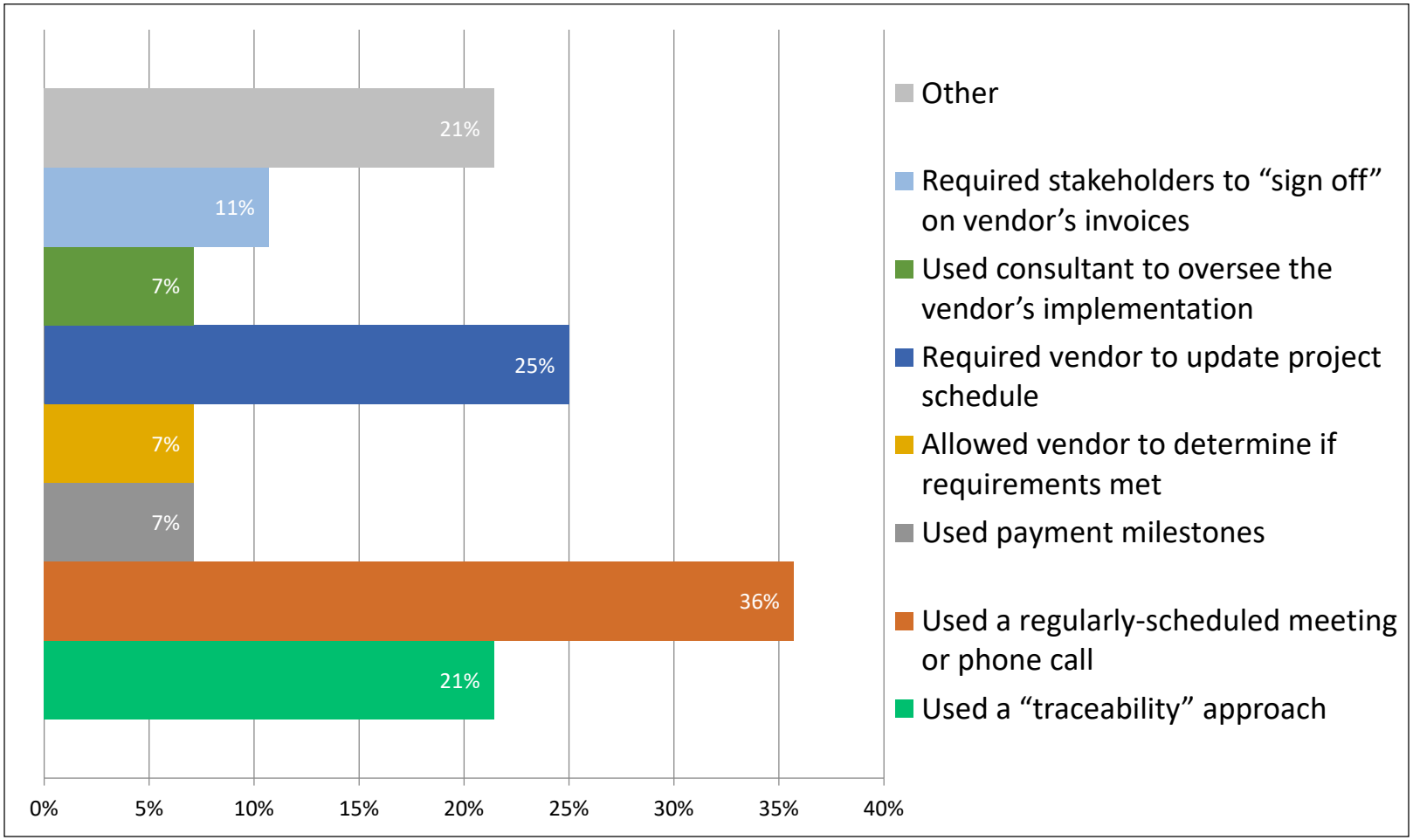
Source: Battelle

Technology Procurement Process



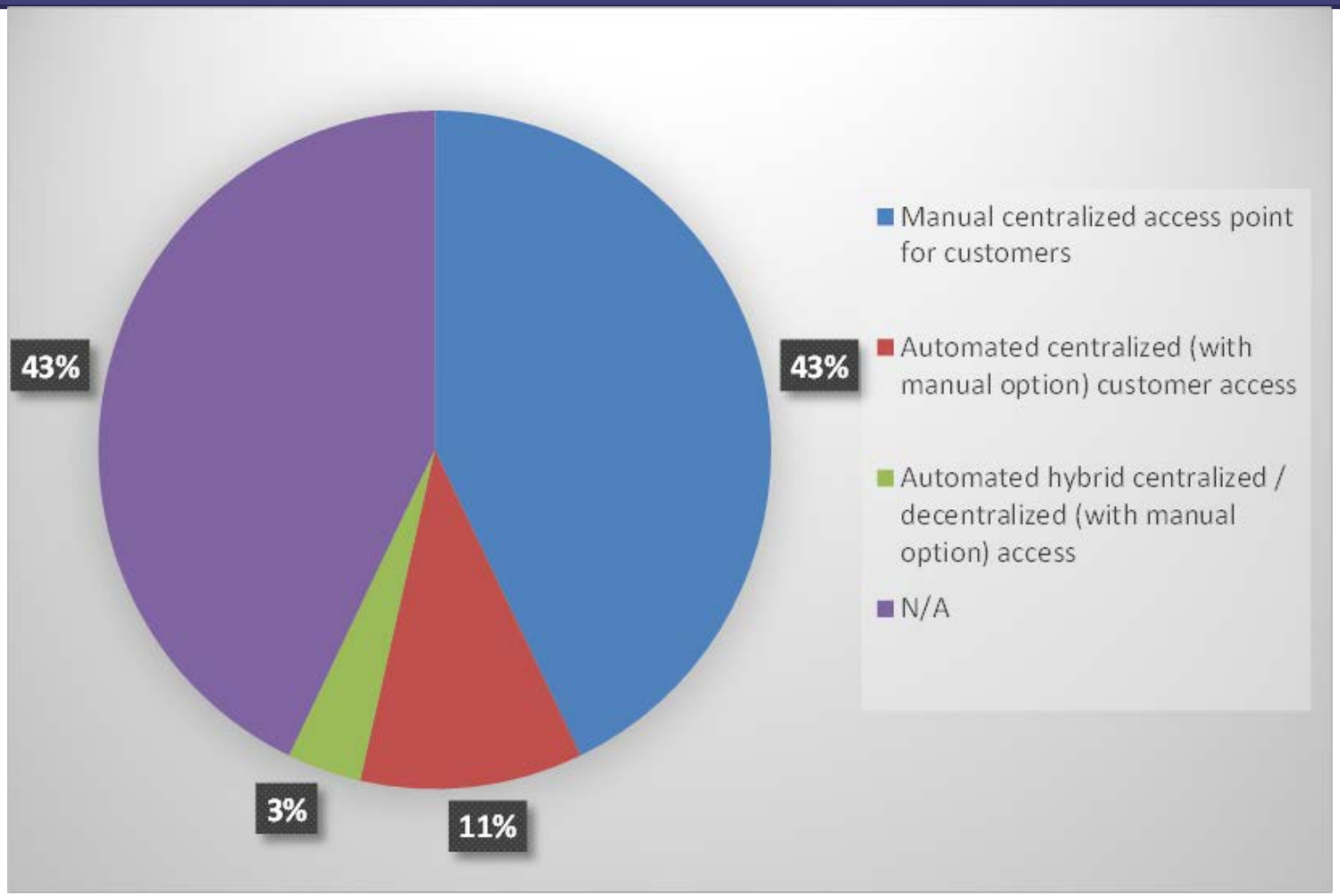
Source: Battelle

Ensuring Requirements Met



Source: Battelle

Trip Reservation Request Process



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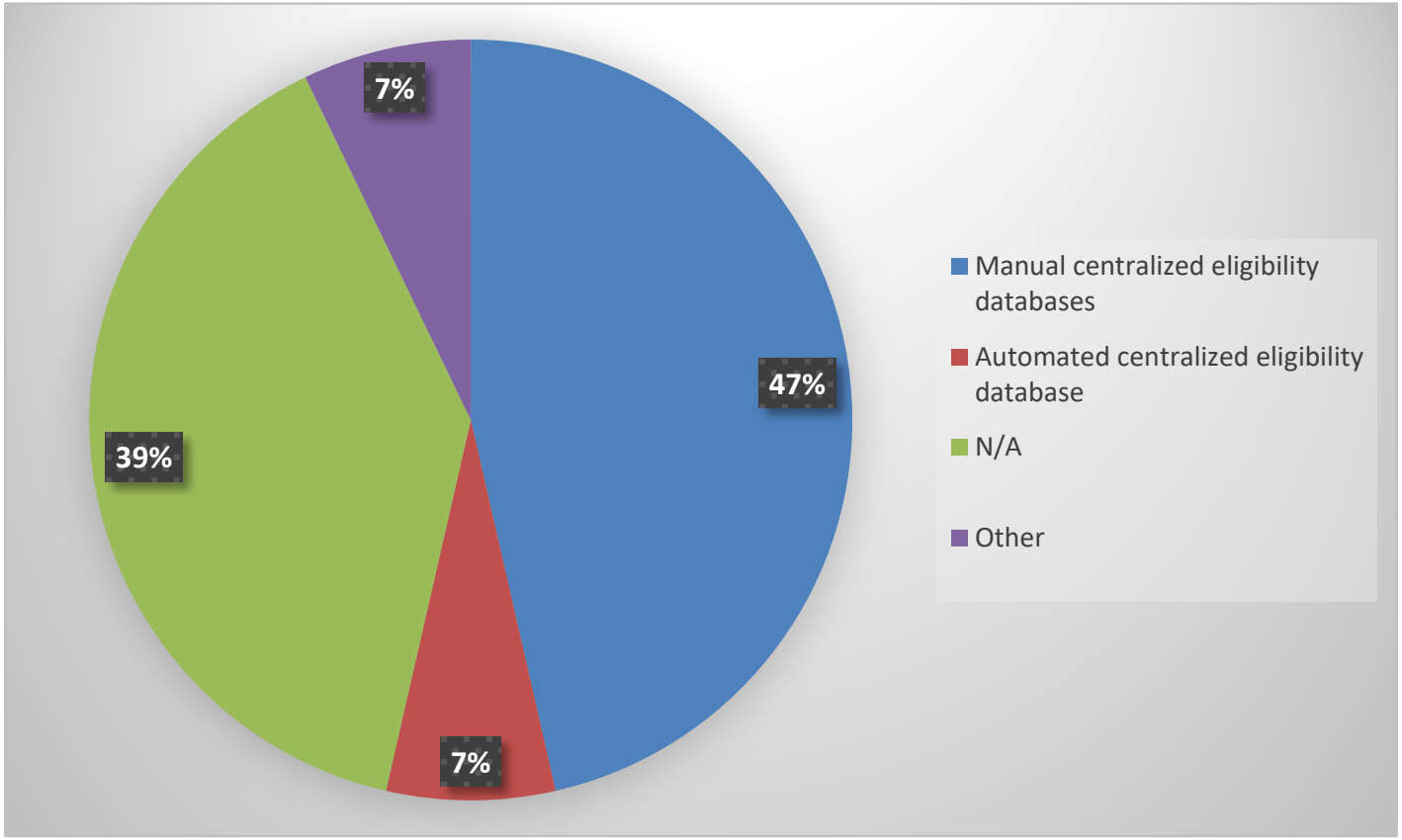
Eligibility Determination



Source: Battelle

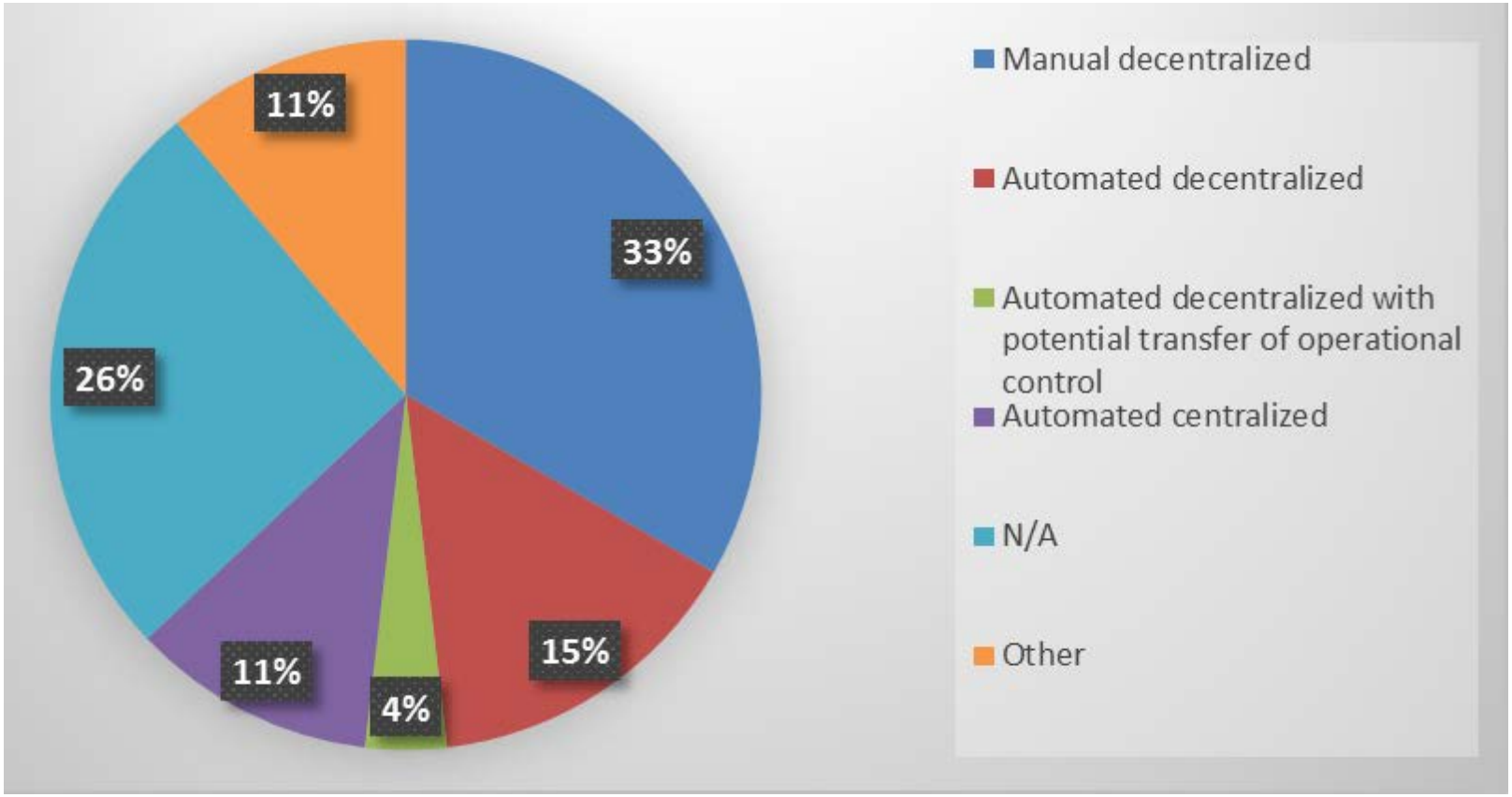
Scheduling and Dispatching

- 27% using some form of automated scheduling
  - 15% of those have single centralized scheduling system
  - 4% have shared scheduling platform with shared coordination
  - 8% have decentralized scheduling with common trip planning interface

Scheduling and Dispatching (cont'd)

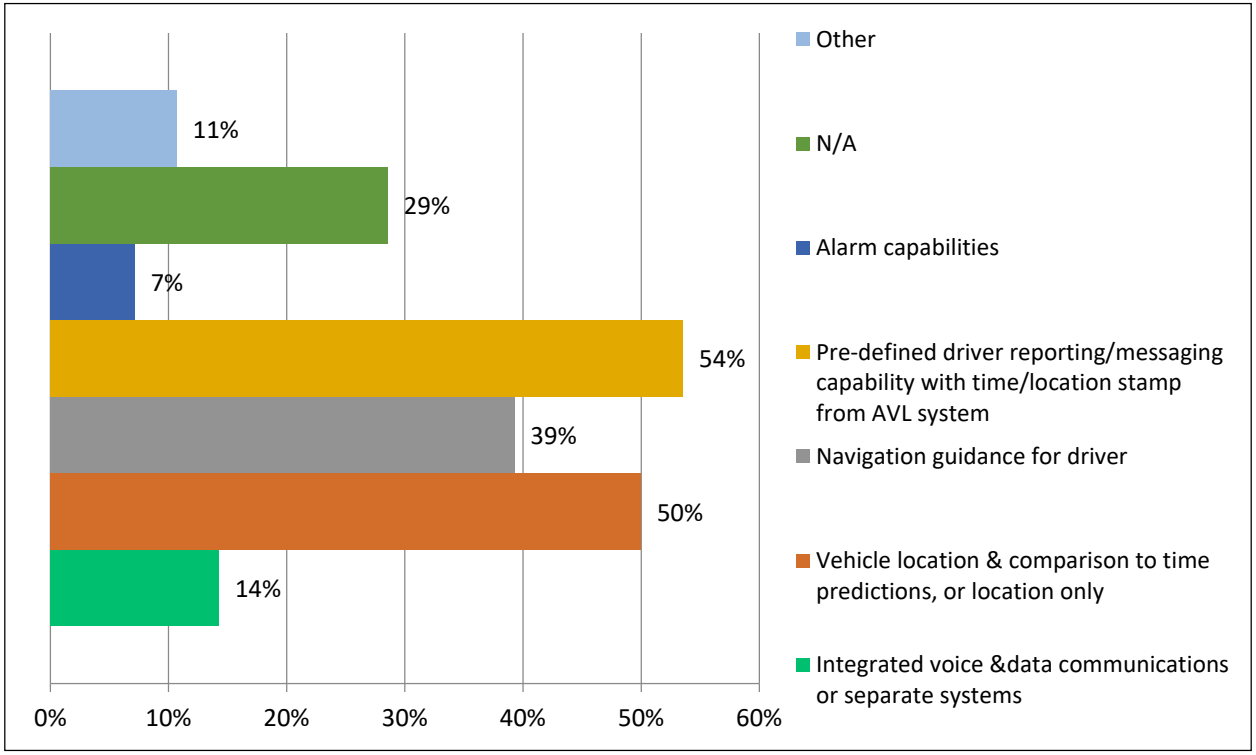
- 4% use computer-assisted decentralized trip request-sharing and booking with separate confirmation
- Nearly half not using technology to dispatch trips
- 7% use automated decentralized dispatch
- 7% use an automated centralized approach

Vehicle Management Approach



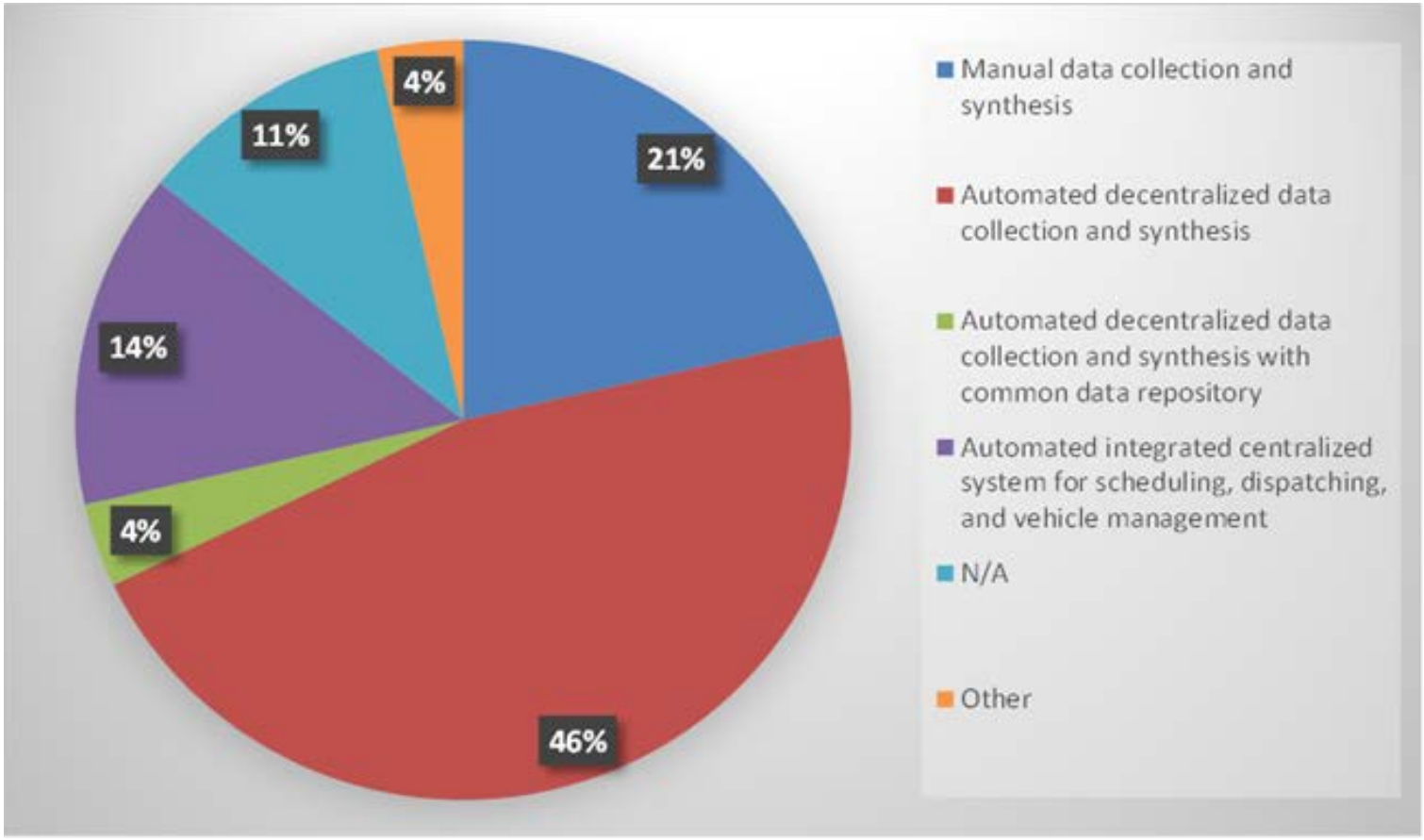
Source: Battelle

Vehicle Management System Functionality



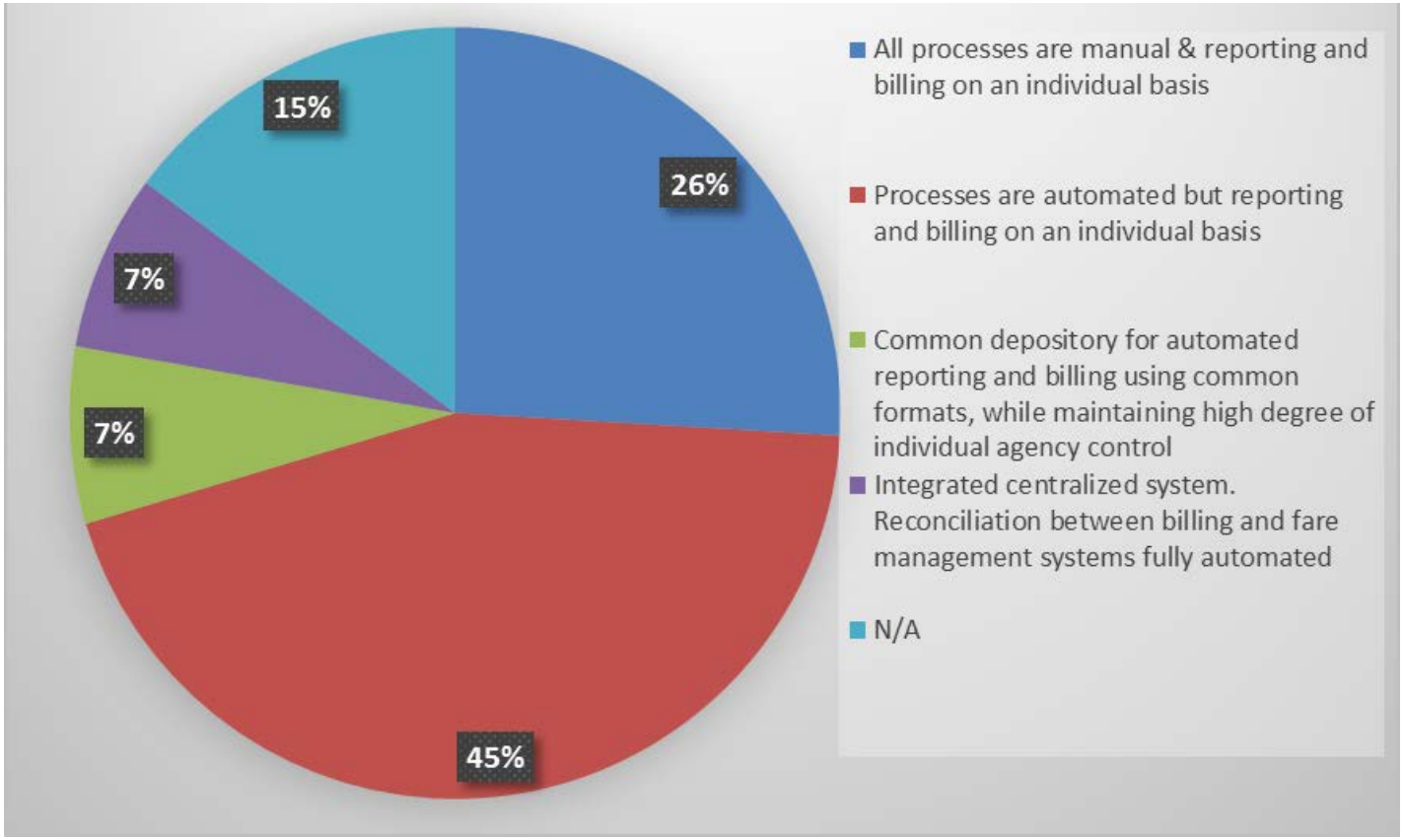
Source: Battelle

Data Management Functionality



Source: Battelle

Data Organization, Reporting and Billing



Source: Battelle

Findings

Automation Opportunity

- Several processes that could improve service coordination are not automated

User Needs Not Central

- User needs not always being considered in determining the need for technology as well as the development and validating of requirements

Internal Process Improvements

- There is an opportunity for agencies to improve their internal processes being used to deploy technology

Conclusions

Industry Needs to Better Understand Tech Potential

- There is still a need for agencies to understand the tools that are available to improve service coordination through the use of technology

Samples, Templates Help

- Agencies need concrete examples of peers that have successfully elicited user needs from stakeholders

Technology Training Required

- Technology training will continue to play a role in the success of technology implementations, specifically those that address coordinated transportation

Case Studies

1. Central Florida Regional Transportation Authority (LYNX) Model Orlando Regionally Efficient Travel Management Coordination Center (MORE-TMCC)
2. United Cerebral Palsy (UCP) / Ride-on Transportation San Luis Obispo (SLO) County TMCC
3. Regional Transportation District (RTD) Northwest Metro Denver Coordination System
4. Jacksonville Transportation Authority (JTA) TransPortal

1

LYNX MORE-TMCC

- Public transportation agency located in Orlando, FL
- Service area = 2,500 sq. miles
- Population = 1,873,359
- Annual ridership = 27,378,046
- Number demand response trips per month = 721,010

- Types of services:
  - Paratransit/demand responsive service
  - Fixed-route service
  - ADA paratransit service
  - Integrated demand responsive service for general public
- Number vehicles:
  - 313 fixed-route
  - 168 paratransit/demand response

1

MORE-TMCC

- Joint effort by region's transit providers and human service agencies
- Primary goal - to utilize existing resources to expand customers' transportation options
- System uses technologies already in use
- Supports and integrates additional transportation providers, human service agencies and funding sources
- Vendor-independent system promotes transferability

1 Determining Appropriate Technologies and Functional Requirements

- Service Coordination Challenges
  - Suppressed Demand
  - Complex Customer Communications
- Implemented
  - TMCC Customer Interface
  - Automated traveler information and/or trip planning systems
  - Vehicle communications
  - AVL

1 Determining Appropriate Technologies and Functional Requirements (cont'd)

- Functional/system requirements determined by engaging stakeholders and customers
- Technology procured via sole source to a vendor that was already working with LYNX

1 Process to Meet Requirements

- "Traceability" approach
- Regularly-scheduled meeting or phone call to discuss list of action items
- Payment milestones, signed off by agency before payment

1 Technology in Stages of Service Provision

- Customer access to **trip reservation** is automated hybrid centralized/decentralized (with manual option) approach
- **Trip eligibility** determined using manual centralized approach
- Centralized eligibility look-up database

1 Technology in Stages of Service Provision (cont'd)

- Customer-requested trip **scheduled** using shared scheduling platform with shared coordination
- Customer-requested trip **booked** and **confirmed** using automated centralized scheduling and booking
- Trip booking **confirmed** immediately to **customer**
- Method of confirmation depends on how the customer accessed the reservation system (i.e., by telephone, internet, or through a call agent)

1 Technology in Stages of Service Provision (concluded)

- **Vehicle management** is automated decentralized approach. Functionality includes:
  - Tracking vehicle location
  - Navigation guidance for the driver
  - Pre-defined driver reporting/messaging capability with time/location stamp from AVL system
- **Data managed** using automated decentralized approach with a common data repository

1 Project Impacts and Lessons Learned

Benefit / outcome:

- Providing easier access to services for customers
- Customer trip booking portal was made available to provide easier access for customer trip reservations
- Allowed customers to reserve their own trips, resulting in less phone hold times for other customers due to reduced phone demand

Key challenge:

- Project was not selected for a further funding award, causing a lack of engagement of the project partners

Lessons learned:

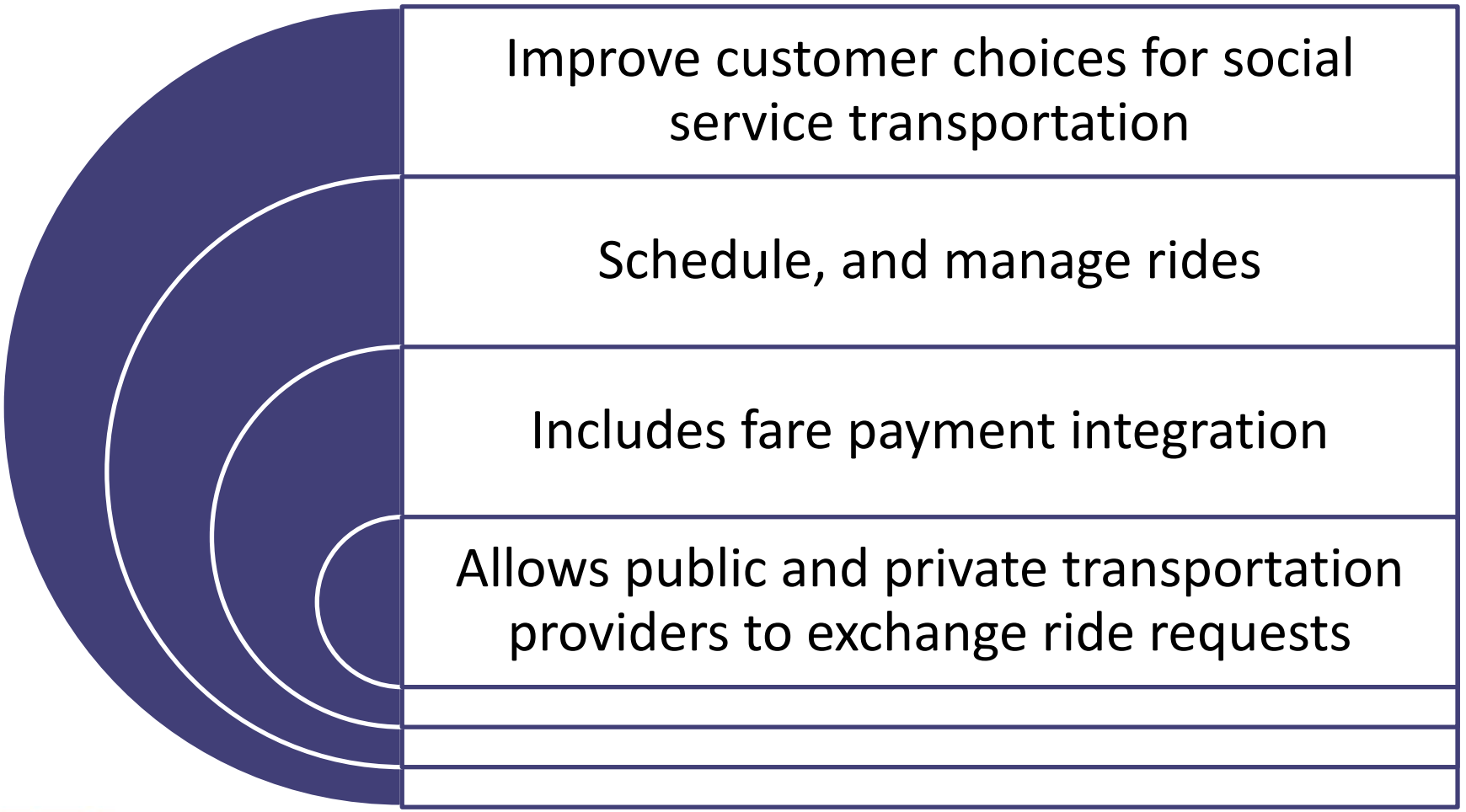
- Focus with a core team and not too many stakeholders as stakeholder group whittled itself down during the design process.
- Involve vendors early in the process, especially legacy vendors, and keep vendors informed of your expectations
- Ensure that each team member has an understanding of the project and the Systems Engineering process to be used

2

United Cerebral Palsy (UCP)/ Ride-On Transportation

- Human service transportation provider located in San Luis Obispo, CA
- Service area = 3,616 sq. miles
- Population = 458,000
- Annual ridership = 338,815
- Number demand response trips per month = 15,750
- Type of service: Paratransit/demand responsive
- Number vehicles:
  - 56 fixed-route
  - 42 paratransit/demand response

2 SLO County TMC



2 Determining Appropriate Technologies and Functional Requirements

Service coordination challenges

- Limited coordination among area providers
- Limited integration between HST and traditional public transportation
- Transportation information lacks private operators, cost for paratransit services

Functional/system requirements being determined by asking stakeholders and customers

2 Technology in Stages of Service Provision

- Plans automated, centralized **trip reservation** (with manual option)
- Customer web interface expected
- TDD, TTY and multi-lingual capability for automated systems

2 Technology in Stages of Service Provision (cont'd)

- **Automated, Centralized Trip eligibility** expected
- Expected to use **unified eligibility process**
- Unified certification portal and process that recognizes distinct eligibility rules of the different service providers
- Each provider will determine eligibility and the software will send the ride request to the provider

2 Technology in Stages of Service Provision (cont'd)

- Customer-requested trip expected to be **scheduled** using decentralized scheduling with a common trip-planning interface.
- Customer-requested trips **booked and confirmed** using automated decentralized marketplace booking and integrated confirmation
- Confirmation immediately provided to the customer or reservation agent
- Booked trip will be **dispatched** using automated decentralized approach

2 Technology in Stages of Service Provision (cont'd)

- **Vehicle management** expected to be automated decentralized approach
- Functionality expected to include:
  - Pre-defined driver reporting/messaging capability with time/location stamp from AVL system
- **Fare collection** system expected to use automated commercial decentralized approach
- Customer billing capability expected

2 Technology in Stages of Service Provision (concluded)

- Automated decentralized data management approach, similar to that used by LYNX.
- Service provision data expected to be organized and processed through automated decentralized approach

2 Project Impacts and Lessons Learned

Benefit / outcome:	• Increased coordination, better information for the customer, and on-line ride requests • Regional transportation providers are working together to create the TMCC
Key challenges:	• Application programming interface implementation • The cost associated with software systems • Resistance to change
Lessons learned:	• Technology that is currently available is not meeting the needs of their recently-determined system requirements • Agreements are being established between transportation providers and working on sending rides to each other even though the system is not in-place yet.

Regional Transit District (RTD)

- Public transportation agency located in Denver, CO
- Service area = 2,000 sq. miles
- Population = 2.3 million
- Annual ridership = 100 million
- Number demand response trips per month = 110,000
- Types of service:
  - Paratransit/demand responsive service
- Types of service (cont'd):
  - Fixed-route service
  - Route deviation service
  - ADA paratransit service
  - Integration of demand responsive service for general public
- Number vehicles:
  - 1,000 fixed-route
  - 400 paratransit/demand response
  - 230 other

RTD Northwest Metro Denver Coordination System

- Via/RTD MSAA project that coordinates Via Paratransit service with Call-n-Ride service in Longmont, CO.:
  - Via uses RouteMatch for trip scheduling; Call-n-Ride uses DemandTrans MobilityDR
  - Allows RTD and Via to transfer trips from one system/service to the other to maximize utilization of both resources
  - Will include Seniors' Resource Center in Thornton and Federal Heights, and Easy Ride in Broomfield

RTD Northwest Metro Denver Coordination System (Cont'd)

- Providing participating agencies' call centers with ability to book trips to the other agency's service:
  - In coordination with Denver Regional Mobility and Access Council (DRMAC) centralized data exchange
  - Will provide unified view of status of all vehicles in coordinated system.
  - Building this centralized data exchange as part of VTCLI project

3 Determining Appropriate Technologies and Functional Requirements

- Service coordination challenges:
  - Suppressed demand
  - Limited service area and hours
  - Complex customer communications
  - Limited coordination among area providers
  - Limited integration of human service transportation with traditional public transportation

3 Determining Appropriate Technologies and Functional Requirements (cont'd)

- Will implement automated trip exchange among service providers that will:
  - Determine need internally
  - Ask stakeholders and customers about their needs for improved service(s)
  - Determine their needs and options after seeing another agency with that technology

3 Determining Appropriate Technologies and Functional Requirements (cont'd)

- Functional/system requirements determined by:
  - Developing/determining requirements internally
  - Asking stakeholders and customers to help the agency determine system requirements
  - Using requirements from another agency that deployed the same technology/system
- Technology procured using sole-source award to existing vendor

3 Determining Appropriate Technologies and Functional Requirements (concluded)

- Process used to ensure technology/system met all requirements/specifications:
  - "Traceability" approach
  - Regularly-scheduled meeting or phone call

3 Technology in Stages of Service Provision

- Automated hybrid centralized/decentralized **trip reservation**,
- Customer-requested trip **scheduled** using decentralized scheduling with a common trip-planning interface, similar to the SLO County TMCC
- Customer-requested trips will be **booked and confirmed** using automated decentralized marketplace booking and integrated confirmation, similar to SLO County TMCC

3 Technology in Stages of Service Provision (cont'd)

- **Data management** uses an automated decentralized approach, similar to that used by LYNX and SLO County TMCC
- Data on service provision expected to be organized and processed for reporting and billing using automated decentralized approach similar to SLO County TMCC

3 Project Impacts and Lessons Learned

Benefit / outcome:	• Overcoming institutional barriers. This project established a mechanism for exchanging trips among providers • Trips can be made by people that otherwise would be unable
Key challenges:	• Agreeing on needed specifications suitable to all providers.
Lessons learned:	• Talk through technical aspects • Determine the common, minimum requirements • Determine what can be left out to get it started (don't need to include all the bells and whistles)

4 Jacksonville Transportation Authority (JTA)

- Public transportation agency located in Jacksonville, FL
- Service area = 798 sq. miles
- Population = 1,021,371
- Annual ridership = 13,317,000
- Number demand response trips per month = 30,833
- Types of service:
  - Paratransit/demand responsive service
- Types of service (cont'd):
  - Fixed-route service
  - Route deviation service
  - ADA paratransit service
  - Automated guideway and ferry service
- Number vehicles:
  - 150 fixed-route
  - 88 paratransit/demand response
  - 1 other

4 Jacksonville Transportation Authority (JTA)

- One Call/One Click Transportation Resource Center, provides a single point of access to plan and book regional and local multimodal travel

4 Determining Appropriate Technologies and Functional Requirements

- Service coordination challenges:
  - Complex customer communications
  - Limited coordination among area providers
  - Limited integration of human service transportation with traditional public transportation

4 Determining Appropriate Technologies and Functional Requirements (cont'd)

- Technologies deployed:
  - Automated scheduling, dispatching, and routing systems
  - TMCC Customer Interface
  - Automated traveler information and/or trip planning systems, particularly for customers with accessibility challenges
- Functional/system requirements determined internally and supplied from vendor that provides these technology/systems

4 Determining Appropriate Technologies and Functional Requirements (concluded)

- Procurement was competitive process
- To ensure that all requirements/specifications met, used payment milestones – each must be completed in full to the agency's satisfaction

4 Technology in Stages of Service Provision

- Reservation through automated centralized approach (with manual option), similar to SLO County TMCC's approach
- One interface included for automating **customer access** to reservation system is web portal (with potential for web-based mobile device)
- **Trip eligibility** determination approach is manual centralized, similar to that of LYNX.

4 Technology in Stages of Service Provision (concluded)

- Customer-requested trip **scheduled** using centralized scheduling
- Customer-requested trips will be **booked and confirmed** using an automated centralized scheduling and booking, similar to LYNX's MORE-TMCC

4 Project Impacts and Lessons Learned

Benefit / outcome:

- One-Click web application helps agencies support the mobility needs of all segments of the populations they serve
- Uniquely incorporates Demand Responsive Transport trip options, based on a rider's eligibility characteristics and any required special accommodations
- Unified regional trip planning
- Improved access to diverse transportation services

Key challenges:

- Ensuring provider information is up-to-date

Lessons learned:

- Plan for continual training of project partners
- Thoroughly investigate project partners' technological capabilities

Overall Case Studies Results

A. TMCC stakeholders may require training to understand, adopt, and value the systems engineering approach to planning, developing, and deploying TMCCs

B. TMCC stakeholders, regardless of their technical know-how, play a crucial role in TMCC development and deployment – without their participation in identifying needs, verifying requirements, and testing, TMCC deployments are not necessarily successful

C. TMCCs can enable changes in transportation services and result in higher ridership due to higher levels of service coordination and improved information

D. TMCC sustainability is not necessarily based on technology – it is more based on industry evolution and standardization

Key Conclusions

Systems Engineering	A systems engineering approach results in a TMCC/system that meets users' needs
Partnerships and stakeholder engagement	Partnerships and stakeholder engagement are critical to successful TMCC/system deployment, but they require leadership and significant efforts to foster and maintain, as well as to encourage useful participation and critical input throughout the whole process
Institutional challenge	Biggest challenges in TMCC/system development and deployment typically are institutional in nature, not technological
Phasing deployment	Phasing the TMCC/system deployment can ensure that something useful is delivered as soon as possible, and the impacts resulting from new system can be experienced a little at a time

Key Resources

- Mobility Services for All Americans (MSAA) Article #1: Deploying Technology to Facilitate Service Coordination: Making it Work, https://www.its.dot.gov/research_archives/msaa/index.htm
- MSAA Case Study Report, December 2017, https://www.its.dot.gov/research_archives/msaa/index.htm
- Reference Manual for Planning and Design of a Travel Management Coordination Center (TMCC) https://www.transit.dot.gov/sites/fta.dot.gov/files/docs/research-innovation/115076/ftareportno0117.pdf
- "Technical Leadership in Systems Engineering," SEBoK: Guide to the Systems Engineering Body of Knowledge, http://sebokwiki.org/wiki/Technical_Leadership_in_Systems_Engineering, accessed December 12, 2017

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