Improving Transit Integration Among Multiple Providers, Volume II: Research Report

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TRANSIT COOPERATIVE RESEARCH PROGRAM

TCRP REPORT 173

Improving Transit Integration Among Multiple Providers

Volume II: Research Report

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TRANSIT COOPERATIVE RESEARCH PROGRAM

The nation's growth and the need to meet mobility, environmental, and energy objectives place demands on public transit systems. Current systems, some of which are old and in need of upgrading, must expand service area, increase service frequency, and improve efficiency to serve these demands. Research is necessary to solve operating problems, to adapt appropriate new technologies from other industries, and to introduce innovations into the transit industry. The Transit Cooperative Research Program (TCRP) serves as one of the principal means by which the transit industry can develop innovative near-term solutions to meet demands placed on it.

The need for TCRP was originally identified in *TRB Special Report 213—Research for Public Transit: New Directions,* published in 1987 and based on a study sponsored by the Urban Mass Transportation Administration—now the Federal Transit Administration (FTA). A report by the American Public Transportation Association (APTA), Transportation 2000, also recognized the need for local, problem-solving research. TCRP, modeled after the longstanding and successful National Cooperative Highway Research Program, undertakes research and other technical activities in response to the needs of transit service providers. The scope of TCRP includes a variety of transit research fields including planning, service configuration, equipment, facilities, operations, human resources, maintenance, policy, and administrative practices.

TCRP was established under FTA sponsorship in July 1992. Proposed by the U.S. Department of Transportation, TCRP was authorized as part of the Intermodal Surface Transportation Efficiency Act of 1991 (ISTEA). On May 13, 1992, a memorandum agreement outlining TCRP operating procedures was executed by the three cooperating organizations: FTA, the National Academies, acting through the Transportation Research Board (TRB); and the Transit Development Corporation, Inc. (TDC), a nonprofit educational and research organization established by APTA. TDC is responsible for forming the independent governing board, designated as the TCRP Oversight and Project Selection (TOPS) Committee.

Research problem statements for TCRP are solicited periodically but may be submitted to TRB by anyone at any time. It is the responsibility of the TOPS Committee to formulate the research program by identifying the highest priority projects. As part of the evaluation, the TOPS Committee defines funding levels and expected products.

Once selected, each project is assigned to an expert panel, appointed by the Transportation Research Board. The panels prepare project statements (requests for proposals), select contractors, and provide technical guidance and counsel throughout the life of the project. The process for developing research problem statements and selecting research agencies has been used by TRB in managing cooperative research programs since 1962. As in other TRB activities, TCRP project panels serve voluntarily without compensation.

Because research cannot have the desired impact if products fail to reach the intended audience, special emphasis is placed on disseminating TCRP results to the intended end users of the research: transit agencies, service providers, and suppliers. TRB provides a series of research reports, syntheses of transit practice, and other supporting material developed by TCRP research. APTA will arrange for workshops, training aids, field visits, and other activities to ensure that results are implemented by urban and rural transit industry practitioners.

The TCRP provides a forum where transit agencies can cooperatively address common operational problems. The TCRP results support and complement other ongoing transit research and training programs.

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FOREWORD

By Lawrence D. Goldstein
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TCRP Report 173: Improving Transit Integration Among Multiple Providers presents a comprehensive set of guidelines and procedures to assist transit agencies in evaluating, planning, and implementing steps to integrate transit services in areas with multiple transit providers. The report comprises two volumes: the Transit Integration Manual and the Research Report. Together, these documents can help guide the process of transit service integration by (1) showing the benefits of integration; (2) illustrating the range of potential types of integration activities; and (3) describing procedures necessary to carry out integration efforts, including tips for success.

This report will be of interest to transit operators, metropolitan planning organizations, and others interested in the coordination and integration of transit services to improve customer service in areas with multiple transit providers.

In many transit service regions, individual travel needs often extend beyond the service area of a single public transportation agency. As a result, a high percentage of public transit riders in these service areas use systems that interface with at least one other public transportation provider. These conditions occur not only in larger metropolitan areas but also in smaller communities; yet, full coordination of operations and services to meet these travel needs and service delivery challenges is often the exception.

Under TCRP Project H-49, Nelson\Nygaard was tasked (1) to identify and document the motivations, benefits, and barriers to public transportation coordination and integration that facilitate seamless travel in areas with multiple transit service providers and (2) to provide guidance on how to integrate and coordinate delivery of transit services in areas with multiple transit providers.

The Transit Integration Manual describes a range of possible integration activities, potential benefits of integration, and related management responsibilities for efficient delivery of integrated transit services. The Research Report reviews the steps used to prepare the Manual and, in a set of appendixes, provides detailed case studies and summarizes supporting literature that served as a background for the research project. The appendixes also include suggested guidance on overall evaluation of transit integration activities.

By reviewing and evaluating lessons learned from past efforts, this report provides guidance to assist agencies in getting started and increase their chances of success in providing fully integrated transit service in areas with multiple transit providers.

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SUMMARY

Improving Transit Integration Among Multiple Providers: Research Report

Study Overview

TCRP Project H-49, "Improving Transit Integration Among Multiple Transit Providers," set out to accomplish two goals:

1. To conduct original research and prepare a report that identifies and documents the motivations, benefits, and barriers to public transportation coordination and integration that facilitates seamless travel, reflecting the viewpoints of all stakeholders; and
2. Based on that report, to provide guidance on how to integrate and coordinate delivery of a public transportation system in a multi-service region.

The challenge with integration lies in balancing transit operators' interest in expanding their markets and improving service efficiency and effectiveness with a natural reticence to change existing practices and policies that could disrupt smooth functioning of the system on a day-to-day basis and challenge agencies' delicate financial stability. The importance and difficulty of striking this balance is a theme throughout this study.

The research team took a multi-step approach to tackling this topic, starting with a review of literature written on the subject and a high-level analysis of 19 examples where transit agencies have successfully undertaken integration and/or coordination, documented as "agency profiles." The analysis looked at motivations, keys to success, and outcomes to derive lessons learned. During this first phase of research, in recognition of the fact that integration among multiple transit providers is an expansive topic, the research team established a research framework of five transit integration focus areas to organize and understand findings throughout the study:

- **Customer-Oriented Focus Areas**
  1. Services
  2. Fares
  3. Marketing/Customer Service and Information
- **Agency-Oriented Focus Areas**
  4. Operations, Maintenance, and Assets
  5. Administration/Procurement

The team then dug much deeper into a subset of these 19 examples. Six exemplary cases were selected as the most illustrative of successful integration across the range of focus areas, and because they represented a mix of system sizes and types, and U.S. locations with varying geographic characteristics. This in-depth case study approach was carried out because it offers a rich set of information on motivations (e.g., cost considerations, service improvements, political climate) as well as challenges, agency staff and customer experience, and outcomes. The site visits allowed research team members to thoroughly examine the coordination

experience in each community, where they conducted several hours of interviews with a wide variety of stakeholders involved in these projects. The case study sites were as follows:

- Phoenix Metropolitan Region, AZ
- Butte County, CA
- Minneapolis–Saint Paul (Twin Cities), MN
- Research Triangle, NC
- McAllen, TX
- Central Puget Sound Region, WA

The findings from the case studies were the primary source for this report, supplemented with information gleaned from the profiles and literature review. The case studies also informed the other significant product of this research, Volume I, the Transit Integration Manual that provides step-by-step implementation guidance for agencies that desire to move forward with service and system coordination.

Overview of Findings

The research suggests there are many real and substantive benefits that result from integration; this is particularly true for customers, but benefits also accrue to transit agencies and external stakeholders, such as community downtowns and Main Streets. In addition, beyond benefits acknowledged and celebrated by transit operators and stakeholders, there are also a host of intangible benefits that integration projects offer. In both cases, benefits are difficult to measure.

The research also suggests that the challenges associated with carrying out a coordinated multi-agency effort cannot be understated; projects require time, patience, and commitment as agencies resolve many important details associated with facilitating successful long-term collaboration. In particular, challenges related to local control, autonomy, and revenue sharing/funding are common obstacles. Among the most important factors leading to successful integration is leadership. A strong leader is critical to bring stakeholders to the table, champion the project, build trust, and maintain momentum through setbacks and challenges.

This report includes a discussion of common benefits of integration projects, common challenges encountered and strategies to overcome them, overarching issues related to integration efforts, and lessons learned. The report also includes a chapter assessing the costs and benefits of the 19 profiles and the six case studies conducted for this research. Key lessons learned are summarized here.

Benefits that Can Be Expected

In undertaking collaborative projects, better customer service is the most likely outcome. These efforts are critical for public transit to be a more user-oriented, competitive travel option. Although systemwide ridership increases often cannot be directly attributed to integration efforts alone, cross-boundary travel between two or more systems can increase ridership in submarkets, resulting in greater transit mode share. Further, by working together to ensure strong operational performance, transit providers can also create economic benefits for the wider region. Easy-to-use transit encourages more people to ride or ride more frequently, leading to increased access to jobs. Businesses also benefit when customers have enhanced access to their services, and the combination of these transit impacts can create a more vibrant community. These regional benefits in turn increase public support for public

transit and can generate political leverage for funding and policy initiatives to support enhancing the transit system. These types of benefits can be some of the most elusive and difficult to measure but were widely cited as key benefits by stakeholders across the case studies.

In some cases, the partnerships that have been built through the process of implementing a coordinated project have prompted more robust regional cooperation on a variety of other issues that benefit customers. Creating partnerships allows staff to meet and discuss common concerns about other shared issues. In this way, coordination can become a part of everyday operations for many transit agencies instead of an afterthought.

Unlike the above benefits, cost savings is a frequent driver of coordination and integration efforts, but anticipated savings may not be fully realized. The process of setting up a project costs money in terms of staff time, infrastructure, hiring consultants, and conducting studies; though some savings may accrue from increased efficiencies, the final outcome may actually be more expensive on an ongoing basis than the status quo. To explore this issue further, the research team conducted an assessment of the costs and benefits of the profiles and case studies. The principal finding was that traditional quantitative, data-driven cost–benefit analyses, especially for complex, multi-year, multi-agency efforts, may not be possible or meaningful. Nevertheless, it is important for agencies to establish goals and estimate both the anticipated costs and the anticipated savings at the outset of an integration effort so that expectations can be managed and success can be fairly reported. This pre-planning process allows agencies to evaluate qualitatively whether goals have been achieved post-implementation and to allow for any needed adjustments to the project.

Confronting Challenges

The primary challenges fall under two related categories: local control and funding.

Giving up local control over the operation of a transit agency and "turfism" are two of the most prevalent barriers to integration. Resistance to giving up local control is most often based on a concern that a community would lose its decision-making power and be disadvantaged in a larger pool of decision makers. How projects dealt with issues of local control and autonomy was one of the biggest factors that differentiated the case studies.

Each case study offers a different governance approach. The places that have been most successful accomplishing their integration vision have created processes where all transit providers, especially smaller providers, believe their interests are adequately represented and that their voices are heard. In most cases of success, stakeholders built inclusive and broadly representative structures and processes that were trusted by stakeholders. Bottom-up strategies tended to yield more long-lasting results than centralized or top-down approaches.

Figuring out how to equitably allocate costs and revenues so that every agency feels it is getting its fair share of revenue (or cost savings) and paying its fair share of costs is a challenge that arose in every case study. Case study sites developed different tools to address this challenge:

1. Butte County: A cost-sharing model based on population and ridership
2. Phoenix Metropolitan Area: A regional equity mechanism for tax distribution
3. Twin Cities: A regional operating revenue allocation model
4. Research Triangle: A contractual merger and a shared benefits analysis
5. Central Puget Sound Region: A revenue allocation model based on relative fare levels

Ultimately, the strategy undertaken depends on the specific type of integration project undertaken and issues unique to each region. However, in all cases, leaders must acknowledge the sensitivity of this issue and the importance of finding a mutually agreeable solution

that all participants believe to be fair. Anything short of that risks losing agency buy-in and can undermine the likelihood of project success.

Another key factor in overcoming the challenges related to integration efforts is having a regional agency with integration as a key part of its mission. These processes take time to get buy-in from all the partners, to sort through all the detailed business practices, and to review operations issues that integration efforts require. It is valuable to have a regional agency that can take on project management responsibilities, be the keeper of project records, and keep the ball rolling by reminding stakeholders of the benefits of regionalization when challenges arise.

Lessons Learned

Lesson One: Prioritize the Customer Experience

Transit provision is first and foremost a service industry. This research found that whether providers were seeking more integration or resisting integration, the underpinning of their rationale was to provide better customer service. This means that any move toward improving transit integration among multiple transit providers must address *why* changes to the status quo will benefit their passengers, and these benefits must be transparent to all partners involved. It is clear from these six case studies that transit agencies can achieve some success in integrating when they put the customer first.

Lesson Two: Collaboration Succeeds when Implementation Is Incremental

In many cases, coordination efforts were most successful when they evolved gradually over time. Agencies often were not ready to commit to full integration efforts at the start. By working together over time, staff and leaders built trust, established a step-by-step track record of success, and came to understand—and "buy in" to—the benefits of integration. In places where agencies moved quickly and skepticism has remained, integration has been more challenging.

Lesson Three: Strong Local Leadership Is Needed to Sustain an Integration Effort

The case studies underscore the importance of local leadership that is *committed* to the value of integration for its community. When that commitment is present, the leadership needs to be involved for the long term, because integration rarely happens quickly. Leaders need to be flexible and willing to change directions if the followers are not behind them as they keep their eyes on the ultimate goal of better service for their constituents; leaders must have a degree of humility to put greater goals before their own. Willingness of large agencies to cede some of the power inherent in their size and put themselves on an equal footing with smaller agencies can be very important to getting and keeping everyone at the table.

Lesson Four: Broadening the Pool of Stakeholders Leads to More Widespread Acceptance

Including all key stakeholders and giving them decision-making power in the process proved essential to success in most of the case studies. Further, stakeholders must have equal access to the process, information, and project leadership. A broader decision-making group can have the effect of slowing a project down, but many of these integration efforts could

not have been accomplished without this "grassroots" approach. The failure proves the rule: where stakeholders have felt excluded or not respected, coordination efforts have faltered.

A diversity of stakeholders ensures the following:

- Projects are not dominated by a single interest or stakeholder group and the needs and perspectives of a broader range of users are included in project design.
- A large base of support that can sustain the project through challenges. In particular, thinking broadly about partnerships—law enforcement, firefighters, retailers, nonprofit organizations, the business community—can avoid problems later in implementation and can build advocates if controversy arises.

Lesson Five: Create Processes that Develop Trust Among Stakeholders

Where projects succeeded, cultivating trust and respect among project stakeholders was cited as an important factor. Establishing problem-solving processes or methods that are transparent, inclusive, and effective gives stakeholders and policymakers confidence that, as problems arise, there are systems in place to balance competing interests. Committees need to be representative of all stakeholders involved, with some degree of power to guide projects and a clear line of reporting back to the regional decision-making body.

Lesson Six: Maintain a Level of Local Control

Stakeholders need to determine the baseline components of a coordinated process that cannot be sacrificed. Beyond these baseline components, flexibility can be granted to ensure participants that they can retain some local identity and are not being entirely subsumed into the regional process. This flexibility was used in the case studies in a number of ways: agreeing on minimum performance standards, allowing local control over fare changes, developing cooperative agreements instead of top-down mandates, negotiating formulas to prioritize projects, and creating subcommittees to determine local versus regional details of joint projects.

Flexibility can ensure that issues that are primarily local in nature remain in the purview of the local agencies. This is important for long-term working relationships among the stakeholders involved in collaborative efforts.

Lesson Seven: Set Goals and Document Anticipated Outcomes at the Outset of the Integration Process

Setting goals and documenting anticipated outcomes—costs, savings, ridership gains—will help to determine whether to stay the course or make changes as the project is implemented. Communicating financial information clearly throughout the project will build trust among participants. Project evaluation is a useful and effective tool to demonstrate the value of the project to decision makers, funding agencies, and the public and to make adjustments mid-stream to improve project outcomes.

Lesson Eight: Benefits May Outweigh Additional Costs Incurred in Integration

Integration projects do not necessarily result in cost savings and may incur additional costs. Cost reduction is often a primary impetus for working toward transit integration. Many transit agencies have found, however, that integrating transit systems, programs, and

services does not necessarily result in cost savings and can in fact lead to increased costs. This is often because successful transit integration requires effort on the part of individuals at all participating agencies over an extended period of time which comes at a cost of time, money, and other resources. Sometimes these are only upfront costs and, over time, costs do go down as a result of integration. However, even in cases where projects result in permanently higher costs due to increased project management or ongoing coordination activities, the majority of the agencies studied in the research viewed the benefits of integration efforts as worth the additional costs they incur. In particular, they often cited the more qualitative benefits that cannot be readily measured such as a superior passenger experience, improved access to regional locations, and increased public and political support for transit.

Conclusion

In 2012, the United States recorded its second highest transit ridership since 1957, according to the American Public Transportation Association (APTA). Convergence of this growing interest in transit with a reduced funding environment creates a ripe climate for transit agencies to pursue increased integration among multiple providers. By partnering with neighboring providers, transit agencies may be able to address shrinking funding without decreasing overall service. These same partnerships may actually improve service for riders by transporting them to desired destinations previously inaccessible because of jurisdictional boundaries. With the benefit of lessons learned by successful peer agencies, the findings of this research project will help agencies shorten the learning curve of transit properties wishing to advance integration in their regions.

CHAPTER 1

Background and Overview

Problem Statement

The study was initiated to address the following observed problem(s) in the public transportation sector, as stated in the request for proposals issued by TRB:

> More than 90% of U.S. public transportation riders are served by systems that interface with at least one other public transportation provider. This condition occurs especially in larger metropolitan areas, but is also true in smaller communities. Individual travel needs often extend beyond the service area of a single public transportation agency, yet full coordination of operations and services to meet those travel needs is the exception in the United States. This is in contrast to the seamlessness that exists in our street and road systems, where every city, county and state government is responsible for portions of the system; yet, the connected system allows an individual to drive from any point to any point without regard to the multiple agencies involved. In some cases, lack of public transportation integration results in inferior service to existing customers and lost opportunities to attract new customers. In other cases, duplicate services offered by multiple organizations waste resources that could be deployed more effectively. Efforts to improve integration have often generated significant increases in transit ridership; however, at times those efforts have been piecemeal, generally focusing on only one element of integration, such as fares. In other developed countries, a comprehensive or universal approach to integration is more common.

TCRP Project H-49, "Improving Transit Integration Among Multiple Transit Providers" set out to accomplish two goals:

1. To conduct original research and prepare a report that identifies and documents the motivations, benefits, and barriers to public transportation coordination and integration that facilitates seamless travel, reflecting the viewpoints of all stakeholders
2. Based on that report, to provide guidance on how to integrate and coordinate delivery of a public transportation system in a multi-service region

An 11-person TCRP panel was formed to guide the study, consisting primarily of staff at transit agencies as well as a several other professionals in the field.

The research team took a multi-step approach to tackling this topic, fully described in Chapter 2, Research Approach. Along with this Research Report, the research team produced the Transit Integration Manual, a step-by-step implementation guide to provide practical, accessible information and resources.

Overview of Public Transit Integration and Coordination

Increasing the coordination, integration, and in some cases, consolidation, of public transit services has been a critical topic for metropolitan planning organizations, transit agencies, cities, and counties over the last several decades. Prolonged budget shortages have increased policymakers' interest in encouraging cooperation and integration as a strategy to improve efficiencies

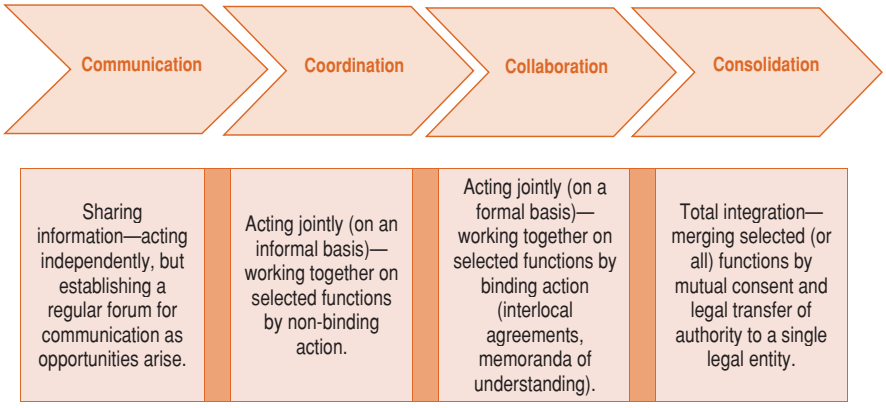
and, in particular, create cost savings. Fiscal challenges also overlap with changing travel patterns that have become increasingly regional in nature; the combined effect of these two factors has led cities and regions to take stock of the inter-connectedness of the system, beyond the performance of an individual operator, to evaluate service delivery structures, efficiency, connectivity, and service gaps.

Integration promises many benefits for consumers and agencies including lower costs, increased service efficiency, an expanded transit network, an improved rider experience, and increased ridership. These goals have led some regions to work toward integration of services to create a more seamless system in terms of how riders pay for fares, transfer between routes, and access information about what is available. Indeed, transit riders do not think of travel in terms of jurisdictional boundaries or agency ownership, but in terms of origins and destinations. Successful integration can create a system that feels unified to the rider.

Activities that further integration among multiple transit providers can occur along a continuum, moving from simple communication to actions that are jointly coordinated, then to collaboration formalized in agreements, and finally to consolidation of some or all functions. This "continuum of integration" is illustrated in Figure 1-1.

Despite laudable goals and efforts to coordinate, increasing service coordination and integration is not necessarily easy and, in nearly every case, requires agencies and local communities to relinquish some degree of control over operations and oftentimes requires agencies to share limited resources. In addition, projects are risky, or perceived as risky, and to be successful efforts require significant staff time. Another challenge is competing priorities at transit agencies: transit agencies are committed to serving passenger needs and being a regional resource that supports quality of life, equity, economic prosperity, and urban form; however, on a day-to-day basis, they are often largely concerned with keeping the buses/trains running on time, balancing budgets, and ensuring the safety of their passengers. During times of fiscal crisis, as in the past five or more years, while interest in engaging in coordination increases, the pressures against transit integration mount as financial and staff resources become strained.

The challenge, therefore, with integration lies in balancing transit operators' interest in expanding their markets and improving service efficiency and effectiveness with a natural reticence to change existing practices and policies that could disrupt smooth functioning of the system on a day-to-day basis and challenge agencies' delicate financial stability. The importance and difficulty of striking this balance is a theme throughout this study.



Adapted and modified from North Carolina Department of Transportation, KFH Group, Inc. 2012. Statewide Regionalization Study Final Report. As requested in Session Law 2011-145, Section 28.21.

Figure 1-1. Continuum of integration.

Overview of Final Report

Chapter 2 describes in more detail the approach that the research team took to this topic.

Chapter 3 relates the principle findings of this research, drawing broad conclusions and calling out common themes that emerged from the research with particular focus on common benefits and challenges agencies can encounter in embarking on transit integration projects; how some of the most challenging issues can be addressed; and the lessons learned from the research that are applicable to other transit agencies interested in improving coordination and integration.

Chapter 4 describes key lessons learned from assessing the costs and benefits of the project profiles and case studies which were the foundation of this research. (The Guide for Evaluation of Transit Integration Projects is included in the appendixes as a companion to Chapter 4.)

Chapter 5 summarizes the principle conclusions reached by the research team and suggests some areas for future research.

The appendixes comprise full case studies for the six agencies where site visits were conducted; profiles of 19 agencies; a review of relevant literature; and the Guide for Evaluation of Transit Integration Projects. The appendixes are available on the TRB website (http://www.trb.org/Main/Blurbs/171657.aspx).

CHAPTER 2

Research Approach

Introduction

Many transit agencies across the United States are working with each other to create effective, efficient regional transit networks and to make it easier for their riders to travel across boundaries and between systems. Four key tasks were undertaken in this research to document these efforts by transit agencies:

- The team researched examples of transit integration/coordination across the country and selected 19 exemplary integration efforts to document as "agency profiles," including two international examples.
- A far-reaching literature review was developed to describe not only the scope of transit coordination and integration but also the depth of knowledge that has been generated on this topic.
- In-depth case studies were conducted to thoroughly examine the coordination experience in six communities selected by the TCRP project panel from the 19 profiles. During the site visit, the research team conducted several hours of interviews with a wide variety of stakeholders involved in these projects. They also toured facilities and observed operations.
- Costs and benefits were assessed for the project profiles and case studies, including a detailed cost–benefit assessment of the ORCA integration effort in Oregon's Central Puget Sound region.

During the first phase of research, recognizing that integration among multiple transit providers is an expansive topic, the research team created five focus areas to organize the breadth of potential integration activities into the following clear and simple framework.

Focus Areas

Customer-Oriented Focus Areas

1. **Services:** This focus area includes the coordination of transit services that are perceptible to a transit rider. These projects are mostly focused on efforts that affect "wheels on the road" rather than operational issues and assets that would not be directly perceived by transit riders in their daily use of a system. This could include efforts such as timed transfers, coordinated modal connections, and jointly operated routes and services.
2. **Fares:** This focus area includes anything related to fare policy, fare media, coordinated fare structures, discounted transfers, universal fare cards, and universal transit passes.

3. **Marketing/Customer Service and Information:** This focus area includes anything related to customer interfaces such as marketing materials, website development, customer call centers, transit trip planning resources, mobility management, and coordinated signage and wayfinding. This does not include efforts related to fares, which fall into the prior category.

Agency-Oriented Focus Areas

4. **Operations, Maintenance, and Assets:** This focus area includes coordination and integration efforts that relate to the transit agency's operations and the construction and/or maintenance of capital assets and infrastructure. It is distinguished from services because it primarily represents the perspective of a transit agency rather than that of a transit rider. In other words, the focus is less on "wheels on the road" and more on the fixed assets of an agency and the operational issues that occur behind the scenes. For example, whereas coordinated transfers would fall under Services (the first focus area), the development and operation of a station that is shared by multiple agencies would appear in this fourth focus area. Efforts under this area could include sharing of vehicles, station development and maintenance, technologies, or vehicle maintenance functions. Transit agency consolidation would be included in this focus area even though consolidation would encompass a number of other focus areas.
5. **Administration/Procurement:** This focus area includes subjects related to administrative issues and back office functions such as procurement (including vehicles), administrative services, capital and long-range planning, lobbying for and acquiring joint funding, and staff training and human resources. Many of these efforts will be directed toward cost-saving measures that are achieved through bulk purchases and/or sharing resources across multiple partners.

Agency Profiles

The 19 transit agency profiles were used as a tool to inform the research team and panel in selecting case studies for further research. The profiles include efforts to improve system connectivity and usability through better coordination of schedules, fares, and branding across multiple transit providers. They also include examples of resource sharing, transit cooperatives that lobby for funding, joint procurement, joint station and route development, and other "behind the scenes" coordination less visible to the riders.

Figure 2-1 shows the locations of the 19 profile sites and six case study sites, which were selected by the TCRP project panel from the profiles. The profiles are summarized in Table 2-1. Many of the profiles cover multiple focus areas; however, the research team selected only the one or two focus areas that best reflect the main impetus for the coordination/integration effort. Full profiles are included in Appendix H.

Literature Review

The research team surveyed over 100 documents, including reports, conference proceedings, and academic papers on a range of relevant topics about transit integration. The review showed that objective evaluations of integration practices are difficult because of a lack of quantitative data and the complexity of accounting for certain costs and benefits. However, most evidence

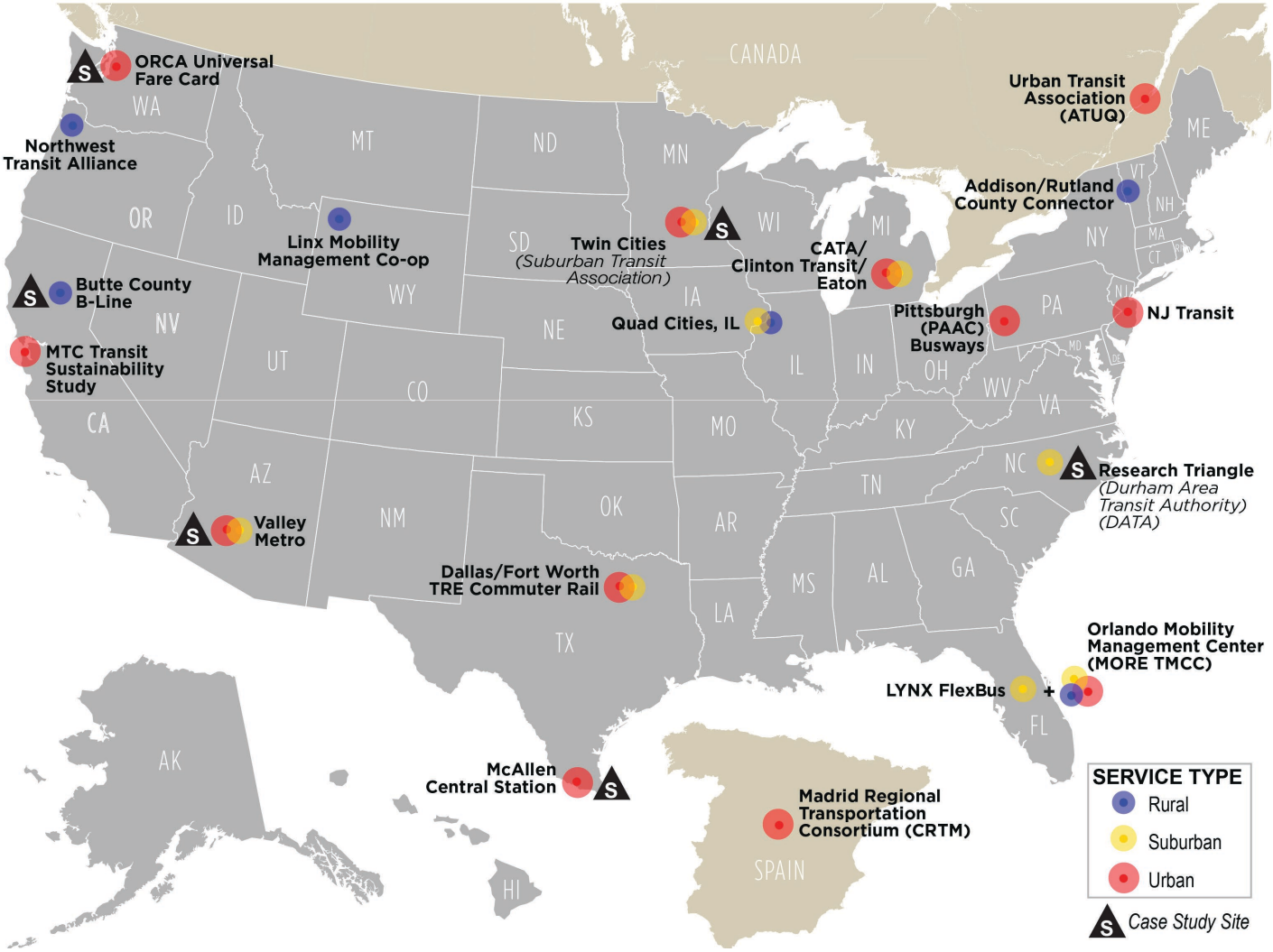


Figure 2-1. Map of transit integration and coordination locations used for agency profiles and case studies.

suggests that integration practices are typically net positive developments wherever they are applied. The challenges of integration, which can be significant, may be underrepresented in the literature. It is an ongoing, often difficult process that engages agencies with different cultures, policies, and personalities. Mutually establishing a well-defined goal or set of goals at the outset is vital for keeping collaboration activities oriented to and measurable against a desired result. The literature makes it clear that specific integration activities must be carefully adapted to their context. The full literature review can be found in Appendix G.

Case Studies

The research team conducted site visits during the summer of 2013 to six regions of the country where multiple transit agencies have exhibited successful levels of coordination/integration. These six sites were selected by the TCRP project panel from 19 profiles of notable examples of integration previously developed by the research team. From the 19 profiles, the "best" case study candidate(s) within each focus area was(were) selected. Ensuring a representative mix of system sizes and types and broad geographic representation were also considerations in site selection.

Table 2-1. Summary of agency profiles and focus areas.

No.	Name of Integration Example	Transit Agency/ Agencies Profiled	City/ Jurisdiction	State/ Country	Description	Focus Area				
						Services	Fares	Marketing/Cust. Service & Info.	Ops/ Maintenance/ Assets	Admin./ Procurement
Domestic										
1	Valley Metro	Valley Metro	Maricopa County	Arizona	Unified market and branding; ongoing unification efforts.			X		
2	Butte County B-Line	Butte Regional Transit (B-Line), Chico Area Transit, Oroville Area Transit, Butte County Transit	Butte County	California	Consolidation of six systems into one unified system.	X				
3	MTC Transit Sustainability Study	Metropolitan Transportation Commission, AC Transit, BART, Caltrain, Golden Gate Transit, Golden Gate Ferry, SamTrans, SF Muni, Santa Clara VTA	San Francisco Bay Area	California	MPO mandate for cost reductions and for increased regional coordination.	X				X
4	LYNX FlexBus	Central Florida Regional Transportation Authority (LYNX)	Orlando	Florida	Use of technology to serve suburban riders according to user requests in real-time rather than fixed route/schedule.	X			X	
5	Model Orlando Regionally Efficient Travel Management Coordination Center (MORE TMCC)	LYNX, Polk County Transit, Citrus Connection, six human service agencies	Orlando	Florida	Use of web-based scheduling system to foster coordination of fares, fare policy, service delivery, and cost sharing between public transit, human service agencies, and veterans' services.	X		X		
6	Quad Cities	Rock Island County Metropolitan Mass Transit District (MetroLINK), Bettendorf Transit, Citibus	IA: Davenport, Bettendorf IL: Rock Island, Moline	Iowa and Illinois	Universal fare card and creation of a riverfront circulator that serves four city downtowns in two states.	X	X			
7	CATA/Clinton Transit/Eaton	Capital Area Transportation Authority, Clinton Transit, Eaton	Lansing	Michigan	Coordinated transfers at county borders; joint vehicle procurement.	X				X
8	Suburban Transit Association (STA)	Southwest Metro Transit, Plymouth MetroLink, Maple Grove Transit, Minnesota Valley Transit Authority, Shakopee Transit, Prior Lake Transit, Metro Transit	Eden Prairie, Plymouth, Maple Grove, Minneapolis, St. Paul	Minnesota	Integrated regional fare structure and joint information and marketing.		X	X		
9	NJ Transit	New Jersey Transit	Statewide	New Jersey	Trenton Transit Center hosting multiple operators; passenger information about multiple operators; development of the "Capitol Connector," co-branded buses serving downtown Trenton.			X	X	

(continued on next page)

Table 2-1. (Continued).

No.	Name of Integration Example	Transit Agency/ Agencies Profiled	City/ Jurisdiction	State/ Country	Description	Focus Area				
						Services	Fares	Marketing/Cust. Service & Info.	Ops/ Maintenance/ Assets	Admin./ Procurement
10	Durham Area Transit Authority (DATA)	Cities of Durham, Raleigh, Chapel Hill, Cary, and North Carolina State University and Triangle Transit Authority	Durham, Raleigh, Chapel Hill, and Cary	North Carolina	Development of a regional call center, joint marketing, joint procurement, a regional fare program, and a joint maintenance facility.	X			X	
11	Northwest Transit Alliance	Columbia County Rider, Sunset Empire Transportation District, Tillamook County Transportation District, Benton County Transit, Lincoln County Transit	Columbia Clatsop, Tillamook, Lincoln, and Benton Counties	Oregon	Five transit providers operating and marketed under a single brand that crosses jurisdictional boundaries.			X	X	
12	PAAC Busways	Port Authority of Allegheny County	Pittsburgh	Pennsylvania	Sharing of separated fixed-guideway busways between multiple operators and regional transit hub.				X	
13	McAllen Central Station	McAllen Metro (McAllen Express)	McAllen	Texas	Co-development of a local bus/transfer hub for regional bus service, including domestic and international services.				X	
14	Dallas-Fort Worth Trinity Railway Express (TRE) Commuter Rail	Dallas Area Rapid Transit (DART), Fort Worth Transportation Authority (The T), Denton County Transportation Authority (DCTA)	Dallas	Texas	Jointly operated [contracted] commuter rail service and regional fare agreement.		X			
15	Addison/Rutland County Connector	Addison County Transit Resources, Marble Valley Regional Transit District	Middlebury, Rutland	Vermont	Jointly operated 45-mile daily commuter service plus ongoing efforts to share resources and develop joint systems.				X	
16	ORCA Universal Fare Card	Community Transit, Everett Transit, King County Metro Transit, Kitsap Transit, Pierce Transit, Sound Transit, Washington State Ferries	Puget Sound	Washington	Regional universal fare card valid on seven transportation providers.		X			
17	Linx Mobility Management Co-op	Public transit, human service transportation, and private carriers	Greater Yellowstone Region	Wyoming, Idaho and Montana	19-member mobility management cooperative facilitating access to public, private, and human services transportation services.	X			X	
International										
18	Urban Transit Association (ATUQ)	9 public transportation organizations in Quebec	Montreal, Quebec	Canada	Transit association formed to influence government decisions and coordinate services.					X
19	Madrid Regional Transportation Consortium (CRTM)	Urban bus, suburban bus, private bus concessionaires, subway, suburban rail, light rail, trams	Madrid	Spain	Agency responsible for physical, administrative, and fare structure integration of the regional system.		X		X	

The case studies are the centerpiece of this research. This in-depth case study approach was carried out because it offers a rich set of information on motivations (e.g., cost considerations, service improvements, political climate) as well as challenges, agency staff and customer experience, and outcomes. The site visits allowed research team members to thoroughly examine the coordination experience in each community, where they conducted several hours of interviews with a wide variety of stakeholders involved in these projects. They also toured facilities and observed operations.

The six case studies are briefly described beginning in Table 2-2. Full case studies can be found in Appendixes A–F.

Table 2-2. Case study summaries.

Integration Effort	Summary
Valley Metro, Phoenix Metropolitan Area, AZ	The Maricopa County Regional Transportation Planning Authority, also known as Valley Metro, is the regional transit authority for the majority of the Phoenix metro area. Some of Valley Metro's early success has been in coordinating the appearance of the system by consolidating passenger systems, such as service branding, fares, and some capital projects. This case study is referred to as "Valley Metro" or "the Phoenix metropolitan region" throughout this document.
Butte County B-Line, Butte County, CA	Butte Regional Transit, known to the public as B-Line, represents the consolidation of six separate transit operations in a mix of rural communities, fast-growing towns, and one small urban area. Today, the primary transit services in Butte County are administered by the metropolitan planning organization and operate as a single, unified system that provides a mix of fixed-route bus services and paratransit operations. This case study is referred to as "Butte County" throughout this document.
Twin Cities, Minneapolis, MN	The Minneapolis-Saint Paul region, or Twin Cities, illustrates an array of initiatives and policy direction that encourages—in some instances, mandates—that the region's transit providers work together. The Twin Cities' regional transit network consists primarily of one major transit provider, Metro Transit, which operates the services in and around Minneapolis and Saint Paul, working with six smaller transit providers that serve the region's vast suburbs and provide links to major destinations. Among the coordinated efforts are a regional fare structure, a unified route numbering scheme, a regional vehicle fleet and procurement program, shared operations protocols for transit facilities, and regional performance standards. This case study is referred to as "Twin Cities" or "Minneapolis" throughout this document.
Research Triangle, NC	The Research Triangle, comprising Wake, Durham, and Orange Counties, contains the cities of Raleigh, Durham, and Chapel Hill, which form the three points of the triangle. Although an initial consolidation effort under a single regional operator failed, the region has successfully accomplished a contractual merger and nine seamless transportation projects, including a regional bus plan, regional paratransit service, and a regional call center. This case study is referred to as "Research Triangle" or "North Carolina" throughout this document.
Central Station, McAllen, TX	Central Station is a multimodal bus terminal located in downtown McAllen, Texas. The terminal was designed as a focal point for local transit service and regional intercity bus operators, including Mexican bus operators. Additionally, both the transit services and the multimodal hub were intended as economic development projects, especially when the decision was made to develop the station in a downtown location. This case study is referred to as "McAllen" or "McAllen Central Station" throughout this document.
ORCA Universal Fare Card, Central Puget Sound, WA	The ORCA card, which stands for "One Regional Card for All," is a contactless smart card that can be utilized for fare payment on seven public transportation providers in the four-county Central Puget Sound region. ORCA is the current iteration of a long history of fare integration efforts in the Central Puget Sound region. This case study is referred to as "the Central Puget Sound region" or "ORCA" throughout this document.

The site visits clarified that most case studies fit into multiple focus areas and should be seen as a complex mixture of integration activities. Each case study was identified as having a primary focus area as follows:

Customer-Oriented Focus Areas

- Focus Area 1: Services:
  - Research Triangle, NC
  - Butte County B-Line, Butte County, CA
- Focus Area 2: Fares
  - ORCA Universal Fare Card, Central Puget Sound Region, WA
- Focus Area 3: Marketing/Customer Service and Information
  - Valley Metro, Phoenix Metropolitan Area, AZ

Agency-Oriented Focus Areas

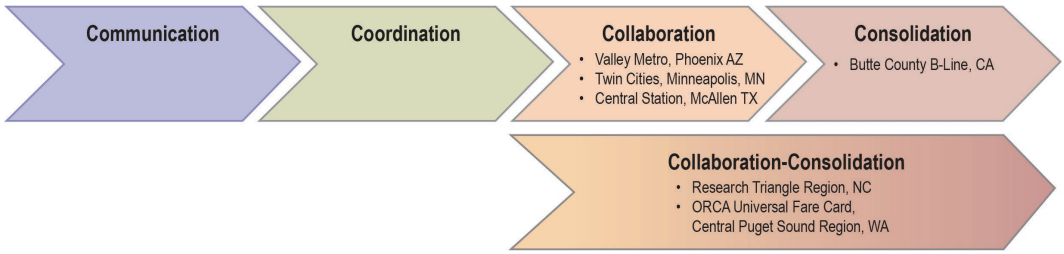
- Focus Area 4: Operations, Maintenance, Assets
  - Central Station, McAllen, TX
- Focus Area 5: Administration/Procurement
  - Twin Cities, Minneapolis, MN

The six case studies selected for this research are examples of agencies or operations that have moved far along the continuum of integration described in Chapter 1. As shown in Figure 2-2, three of the cases are highly collaborative, two have made some moves toward consolidation, and one has embraced consolidation. For purposes of this discussion, the word "integration" is used as a general term to encompass both collaboration and consolidation efforts along the continuum.

Collectively, the six regions have implemented many successful joint integration activities, listed in Table 2-3. Detailed information on the activities can be found in the individual case studies included in the appendixes.

This report is designed to convey to readers the most important lessons from the case studies, supplemented by information gleaned from the profiles. However, to gain a broader and deeper understanding of project implementation, readers are encouraged to read the full case studies. Each case is a fascinating story of how personalities, external circumstances, regional demographics, geographies, and other unique local conditions came together to create these integration projects. Further, if an agency is interested in pursuing a specific type of integration project, it is worthwhile to read the details of relevant case studies to glean project-specific lessons and guidance on implementation.

The following chapter relates the findings of this research, drawing some broad conclusions and calling out common themes that emerged from the sum of all the tasks, but particularly the case studies. These six case study regions have all been working on efforts toward coordination/integration for a number of years. Because they have worked through many issues and matured in their interactions, they have valuable lessons that are transferable to other regions of North America. For the most part, the conclusions drawn are relatively general; there can be pitfalls in drawing more detailed



Source: KFH Group, Inc.

Figure 2-2. Case studies on continuum of integration.

Table 2-3. Integration activities by case study.

Profile	Coordination/Integration Activities
Valley Metro, Phoenix Metropolitan Area, AZ	▪ Central call center for multiple providers ▪ Development of a regional transit system ▪ Development of unified brand (Valley Metro) ▪ Development of service standards and guidelines ▪ Integrated fare system ▪ Integrated passenger information system ▪ Regionalization of paratransit service
Butte County B-Line, Butte County, CA	▪ Consolidated bus purchases ▪ Consolidation of transit providers ▪ Contractual mergers of some agencies or functions ▪ Development of unified brand (B-Line) ▪ Elimination of duplicate services along main corridors, connecting cities ▪ Regional planning ▪ Single lead agency and policy board for transit operations
Twin Cities, Minneapolis, MN	▪ Central call center for multiple providers ▪ Centralized fare revenue collection and distribution for regional passes ▪ Coordinated service along main corridors, connecting cities ▪ Common technologies shared by transit providers ▪ Development of service standards and guidelines ▪ Real-time information ▪ Regional transit fleet ▪ Regional planning ▪ Regionalization of paratransit service ▪ Shared facilities ▪ Unified regional fare policies ▪ Unified regional fare medium ▪ Unified passenger information, marketing
Research Triangle, NC	▪ Bus and Rail Investment Plan for two counties ▪ Central call center for multiple providers ▪ Coordinated service along main corridors, connecting cities ▪ Contractual merger of one local service with regional service ▪ Joint bus purchases ▪ Joint marketing, branding, signage ▪ Joint maintenance, shared facilities ▪ Joint technical committees ▪ Joint training ▪ Joint usage of software for scheduling, vehicle location, passenger counts ▪ Real-time information ▪ Regional fare passes ▪ Regional planning ▪ Regionalization of paratransit service (partial)
Central Station, McAllen, TX	▪ Centralized transportation hub for multiple providers with high customer amenity ▪ Coordinated service along main corridors, connecting cities ▪ Regional planning
ORCA Universal Fare Card, Central Puget Sound Region, WA	▪ Centralized fare revenue collection and distribution for regional passes ▪ Regional planning ▪ Unified regional fare medium ▪ Unified regional fare policies and free transfers between operators

conclusions because regions and local conditions can vary greatly. Chapter 3 seeks to describe the benefits and challenges agencies can encounter in improving integration among multiple providers, how some of the most challenging issues can be addressed, and the lessons learned from this research that can be applicable to other transit agencies interested in improving coordination and integration.

Chapter 4 describes key lessons from an evaluation of the costs and benefits of the project profiles and case studies.

CHAPTER 3

Research Findings

Overview

The spectrum of integration activities examined in this research is broad and encompasses significant variation in how the integration process was undertaken; despite this diversity, several lessons are consistent across many different integration examples. For example, the research suggests there are many real and substantive benefits that result from integration; this is particularly true for customers, but benefits also accrue to transit agencies and external stakeholders, such as community downtowns and Main Streets. In addition, beyond benefits acknowledged and celebrated by transit operators and stakeholders, there are also a host of intangible benefits that integration projects offer. In both cases, benefits are difficult to measure.

Results of this research also suggest that the challenges associated with carrying out a coordinated multi-agency effort cannot be understated; projects require time, patience, and commitment as agencies resolve many important details associated with facilitating successful long-term collaboration. In particular, challenges related to local control, autonomy, and revenue sharing/funding are common obstacles. Among the most important factors leading to successful integration is leadership. A strong leader is critical to bring stakeholders to the table, champion the project, build trust, and maintain momentum through setbacks and challenges.

Ultimately, the proliferation of efforts going on nationwide, as documented in this research, are a testament to the fact that these efforts are worthwhile and that the benefits outweigh the potential difficulties and costs of getting projects up and running.

This chapter organizes the Research Findings into four sections:

- Common Benefits and Challenges of Coordination and Integration
- Strategies to Overcome Challenges
- Overarching Issues Related to Integration Efforts
- Lessons Learned

Common Benefits and Challenges of Coordination and Integration

Common Benefits

Why would an agency undertake a coordination or integration project across multiple transit providers? A key lesson from this research is that coordination projects are time consuming and challenging but have real benefits that make them worthwhile to pursue. However, stakeholders across all case studies attested that despite the resources required and determination necessary to bring integration projects to fruition, the results are worth the effort and cost. (A more extensive

discussion of the costs and benefits attributed by stakeholders to these projects is included in Chapter 4.)

Customers/Riders

In undertaking collaborative projects, better customer service is the most likely outcome. The customer benefits are paramount; integration/coordination makes fare payment and transfers easier and makes the system appear and function as a seamless network across multiple agencies. Better customer service can also bring ridership gains to the collaborating agencies. For example, by having initial data on cross-boundary trips, agencies may be able to demonstrate ridership growth in submarkets—such as an increase in trips beginning on one system and ending on another. Although systemwide ridership increases often cannot be directly attributed to integration efforts alone, such cross-boundary integration can increase transit market share on corridors with strong travel demand.

The agencies studied in this research illustrate approaches that have resulted in positive customer service. Customers in Butte County have seamless service across a large rural county with timed connections and a single system of fares, whereas before consolidation, passengers traversed two or sometimes three transit providers to complete a trip. Similarly, Valley Metro's regional fare structure, unified service branding, and common passenger information systems significantly improve a rider's ability to understand and use the system. Appreciation for these customer improvements is evidenced by the increased ridership in the Phoenix metropolitan area. In the Central Puget Sound region, the ORCA electronic fare card has eliminated the need for monthly purchases of multiple tickets in four counties. But it has also helped transit stay relevant and appear modern, countering the more traditional, antiquated, or bureaucratic image that sometimes prevails; this is especially important for attracting and retaining younger tech-savvy riders.

Based on these examples, integration efforts are likely to offer customer improvements that make the challenge of coordinating and integrating services ultimately worthwhile, because the enhancements help to attract and retain riders. Such integration efforts are critical for public transit to be a more user-oriented, competitive travel option.

Cost Savings

Cost savings is often one of the primary drivers of coordination and integration efforts. However, the process of setting up a project costs money in terms of staff time, administrative infrastructure, consultant hiring, and study conduct; and the outcome may actually be more expensive on an ongoing basis than the status quo.

That is not to say that cost savings will not be achieved. Because of the ORCA smart card technology, the seven Central Puget Sound region transit agencies realized multiple benefits internal to their operations, such as a decreased number of fare media to produce, account for, and train the operators to recognize; less fraud; and fewer cash purchases, which simplified cash handling and accounting. In the Research Triangle, a contractual merger between the City of Durham's transit operations and the regional provider resulted in an improved fleet condition and savings on bulk purchases such as tires, oils, and transmission fluids. Similarly, the ATUQ in Quebec, Canada, realized savings averaging 15% through group purchasing of buses, tires, and gasoline. In the Phoenix metropolitan region, the joint service contract that Valley Metro and Tempe negotiated with the same provider is expected to save several million dollars for Tempe. These savings are gained through shared staffing (including management), fuel costs, greater competition for the contract, and shared bus facilities, among others.

Agencies can also derive cost savings through streamlined operations. In Butte County, consolidation allowed vehicles from multiple operators to be brought together in a single fleet. With a single fleet, vehicles could be reassigned as needed to meet service needs.

Although some costs may be reduced because of increased efficiencies, transit operators need to be realistic and transparent about the cost savings that can be achieved. Qualitative benefits of integration are often just as important or more important. For example, in the Research Triangle, adding real-time information coincided with an increase in staff to manage the data feeding into the system; however, the benefits to the riders overrode any concern about the slight increase in overall costs to provide real-time information. In the case of implementing the ORCA card, the $42 million cost to initiate the system paid off not only in quantitative benefits, such as reduced fraud, but also in qualitative benefits, such as better participation of the business community in the simplified fare program and the corresponding political capital earned by the transit agencies, as well as improved coordination among the seven agencies on other service planning issues.

One stakeholder observed that cost-benefit analyses are not always helpful because the numbers may be underwhelming to the public or policymakers. He cautioned that cost savings may be there, but may be 1% or 2% compared to expectations of 15% by external stakeholders. Therefore, it is important to estimate both the anticipated costs and the anticipated savings at the outset of an integration effort so that expectations can be managed and success can be fairly reported.

Economic Development

An offshoot of greater customer benefits is the economic benefit that a seamless transit system can bring. Easy-to-use transit encourages more people to ride or ride more frequently, leading to increased access to jobs. Businesses also benefit when customers have enhanced access to their services, and the combination of these transit impacts can create a more vibrant community. These types of benefits can be some of the most elusive and difficult to measure, but were widely cited as key benefits by stakeholders across the case studies.

Economic development was on the minds of the businesses in McAllen when decisions were being made about where Central Station would be located. Early plans called for the transit station to be located near a freeway ramp. Downtown merchants supported a location that was closer to the heart of the central business district. Stakeholders now cite the downtown location as part of the success of their vibrant downtown: McAllen continues to have a healthy downtown despite the recent recession. Over four million people visited Central Station in fiscal year 2013.

The City of Minneapolis is another example of transit enhancing access to businesses. After two major downtown streets were redesigned as a pair of dedicated transit corridors, the City and Metro Transit coordinated with all providers to keep traffic flowing and buses on schedule in the heart of downtown. Similarly, an intermodal transit station designed by Metro Transit at the Mall of America accommodates 1.2 million passengers annually on light rail vehicles and more than 900,000 passengers riding buses, as well as additional passengers riding paratransit and private shuttles. The Minneapolis example illustrates how transit coordination can be important to local businesses, both by alleviating congestion and by bringing customers to their doors.

The Tourism Bureau, representing downtown businesses in the Quad Cities region of Iowa and Illinois, identified a need for an easy way that tourists could visit features of the riverfront area, such as the casino, hotels, the convention center, theaters, parks, trails, and the botanical center. They advocated that the three transit agencies serving this area create a single route with no transfers. The resulting Loop is a riverfront circulator operating from 5 p.m. to 1:20 a.m. on Thursdays through Saturdays and during the day on Sundays. It is advertised as "the only single route in the country that crosses two bridges in two states and serves four separate city downtown areas." The Quad Cities Loop shows how engaging outside community groups to create partnerships can benefit the economics of the greater region.

These examples illustrate the positive effect that multiple transit providers' collaborative efforts can have on communities. By working together to ensure strong operational performance, transit providers can collectively create opportunities for increased ridership and benefits for the wider region.

Stronger Relationships

In some cases, the partnerships that have been built through the process of implementing a coordinated project have prompted more robust regional cooperation on a variety of other issues that benefit customers. In cases where projects fully came to fruition as originally envisioned (e.g., McAllen and the Central Puget Sound region), additional projects have been initiated beyond the original intent of the integration effort. In cases where the original intent of consolidation has not been entirely fulfilled, multiple coordinated efforts were nevertheless implemented as a result of agencies working together.

The McAllen Central Station is complete, but the partners have continued to work together to improve regional and local transit services. Staff at Metro McAllen helped design and plan a new multimodal terminal in another city in the region. The region will soon implement a new regional bus service connecting the multimodal terminals, and the partners have collaborated on other projects, such as joint procurement of vehicles. A very strong working relationship was also developed among the site managers at the seven Central Puget Sound agencies working on the ORCA card. These relationships enabled coordination on other fronts, such as information sharing that has benefited each agency's operations, and interagency agreements for service planning.

Similarly, the Northwest Oregon Transit Alliance, through a partnership of transit agencies in five rural counties, has created the North by Northwest Connector. By building relationships among the five participating transit agencies, the agencies were able to overcome concerns about losing ridership and funding sources to each other's system. Each of the five agencies retains ownership of all its assets and operation of all its services, but they have implemented coordinated transfers and share resources such as transit stops and staff. In the Research Triangle, though full consolidation did not come to fruition, the agencies subsequently established the Seamless Public Transportation Service Project, composed of nine coordination projects. By working together, they successfully implemented many of the projects in the consolidation study, such as a seamless Triangle bus service plan, a regional paratransit service, and a regional call center.

Partnerships on singular integration projects allow staff to meet and discuss common concerns about other shared issues. In this way, coordination can become a part of everyday operations for many transit agencies instead of an afterthought.

Strengthened Political and Public Support

Case study agencies experienced regional benefits of creating an integrated system by gaining political leverage and increased public support. Specifically, a partnership between multiple transit agencies can potentially leverage more funds than any single agency would have access to on its own. For example, in the Central Puget Sound region, the two largest operators attested that they were able to build a much more compelling case at the state legislature for additional funding and other policy initiatives because they could show they were coordinating with one another and successfully working together in the public interest. Stakeholders in the Central Puget Sound region also said the ORCA single fare card is seen as a major employee benefit valued by employers in attracting and retaining employees, which has built support for transit service in the business community. ATUQ, an association of nine providers in Canada, believes that its collective efforts influenced the passage of the Quebec Public Transit Policy for stable transit funding.

Valley Metro, especially through the development of the light rail service but also the bus system, has strengthened a positive public perception of transit and a willingness to fund system expansion. The population's willingness to invest in transit infrastructure and services through a

2004 tax measure demonstrates support for a regional system and trust in Valley Metro. Similarly, in 2012 and 2013, two counties in the Research Triangle approved the levying of a new ½-cent sales tax to support the construction of a light rail line, a commuter rail line, and enhanced bus service throughout the two counties. The passage of these tax measures after the original 2003 failed consolidation study illustrates the benefit that more experience with regionalism has yielded.

The population of a region—residents, commuters, businesses—is not interested in conflicts between transit agencies and their operations. They are interested in results that benefit them and their communities. By showing the ability to collaborate on the delivery of services, transit agencies generate political and public support needed for a better system for everyone.

Common Challenges

The benefits identified were not achieved without overcoming some real obstacles along the way. The primary challenges fall under two related categories: local control and funding. Other challenges include dissimilar business and operations practices, and overcoming past history.

Local Control

Giving up local control over the operation of a transit agency and "turfism" are two of the most prevalent barriers to integration. In their own communities, local boards have total control over decisions and feel a responsibility to the constituents whom they were elected to represent. For example, one stakeholder in the interviews expressed concern that a regional transit agency would cut unproductive local routes that primarily served the old and infirm. In another example, the fear that Capital Area Transit Authority (CATA) in Lansing, Michigan, would take over suburban operators in adjacent counties was a barrier that had to be overcome. When concern over the loss of local control was alleviated, the outcome was shortening long trips by a suburban operator through timed transfers to CATA.

On a consolidated board, each jurisdiction would typically have only one or maybe two representatives and smaller communities could potentially be subject to weighted voting, which would favor the larger jurisdictions. Therefore, resistance to giving up local control is based upon a concern that a community would lose its decision-making power and be disadvantaged in a larger pool of decision makers.

How projects have dealt with issues of local control and autonomy is one of the biggest factors that set the case studies apart. The places that have been most successful accomplishing their integration vision have created processes where all transit providers, especially smaller providers, believe their interests are adequately represented and that their voices are heard; other regions have struggled to overcome this challenge and have, therefore, experienced less success accomplishing their integration goals. Strategies to overcome the challenges of losing local control are further discussed later in this chapter.

Revenue and Cost Sharing

Beyond loss of local control over decisions, loss of local control over funding for transit is a major challenge to integration of services. Figuring out how to equitably allocate costs and revenues so that every agency feels it is getting its fair share of revenue (or cost savings) and paying its fair share of costs is a related challenge. In the Twin Cities, equitable distribution of transit resources was the primary reason that the 12 suburban communities opted out of the urban transit system. In the Research Triangle, sharing local funding was also grounds for failure of the consolidation plan for the seven transit agencies. And in Butte County, even though they eventually achieved consolidation, it took four years before the affected agencies could agree on a cost-sharing formula. Similarly, the Phoenix metropolitan area was challenged with designing a regional transit service that reflects an equitable distribution of regional tax revenues across

multiple jurisdictions. In the Central Puget Sound region's fare integration efforts, a revenue allocation formula for the regional pass was successfully agreed on, but it represented one of the most challenging negotiations it undertook. Nonetheless, one of the greatest benefits of transitioning to an electronic card system has been the robust data it generates that can be used to allocate revenue accurately; it has given all the agencies confidence that they are getting their fair share.

Figuring out how to distribute funding, share costs (both cost increases and cost savings), and allocate revenue in a way that all stakeholders agree is equitable is one of the most difficult tasks of undertaking an integration project of any sort.

Dissimilar Business and Operations Practices

Transit agencies' business and operations practices have evolved differently, so to actually integrate dissimilar practices can be very time-consuming. In every case study, this meant something different, but all the integration processes were complex. In Butte County, one transit agency's service began at 5:30 a.m. and another's at 8:00 a.m., and there were also disparities in evening and weekend operations. These variations were due to the different needs of each local community, so policies could not be changed overnight but rather required negotiations and careful consideration of local needs. Additionally, significant variations in fleet type and fueling had to be reconciled. In the Valley Metro service area, as of 2012, there were five fixed-route service contracts: four contracts held and managed by municipalities, plus one Valley Metro contract for regional service. There were also separate contracts with demand-response service providers. Merging all these contracts would be a significant barrier to further integration.

Merging union and non-union personnel into one system can also be a problem. When the City of Durham contracted with the regional provider Triangle Transit Authority (TTA), a way around North Carolina's prohibition on collective bargaining in the public sector was necessary. Durham, which had inherited the union when it purchased its transit system from a private company, retained the union by contracting with a private transit management company. TTA continues to contract with the private management company that employs the transit staff and collectively bargains with the union, even though its other employees are not unionized. Another issue that inhibits further consolidation in the Research Triangle is that Chapel Hill Transit is a fare-free system, with major funding from the University of North Carolina at Chapel Hill, whereas the other six transit agencies in the region all collect fares.

In the Twin Cities, for the regional operator, Metro Transit, and the Metropolitan Council, equity and regional mobility are key goals. However, for several of the suburban operators, congestion mitigation is the main goal, not regional mobility and equity. Because of this different focus, to design an attractive commuter service, the suburban operators were the first to use over-the-road coaches and install Wi-Fi on buses in hopes of attracting choice riders and, thus, reducing congestion.

In the Central Puget Sound region, integrating special fare categories (e.g., senior, youth, and disabled) required each agency to strike a delicate balance between local political demands, unique local needs, and the benefits of regionalization. Fare policy touches nearly every aspect of agency operations, and the depth of coordination that was needed was far greater than initially anticipated; it proved extremely complex and time consuming to integrate the business practices of seven different agencies of various sizes and involved hundreds of meetings among agency staff.

Integration efforts require delving into the challenging and complex territory of differing operational practices, business practices, and values/goals; agencies must engage in negotiations to align their differences as well as determine what aspects may be able to remain independent. Butte County and the Central Puget Sound region have largely overcome dissimilarities in their business and operational practices; Valley Metro and the Twin Cities have had less success.

Overcoming History

The world is full of examples of the past tainting the present—clan rivalries, border disputes, perceived disrespect. It is not surprising, then, that the past can be a barrier to changing the dynamics among multiple transit providers. The influence of history is most evident as a barrier to integration in the Twin Cities case study. In 1967, the Minnesota legislature created two regional organizations to handle transit operations and planning. Twelve suburban communities objected that they were not getting their fair share of funding in this arrangement; so in 1981, the legislature allowed them to opt out of the regional system. To this day, the split has both encouraged and strained coordination activities.

Similarly, in the Research Triangle in 1981, the North Carolina General Assembly created a regional transit provider, TTA. Some transit agencies perceived the state's leadership as an insinuation that funding would be tied to participation in consolidation and not based on population, as it had been historically. Consequently, when consolidation was considered in 2003, trust of TTA and the state, which both favored consolidation, was one of the issues that stood in the way.

Individual personalities can also have much to do with coordination failure. Sometimes, certain staff members in key positions can stymie a coordination effort, as historical animosities can be difficult to overcome. Butte County's consolidation effort moved forward after a city council member was elected to a higher office and his seat was taken by someone supportive of consolidation. On the other hand, some personality traits can be a positive attribute needed to get projects started and to continue through difficult times.

Sometimes a change in staffing, leadership, demographics, or even a collective change in a region's vision of itself can overcome history. These changing external circumstances can also move the dynamics of the parties toward more collaboration and integration.

Strategies to Overcome Challenges

Collaborative projects take effort to implement and maintain over time. A variety of specific strategies at the case study agencies were used to overcome the challenges they faced. While these strategies are, in most cases, not complete solutions, they represent a road map of how to progress toward the goal of integration.

Local Control and Governance

How regions deal with governance is critical to the success or failure of integration efforts: it gets to the heart of local control issues, one of the primary challenges that these efforts face. Those involved must strike a delicate balance between accommodating local political demands and unique needs versus the group's commitment to the benefits of regional goals and functions.

Each case study offers a different governance approach. The bottom-up strategies tended to yield more long-lasting results than the centralized or top-down approaches. In most cases of success, stakeholders built inclusive and broadly representative structures and processes that were trusted by stakeholders.

To some degree, as much can be learned from the failures as from the successes. The following examples illustrate a variety of paths to integration and their comparative advantages and disadvantages.

Butte County

One of the most successful examples among the case studies of shared governance is Butte County. A number of options for what type of governance model would be most appropriate

were considered. Ultimately, the participating jurisdictions agreed to have the metropolitan planning organization (MPO), the Butte County Association of Governments (BCAG), be responsible for governance and administration of the consolidated transit operation. This agency was seen as the most neutral party and its board had representation from all jurisdictions in Butte County.

The largest city in the county, Chico, was especially concerned about the loss of decision making regarding local transit services within the city, because Chico held only one seat on the BCAG Board, along with a few county representatives from the greater Chico area. To address concerns raised by Chico and other jurisdictions, it was agreed that all transit policy decisions would require a supermajority vote of the board (at least seven of ten members), so that jurisdictions would have to have consensus on major transit interests.

Phoenix Metropolitan Area

In the Phoenix metropolitan area, Valley Metro is the regional transit provider. The agency was created through a voter-approved sales tax in 1985. All Valley Metro members contribute financially to the development and provision of regional transit services, and the governance structure is composed of representatives from 16 communities, including Maricopa County. Most of the board members are elected officials in their home communities. At the same time, most of the larger communities also fund and manage their own local transit services.

Valley Metro has for many years successfully employed a committee structure to make decisions, manage projects, and report back to the full board. These committees include a regional marketing committee and a regional fare committee. The approach has worked well for both Valley Metro and the individual jurisdictions; members are invited to participate and collaborate on decisions affecting their service.

Twin Cities

The Minnesota state legislature played an unusually active role in Twin Cities transit governance. The legislature created the Metropolitan Council, or Met Council, to "coordinate the planning and development of the metropolitan area" and bestowed it with strong authority over transit agencies. The legislature also created the regional transit provider, Metro Transit, which is a division of the Met Council and the region's largest provider. The legislature mandated a common fare structure and fare instrument among all transit providers, which established a baseline of coordination that most stakeholders agree has been important for creating a seamless experience across providers. The Met Council's top-down approach to consolidation has met with resistance by some suburban transit providers, who believe that their concerns and ideas are often not fully considered by the Met Council and its Metro Transit operation.

When suburbs were originally given the opportunity to opt out of the regional service, they did so because they did not believe they were receiving their fair share of services from the regional transit provider. Today, the six suburban transit providers operate service within their own jurisdictions as well as some commuter services and are governed by their own policy boards. Metro Transit, as a division of the Met Council, is governed by a 16-member governor-appointed board, which many of the suburban providers contend does not represent their interests even though most of the decisions made by the regional Met Council impact the suburban communities.

Recently, a 2011 report, Governance of Transit in the Twin Cities Region, recommended incorporating some elected officials on the regional governing board, as well as staggering their terms to foster more independence and stability. Significant consolidation is still unlikely,

however, as the suburban transit providers wish to retain their identities and independence as much as possible.

Top-down governance of coordination efforts can be effective—transit agencies in the Twin Cities region have created a regional transit system that is seamless in ways that matter to customers—but the approach can breed distrust, which can be very difficult to overcome.

Research Triangle

The Research Triangle illustrates that players must first truly understand the benefits and buy into the concept of one regional system before any integration activities can take place. In 2003, a state-initiated consolidation study recommended transferring the governance and management of a consolidated system to an existing regional agency, the Regional Public Transportation Authority (RPTA), but the plan was rejected by the local communities. In the view of many stakeholders—riders, other elected officials—the plan effectively put "the cart before the horse." That is, it laid out the steps for consolidation without gaining regional agreement about why consolidation was needed. The consolidation plan did not adequately address unique local concerns and all the local stakeholders weren't brought into the process early enough. Therefore, local control concerns superseded other advantages for consolidation.

Mayors of the four largest cities took up the challenge for more integration. One city, Durham, saw advantages for a contractual merger with the regional transit provider, TTA, which would provide improved service and on-time performance for its riders. While short of consolidation, the other communities eventually found advantages in many joint projects. They established the Seamless Public Transportation Service Project, with subcommittees working on nine coordination areas—marketing, bus planning, customer service, paratransit, capital procurement, passenger amenities, maintenance, technology, and safety and security. Because the subcommittees were required by the mayors to report quarterly over a five-year period, the projects were kept on track and moving forward. Simply the process of meeting together on the nine projects brought an understanding of each agency's concerns and needs. This understanding translated into trust on a people-to-people basis that the different agencies were collectively working for a goal that would improve service for all their customers.

Taking a more gradual and inclusive approach—implementing selected elements of the consolidation study over time with agency buy-in—helped agencies understand why a level of integration is beneficial to their customers and to their agencies. Once they more fully understood the justification and rationale for the project, stakeholders were able to move forward on a wide range of integration activities, and the region has achieved significant coordination outcomes over a five-year period.

McAllen

In McAllen's Central Station, local control was not a key issue, since the City of McAllen was the agency responsible for building and operating the station. However, even here, many different interests needed to be balanced to create a project that met everyone's needs and fulfilled all the goals. Interviewees emphasized that inclusiveness, that is, everyone having an equal seat the table, was critical for bringing the project to fruition. Making special efforts to include and understand the needs of the Mexican bus operators was particularly important, because they represented a majority of potential lessees and, therefore, a fundamental ingredient in the station's financial sustainability. This broader and more inclusive group of stakeholders ensured that the City of McAllen would achieve its goals, primarily that Central Station would become the focal point for all intercity transit operators and secondarily that the Station would succeed financially through renting and leasing of space.

Central Puget Sound Region

Governance of the successful ORCA card in the Central Puget Sound region is "bottom up." A comprehensive interlocal agreement was negotiated for development of the ORCA card that created a seven-member joint board composed of the general managers of each agency. Every participating agency has one vote on the joint board; the smallest agency's vote is equal to the largest—there is no proportional or weighted voting. Further, the board operates on a consensus-based model, seeking full agreement on issues before moving forward (which it largely achieved throughout the planning period). This equal and representative process removed the power dynamic inherent in agency size and created a level playing field for small agencies and large agencies to work together. The process required the larger agencies to give up the control that their size normally would leverage. It also meant that the smaller agencies had to take just as much responsibility for their decisions as the larger agencies.

This governance structure also delegates decision making to the appropriate level with clear lines of reporting back to policymakers, which has proven very valuable in such a complex, multi-faceted negotiation. The interlocal agreement required each individual agency's board to cede authority to the joint board to make all major decisions about implementing the ORCA card. The joint board is responsible for all policy decisions, but all implementation details are delegated to a regional site managers' group consisting of a senior-level staff representative from each agency. Establishing site managers as the single points of contact at each agency enabled decisions to be made much more quickly, while also ensuring site managers had a direct reporting relationship to their joint board representatives for all policy issues.

The downsides of this governance structure are that a single entity can veto an action, regardless of the size of that transit district, and that the process has been very slow. Reaching consensus among seven agencies on every operational detail was a lengthy process for a very complex project. (It should be noted that transit governing boards with legislative powers should check with their attorneys to make sure that they do not have a constitutional conflict with equal voting for participants of unequal size.)

Another factor in the success of ORCA was maintaining local agency control over fare changes. This gave agencies—especially smaller agencies—a sense of autonomy. They did not sense they were being subsumed, rather that they were simply integrating a key feature—the fare medium—that had tremendous customer benefits.

Revenue Allocation and Cost-Sharing

As discussed under Common Challenges, determining how to equitably allocate costs and revenues so that every agency feels it is getting its fair share of revenue (or cost savings) and paying its fair share of costs is one of the greatest challenges to integration efforts. The following vignettes discuss how case study sites used different strategies to address revenue allocation and cost-sharing issues:

1. **Butte County:** A cost-sharing model based on population and ridership
2. **Phoenix Metropolitan Area:** A regional equity mechanism for tax distribution
3. **Twin Cities:** A regional operating revenue allocation model
4. **Research Triangle:** A contractual merger and a "shared benefits" analysis
5. **Central Puget Sound Region:** A revenue allocation model based on relative fare levels

Butte County

Several cost-sharing formulas existed among the transit providers prior to consolidation to account for overlapping service areas and the availability of regional services in each city. There

was no uniformity in the formulas, and the agreements were not necessarily documented or formalized. Nevertheless, agencies working together to pursue consolidation recognized that any formula change would result in an increase or decrease over current financial obligations, and they were concerned that if any jurisdiction would be required to increase its financial contribution, it could thwart service consolidation. In order to work toward consensus, the agencies agreed that their goal would be to minimize the financial impact on any single jurisdiction while, at the same time, ensuring the formula was fair and equitable.

With goals and objectives clearly stated, the next step was to agree on a series of formulas, calculating hypothetical local funding obligations to determine if the results would increase or decrease the financial contributions for each jurisdiction. Through this process, which required a lot of discussion back and forth between different city councils and the County Board of Supervisors, they achieved their goal of an equitable funding arrangement. The formula to determine the financial contribution for fixed-route services would be based on a jurisdiction's population (50%) and total service hours within that jurisdiction (50%). For dial-a-ride services, the formula dictated that financial contributions would be based on a jurisdiction's population (50%) and total boardings (ridership) within that jurisdiction (50%). Population alone was originally assumed to be a preferred basis for sharing costs, but through ongoing discussions, it became clear that population alone is not necessarily a predictor of ridership, so by accounting for ridership, agency representatives said they believed the formula was fair to everyone.

Phoenix Metropolitan Area

In 2004, Maricopa County voters authorized a 20-year regional tax of $2.8 billion for transit, including funding for bus and light rail transit improvements, development of a "supergrid" bus network, and development of 27 additional miles of light rail or other high-capacity transit service. Because the revenue source is a regional tax to which all county residents are contributing, regional equity in terms of the allocation of funding was a critical part of selling and managing a regional system.

Valley Metro established a regional equity mechanism that allocates a certain number of service hours and miles based on financial contributions from each area. Although this strategy is "equitable" and has the buy-in of all participants, it also means that in some cases services are developed in response to equity concerns rather than demand and need. As a result, Valley Metro operates in areas with less productive service while other areas are underserved.

Maricopa County is challenged by having multiple operators. But, the region—including both Valley Metro and the municipal systems—has clear direction about the funding of these services and sharing fare revenues. The challenge occurs when collaboration projects create financial benefits and a determination must be made regarding how those financial benefits are shared regionally. An ongoing example is provided by the City of Tempe. Valley Metro and the City of Tempe recently issued a joint contract, which is expected to generate considerable cost savings. The challenge lies in how those cost savings are shared and distributed. Both the City of Tempe and Valley Metro recognize the need to share the financial benefits, but the City of Tempe believes it has a strong case to reinvest a substantial portion of the savings into its system, while Valley Metro believes an equally valid case can be made to dedicate a large share of the savings to its system, which serves the entire region.

Twin Cities

In 2008, the Met Council developed a regional operating revenue allocation model, adopted by the Met Council staff over the objections of the suburban transit providers. Several reasons explain why stakeholders from nearly all of the agencies voice reservations about the model. Unlike many revenue allocation models that are based on population or demographic

characteristics, the Met Council model is roughly based on the level of service that was in place when the model was prepared, meaning that money distributed among the agencies correlates to the amount of transit service each agency has historically provided. All transit operators have limitations on how much money may be kept in an operating reserve fund, called a fund balance. Although the model is far from perfect—and often frustrating to administer, according to Met Council staff—representatives from the Met Council and several of the suburban providers said renegotiating the model would be especially challenging because there are such differing views on how the funding formula should be revised.

Research Triangle

While the Research Triangle transit agencies generally retain local control over their funding, in the City of Durham and two of the counties, financial issues are addressed in ways that foster more collaboration on the control of local funds. In 2010, the City of Durham transferred the planning and management of its transit system, DATA, to the regional transit provider, TTA. In this contractual merger, the City owns the buses and maintenance facility and pays for service. The City is still the federal and state grantee for transit funding. TTA and Durham use a perpetual rollover contract, which renews automatically unless one party or the other wants to renegotiate terms.

In addition, in 2011 and 2012, voters in Durham County and Orange County passed a new ½-cent sales tax to support the construction of a light rail line to Chapel Hill, a commuter rail line to Raleigh, and enhanced bus service throughout the county. To determine how to pay for these investments with the tax and vehicle fee revenues, county representatives developed a shared-benefits analysis. This analysis examined "the different types of new revenues that might be available and their sources by location; the cost of the investment and how these costs relate to the amount of bus service that could be provided in each county; and the benefits of the investments and the degree to which these benefits can be attributed to citizens and enterprises in each county." The goal of the Shared Benefit Analysis is to have a framework in place that is acceptable to the two counties on how revenues and costs would be shared near the Durham-Orange County line when the future light rail line is operational.

Central Puget Sound Region

The ORCA card utilizes a model to allocate the regional pass revenue that accounts for each agency's approach to fare policy. Revenue is distributed based on the proportional "share" of a trip (what the single-trip cash fare would otherwise be). For example, if someone begins a trip with Agency A on a service that costs $3 and transfers to Agency B to complete his trip on a service that costs $2, that rider pays only $3 (transfers are free). Of the passenger's total payment, Agency A gets 60% and Agency B gets 40%. The advantage of this system is that each agency's revenue from regional passes is an extension of its local pass revenue: if fares are low, its revenue will be lower; if fares are high, its revenue will be higher. This system works particularly well because the electronic fare card yields very accurate data on boardings, which means agencies have a high level of confidence that they are getting their fair share.

Need for a Regional Authority

Another key factor in overcoming the challenges related to integration efforts is having a regional agency with integration as a key part of its mission. These processes take time to get buy-in from all the partners, to sort through all the detailed business practices, and to review operations issues that integration efforts require. It is valuable to have a regional agency that can take on project management responsibilities, be the keeper of project records, and keep the ball rolling by reminding stakeholders of the benefits of regionalization when challenges arise.

It is particularly valuable for this agency to have access to funds to help cover startup and implementation costs and even fund agency participation during planning stages if necessary. This body does not have to be a transit agency; any agency with a regional presence can play this role.

Butte County

As the California-designated Regional Transportation Planning Agency and federally designated MPO for Butte County, BCAG is responsible for the preparation of transportation plans and programs, and distributes federal and state transportation funds. BCAG staff assessed their abilities and determined that the agency was interested in assuming the administrative function for transit previously held by the various jurisdictions. BCAG approached city managers and representatives from the county to discuss the potential for consolidating transit services. The primary concern expressed by city and county officials was whether consolidation would make services more cost effective.

In 1999, BCAG initiated the study process to consider consolidating services. Effectively, staff-level discussions spurred the consolidation process, without significant involvement from elected officials. Select elected officials were consulted in a round of stakeholder interviews at the start of the consolidation study. Stakeholders said that they generally wanted to consolidate services to improve service quality and enhance service levels and that they expected a consolidated system would allow for expansion of service either through improved frequencies or extended service hours and days.

After several years of study, transit services in Butte County consolidated under the B-Line brand, with BCAG as the lead agency and policy board for transit. The various jurisdictions have representatives on the BCAG board but are not involved in day-to-day decision making about the system or its operations. BCAG has been an effective leader, perceived as having a regional approach that is appropriate for administering transit in the county.

Phoenix Metropolitan Area

In the Phoenix Metro area, Valley Metro is a regional transit agency with authority granted by the taxpayers. Valley Metro's governance challenge relates to it being a relatively new agency providing services as an overlay to municipal services. Indeed, these two challenges are related. When Valley Metro came into being, several of the regional transit service organizational and funding functions were already entrusted to local agencies or other regional authorities. In addition, some of the older transit systems are larger systems. Thus, in some cases, consolidating authority has not been easy; agencies that hold authority are reluctant to relinquish authority, often citing experience, competence, and their regional role.

Valley Metro has, however, achieved success in regionalizing and consolidating several operating and management functions. This success has largely been realized in functional areas that offer considerable, tangible benefits to riders (joint marketing) and/or are perceived as more challenging functions, such as call centers, complaint lines, and Americans with Disabilities Act (ADA) paratransit. Valley Metro has used the regionalization of each of these functions as an opportunity to achieve rider benefits, demonstrate competence, and build trust. Valley Metro also takes a long-term approach to address many of the regional functions, acknowledging that it must work toward regionalization incrementally.

Twin Cities

The Met Council has the authority to set policies for regional transit operations, procurement, and budgeting practices. Some of the Met Council's stated goals include the following, which relate to the organization's approach to coordination:

- Ensure that high-quality, seamless, and coordinated transit service is provided throughout the region.
- Maintain the equitable, efficient, and transparent distribution and use of regional transit capital and operating resources.
- Ensure compliance with all federal and state laws, regulations, and procedures governing the use of transit funds by the Met Council and all subrecipients, including suburban transit agencies.

The Met Council is both the direct recipient of most federal funding and distributor of regional transit funds. With a strong interest in promoting regionalism, the Met Council has led several coordination efforts that have included assuming control and management of the regional vehicle fleet, collection and redistribution of fare revenues, and implementation of a common automatic vehicle location (AVL) system used by all but one of the suburban transit providers.

The Met Council's regional perspective is valuable for planning and funding, but because Met Transit is one of its divisions, it is also one of several transit operators in the region. For this reason, some perceive that the Met Council has a conflict in prescribing policies for all of the other smaller providers. Because it is responsible for establishing policy in the region, the Met Council has significant influence over administration, financing, and planning of transit services at the smaller providers, which has allowed for the appearance of seamlessness to transit riders.

Research Triangle

TTA, the RPTA, has 13 members representing the counties and cities. As such, it has taken on much of the transit coordination role for the Research Triangle. For example, the idea for a regional call center was initially floated in 2002, but agencies were deterred by the cost. To jumpstart the regional call center in 2006, TTA bore most of the initial costs, but now each city is billed for the service based on call volumes from their constituents. TTA created the GoTriangle brand, and all buses in the network have a GoTriangle sticker. TTA has also led other coordination projects, such as common bus stop signage, cost sharing for a regional paratransit system, regional ADA certification, and software for real-time information. TTA periodically calls together the planners from the different cities to discuss regional planning as it relates to transit. This is jointly coordinated through Triangle J Council of Governments, the agency which mediated the Shared Benefit Analysis discussed earlier. Although neither of these agencies has ultimate authority to mandate changes, the leadership provided by TTA and Triangle J is important for continued collaboration among the transportation providers in the Research Triangle.

McAllen

Even though coordination efforts were largely local in McAllen, a regional agency was a key player in initial transit integration efforts. In 1996, the City of McAllen had commissioned a Transit Feasibility Study. The initial local bus service, which began operating in 1997, was operated by Valley Metro, a division of the Lower Rio Grande Development Council, because it had existing vehicles and the capability to operate transit service. Eventually, service was brought in-house, but the regional agency served an important role in providing an operator during the initial years of McAllen Metro.

Central Puget Sound Region

Sound Transit is a regional agency whose voter-mandated mission is regional integration. It provided the administrative and financial backing for the ORCA project as well as an established forum for coordination. Specifically, Sound Transit agreed to fund the capital costs required for ORCA implementation, such as purchase and installation of card readers in vehicles, as well as to cover ORCA operating expenses for the first two years. This financial commitment was critical

to getting the smaller agencies to willingly participate in the ORCA project. Its financial support was particularly critical in late 1999 when a successful citizen's initiative, Proposition 695, cut funding for all the other transit agencies in the midst of the planning and procurement process for regional fare integration and ORCA. The project became less active during what was a very difficult time at the regional transit operators, but Sound Transit continued to pursue the project until most agency funding was restored a couple of years later.

In addition, Sound Transit, together with King County Metro, the largest transit agency in the region, staffs a small regional team that manages and coordinates the ORCA project. They do not provide decision-making leadership but do provide critical project management, such as convening meetings, planning and strategizing projects, and maintaining legal agreements and other records. This role was universally lauded by stakeholders as a key to ORCA's success.

Sound Transit has been trusted in the central organizing role in part because it is responsive to local concerns; a representative from every individual transit agency's board sits on the Sound Transit Board and has an equal vote. Similarly, King County Metro has been trusted to offer administrative support to the project because it has proven that it has the region's interests in mind by entering into an equal relationship with agencies far smaller, thereby giving up the power inherent in its size.

Overarching Issues Related to Integration Efforts

Changing circumstances involving growth and visionary projects can act as catalysts for integration projects. Joint long-range planning can result in a more strategic approach to regional projects, and technology can be a tool that stimulates implementation of planned actions. These overarching issues can be found in many integration efforts.

Taking Advantage of Changing Circumstances

An old adage, "Timing is everything," can also apply to the task of furthering transit integration. While integration might be the logical path to pursue for multiple reasons, it may fail because the timing is not right. Change is difficult, and a community may not understand *why* it should give up something familiar. Lethargy may set in because the many steps that need to be taken seem overwhelming, the obstacles too challenging, or the resistance too great.

Often, however, something occurs that is just the right catalyst for moving forward. Regional growth in an area often necessitates a regional approach, leading to increased collaboration. Ambitious, large-scale projects, such as new rail systems, can be the byproduct of a new wave of regionalism, allowing communities to envision themselves in a fresh light and giving them a more cohesive sense of place than the distinct towns they once were.

Several examples illustrate how the case study integration efforts were sparked by external circumstances.

Regional Growth

McAllen, the Research Triangle, and the Central Puget Sound region undertook efforts for increased collaboration as a result of growth in their respective regions. In McAllen, growth in regional travel followed the 1994 signing of the North American Free Trade Agreement (NAFTA), which eliminated most of the restrictions on cross-border bus operations. Direct connections between cities made travel easier, opened new markets for travel, and encouraged competition among operators. A need then arose to prevent multiple operators from using passenger loading and unloading zones randomly in the city. As a result of these external forces, the City of McAllen

developed Central Station. Now nine local and international transit operators rent or lease space at the station, creating one of the largest passenger ground hubs in the country.

In North Carolina, as the Research Triangle's population almost doubled between 1990 and 2013, the boundaries between the four primary cities began to blur. The leadership began to think of the area as a region instead of distinct communities after the 2000 Census, for the first time, showed contiguous metropolitan areas. The governor convened a conference to discuss regional issues, including transportation. The outcome was the creation of a new regional bus system, the TTA, and ultimately, collaboration on many services, such as a regional call center and regional fares.

At the time that planning for the ORCA card in the Central Puget Sound region was initiated, the greater Seattle region had grown significantly and was ranked as the sixth most congested urban area in the United States. Facilitating more use of transit was seen as a key congestion mitigation effort. These conditions created a circumstance where there was widespread acknowledgment by the community, state and local politicians, and transit leaders that a more seamless system was needed in the Central Puget Sound region to make using the region's multiple public transportation providers easier for consumers.

Two of the profile agencies, Linx Mobility Management Co-op in Yellowstone National Park and CRTM in Madrid, Spain, although extremely different in their size and organization, are both the product of growth in their regions. Linx, whose service area covers 35 to 40 million acres in the Yellowstone region, is a transportation cooperative that facilitates access to a variety of transportation services, including public transit, human service transportation, and private carriers. It emerged from a series of public roundtables identifying transportation as a critical need in a vast geographic region with a sparse population, but no coordinated system to get people to work, to human services, and to tourist sites. The local leaders recognized that they no longer were living in isolated pockets but were part of an interdependent community needing linkages over the immense territory they called home.

CRTM plays a similar coordinating role as Linx but for a service area of 3,100 square miles and a population of 6.5 million. As the population of Madrid grew and spread from the central city to towns and centers on the periphery, the lack of coordination between Madrid's multiple transportation systems became increasingly apparent. All the transit operators that form part of CRTM maintain autonomous management of their operations but cede control over establishment and planning of service to CRTM, which is responsible for the physical, administrative, and fare structure integration of the regional system.

Advancing Integration as Part of a Package of Visionary Projects

A collective goal among leaders can stimulate integration as part of a larger vision for their region. In the case of both the Research Triangle and Maricopa County, a tax to support a new rail system served as a catalyst for increased collaboration on bus systems to support the new rail projects. In the Research Triangle, the ½-cent sales tax to construct commuter and light rail lines and enhanced bus service is viewed by some as the next step toward regional consolidation. Similarly, a successful sales tax initiative in 2004 in Maricopa County was a major step forward in creating a regional transit network in the Phoenix metropolitan region, because it authorized a funding package to develop a regional bus and rail network organized around the regional grid system.

McAllen's Central Station also emerged from a successful tax initiative. The tax passed in 1997 won approval by including both public transportation services (McAllen Metro) and a physical hub (Central Station) as two of the public projects included in the tax measure.

The Sound Move initiative in the Central Puget Sound region was a vision for a one-ticket ride on transit. In 1996, voters in King, Pierce, and Snohomish Counties approved the Sound Move

initiative to fund a package of transportation improvements, including a "one-ticket ride"—a uniform, single-ticket fare system among local and regional transit providers and an integrated fare policy for the entire public transit service network. Creation of this dedicated funding source, the "regional transit integration fund," and a regional policy directive to integrate fares ultimately would prove critical to the future success of ORCA. This mandate kept the project moving forward through many hurdles.

Joint Long-Range Planning

Beyond coordination and integration, several profiles and case studies provide a model for regions to do joint capital and other integrated long-range planning, taking a more strategic approach to identifying and implementing capital projects and services. Through joint planning, agencies can produce projects that are beneficial to all rather than the typical segmented approach, thus avoiding multiple projects and service plans specific to each transit agency, as well as reducing the likelihood of duplicate services or services that don't connect at all.

Cases like the ORCA card and McAllen's Central Station are collaborative efforts that have included development of regional capital projects and, therefore, can offer direct lessons for achieving regional capital planning. In another example, Durham and Orange Counties in the Research Triangle have developed and adopted a unified Bus and Rail Investment Plan to serve the new rail system being planned. Also, the Seamless Public Transportation Service Project identified capital projects to benefit the region, such as a server and software to store automated passenger count data and next bus technology, an AVL system, and global positioning system (GPS) to make real-time information available to riders.

In the Twin Cities, long-range planning efforts are spearheaded by the Met Council to encourage participants from across the region to share their ideas and work together on joint projects that include transitways and new transit facilities. All agencies are invited to the table, and this has led to a network of transit investments throughout the region, including in a number of suburban areas (e.g., the new METRO Red Line Bus Rapid Transit service is wholly in suburban areas).

In Maricopa County, Valley Metro is developing shared service standards and guidelines as part of a regional framework for managing service development in line with service performance and productivity. Valley Metro hopes to use this process to set goals for service delivery, define service types, identify operating standards, and define performance measures. Agreeing on guidelines will support a system for service management and delivery that also helps create more consistency and fewer redundancies across service areas.

Many of the same strategies that are critical to achieving integration across multiple providers discussed in this chapter can be applied more broadly to long-range planning. In particular, by designing inclusive processes, stakeholders believe their participation and input are valued. A regional authority is important in long-range planning to convene stakeholders, provide project management, sustain efforts over long periods of time, and counter agencies' natural tendencies toward turfism by keeping the regional perspective at the forefront of discussions.

Technology

Technology cannot by itself effect integration, but it can support and facilitate integration efforts. Any integration effort has to start with transit providers asserting their combined commitment to a goal—whether it be constructing a transit hub as McAllen did or creating a seamless network through branding, as Valley Metro does. However, technology can be the tool to move coordination from an idea to an integrated system.

The benefits of technology can be most clearly seen in fare coordination. Before the ORCA electronic payment card, the Central Puget Sound region was already using a paper-based regional transit pass across multiple operators, so the foundation for coordination predated any application of technology. However, there were a number of challenges with a paper-based medium; most notably, revenue reconciliation was cumbersome and time-consuming and revenue allocation was based on annual survey data that agencies felt was unreliable and not reflective of actual ridership patterns. Therefore, evolving to an electronic system was a major improvement for two main reasons: it built agencies' trust in the system—and, thereby, their willingness to participate—and it streamlined certain systems. The smart card allows for transit usage to be precisely tracked, giving operators more certainty that they are getting their "fair share" of revenue from regional pass sales. ORCA also allows for faster and less cumbersome revenue distribution and reconciliation, a cost savings.

Another popular use of technology is the establishment of a regional call center. Metro Transit in the Twin Cities handles customer calls from people across the region at its Transit Information Center and keeps the website with information on all operators up to date. In the Research Triangle, one of the most praised outcomes of the collaboration that resulted from the consolidation plan is the Regional Call Center. Each city pays into the call center every year based on the system's tracking of calls logged from its citizens. New technology also made real-time information available, decreasing the number of phone calls fielded at the call center.

A technology project in Central Florida is now under way to use web-based regional trip-booking and scheduling software and an associated regional geographical information system map base to integrate three public transit agencies, six human service agencies, and veterans' transportation services. The Model Orlando Regionally Efficient Transportation Management Coordination Center (MORE TMCC) leverages a range of mobility resources and funding sources efficiently and still fulfills program eligibility and reporting requirements for each agency. It integrates general public transit, human services transportation, and rural services and will connect to a regional 211 One-Call, One-Click mobility management system. This allows multiple providers to integrate services through technology without agencies abdicating their role or authority.

However, selecting the right technology for the environment in which transit operates—extreme weather conditions, dust, vehicle vibrations—can be a time-consuming process. Technology can also be costly to implement and maintain. For example, in the Central Puget Sound region, just creating a request for proposals (RFP) that specified all the technological, financial, management, customer service, and agency-specific requirements for the system was an enormous undertaking that took months longer than expected. The final RFP was hundreds of pages long. Despite this highly involved process, it still took six years to overcome all the technological challenges after the vendor was selected. Even now, the ORCA software has been described as "clunky," causing the need for many workarounds to block cards or transfer the balance from one card to another, all of which require ongoing staff time. All told, it cost $42 million to initiate the ORCA card, which did, in fact, come in on budget; it costs approximately $7.5 million per year to operate the ORCA system. All stakeholders remain in agreement that the card's benefits are worth it, but projects involving technology with this level of complexity require significant time and financial resources.

Despite the benefits of technology in easing the arduous tasks that must be accomplished in integration, keeping up with the fast changes in technology can be challenging. For example, the FlexBus demonstration project in Central Florida came originally from a 1999 effort to define a better way of serving suburban travel but will not go live until the summer of 2015. The FlexBus concept is a transit service that serves stations at designated locations according to the user's request in real-time rather than by fixed route and fixed schedule. It requires significant use of transit technologies for scheduling, trip-booking, fare payment, and vehicle assignment functions in real-time. The final design was completed in 2007 but Small Start funding

requests for construction were not successful. In 2010, the FTA funded $3.5 million to develop and demonstrate the concept. In this case, the delay in obtaining funding was advantageous because the advances in web-enabled smartphones now provide an ideal platform for requesting and paying for service and as a "boarding pass."

Collaboration and consolidation are lengthy processes of negotiation. The chosen technology to support change can be antiquated by the time the negotiations are concluded and implementation has yet to begin. Nonetheless, these case studies confirm that the ability of technology to quantify costs among participants and to speed up the tasks of integration can be worth the investment.

Lessons Learned

The research and case studies illustrate several commonalities that highlight the most effective ways agencies have worked together toward their coordination goals.

The key lessons learned, each explained in turn below, are as follows:

1. Prioritize the Customer Experience
2. Collaboration Succeeds when Implementation Is Incremental
3. Strong Local Leadership Is Needed to Sustain an Integration Effort
4. Broadening the Pool of Stakeholders Leads to More Widespread Acceptance
5. Create Processes that Develop Trust Among Stakeholders
6. Maintain a Level of Local Control
7. Set Goals and Document Anticipated Outcomes at the Outset of an Integration Process
8. Benefits May Outweigh Additional Costs Incurred in Integration

Lesson One: Prioritize the Customer Experience

Transit providers are first and foremost a service industry. This research found that whether providers were seeking more integration or resisting integration, the underpinning of their rationale was to provide better customer service. This means that any move toward improving transit integration among multiple transit providers must address *why* changes to the status quo will benefit their passengers and these benefits must be transparent to all partners involved.

These processes are difficult so the expected benefits must be clearly stated. Maintaining the common focus on improving the quality of the customer service experience can help ease friction among operators and get partners through challenging negotiations. Further, in many cases, cost savings, one of the other hoped-for benefits, were not realized. However, transit agencies and elected officials interviewed believe that the expenditures involved in integration are a worthwhile investment because they improve service quality for the customer.

Further, a focus on the customer allows agencies to strategically "choose their battles," tackling integration issues that will have the most benefit for passengers while allowing other areas that do not affect passengers as directly to remain independent, preserving a degree of autonomy and local control.

It is clear from these six case studies that transit agencies can achieve some success in integrating when they put the customer first.

Lesson Two: Collaboration Succeeds when Implementation Is Incremental

In many cases, coordination efforts were most successful when they evolved gradually over time. Agencies often were not ready to commit to full integration efforts at the start. By working

together over time, staff and leaders built trust, established a step-by-step track record of success, and came to understand—and "buy in" to—the benefits of integration. These examples illustrate that agencies were able to move along the continuum (Figure 1-1) from communication to more robust integration activities over time.

When integration among multiple transit providers is pursued, perhaps the old adage, "If at first you don't succeed, try, try again" applies. The case studies demonstrate that patience among the participants and commitment to improving the passenger experience is essential. While each of these regions evolved differently, they all succeeded in developing trust among skeptics by building on early successes in order to move toward a more mature stage of integration. Where some agencies have moved quickly and skepticism has remained, integration has been more challenging.

Lesson Three: Strong Local Leadership Is Needed to Sustain an Integration Effort

State intervention was important to initiate integration efforts in two of the case studies. However, decrees and even additional funding that originate at higher political levels are not enough to sustain collaboration in the long term. As shown in Lesson Two, implementation of collaborative measures is almost always incremental, leading to the ongoing involvement of local leadership.

Examples from the case studies underline the importance of local leadership that is *committed* to the value of integration for their community. When that commitment is present, the leadership needs to be involved for the long term, because integration rarely happens quickly. Leaders need to be flexible and willing to change directions if the followers are not behind them as they keep their eyes on the ultimate goal of better service for their constituents; leaders must have a degree of humility to put greater goals before their own. Willingness of large agencies to cede some of the power inherent in their size and put themselves on an equal footing with smaller agencies can be very important to getting and keeping everyone at the table.

Lesson Four: Broadening the Pool of Stakeholders Leads to More Widespread Acceptance

Including all key stakeholders and giving them decision-making power in the process proved essential to success in most of the case studies. Further, stakeholders must have equal access to the process, information, and project leadership. A broader decision-making group can also have the effect of slowing a project down, but many of these integration efforts, especially those farther along the continuum, could not have been accomplished without this more "grassroots" approach. In particular, thinking broadly about partnerships—law enforcement, firefighters, retailers, nonprofit organizations, the business community—can avoid problems later in implementation and can build advocates if controversy arises.

A diversity of stakeholders ensures the following:

- Projects are not dominated by a single interest or stakeholder group.
- The needs and perspectives of a broader range of users are included in project design.
- A large base of support sustains the project through challenges.

A plan, even with the leadership of mayors or the state, was not enough to bring about consolidation, or even collaboration in three of the case studies. The affected parties had to be brought into the process to develop their own understanding of the benefits and be able to then articulate those benefits to their communities and to the riders they serve. The need to be more

inclusive, while lengthening the process, ultimately can lead to a project supported by the whole community. The failure proves the rule: where stakeholders have felt excluded or not respected, coordination efforts have faltered.

Lesson Five: Create Processes that Develop Trust Among Stakeholders

Where projects succeeded, cultivating trust and respect among project stakeholders was cited as an important factor. Problem-solving processes or methods that are transparent, inclusive, and effective gives stakeholders and policymakers confidence that, as problems arise, there are systems in place to balance competing interests. Committees need to be representative of all stakeholders involved, with some degree of power to guide projects and a clear line of reporting back to the regional decision-making body.

Some additional processes that develop trust include:

- Creating budgets and timelines that span elected terms: Projects can get hijacked by a political turnover with a different or competing vision. Stakeholders can be discouraged over the time they invested in a project they believed in and will have reluctance returning to the process. Keep the political background in mind to avoid such disruption.
- Meeting stakeholders on their own "turf," both physically and metaphorically to understand partners' needs, interests, and limitations. If important stakeholders are reluctant to join the process, visit the persons or agencies in their own territory instead of asking them to come to unfamiliar ground. Leaders willing to extend themselves show that the project values broad participation. It may be helpful to identify a "power player" who will support the process to bring others on board.
- Developing systems for continued participation by partners. When agencies share or relinquish authority to another agency, they need assurance that their needs will remain at the forefront of decision making. Several of the case study examples crafted systems, typically committees but also guidelines, which allowed agencies to retain some influence and authority on an ongoing basis. If effective, such systems build trust and confidence and can lead to additional integration/collaboration efforts.

Lesson Six: Maintain a Level of Local Control

Fear of the loss of local control is one of the chief tests integration efforts will encounter. Therefore, one of the biggest challenges for coordination projects is balancing local control with regional interests. Having pre-determined ways that agencies can provide input and maintain some degree of local control, while regionalizing other functions, has proven critical in many cases.

Stakeholders need to determine the baseline components of a coordinated process that cannot be sacrificed. Beyond these baseline components, flexibility can be granted to ensure participants that they can retain some local identity and are not being entirely subsumed into the regional process. This flexibility was used in the case studies in a number of ways: agreeing on minimum performance standards, allowing local control over fare changes, developing cooperative agreements instead of top-down mandates, negotiating formulas to prioritize projects, and creating subcommittees to determine local vs. regional details of joint projects.

Flexibility can ensure that issues that are primarily local in nature remain in the purview of the local agencies. This is important for long-term working relationships among the stakeholders involved in collaborative efforts.

Lesson Seven: Set Goals and Document Anticipated Outcomes at the Outset of the Integration Process

Setting goals and documenting anticipated outcomes—costs, savings, ridership gains—will help determine whether to stay the course or make changes as the project is implemented. Communicating financial information clearly throughout the project will build trust among participants. Budgets must be realistic and accurate to be believable to participants. Participants will need to understand service costs, funding sources, and the benefits, both qualitative (e.g., more downtown activity) and quantitative (increased ridership). Determining how close the project came to meeting its goals and anticipated outcomes can assist in an evaluation of the integration project after it has been implemented. Project evaluation is a useful and effective tool to demonstrate the value of the project to decision makers, funding agencies, and the public and to make adjustments mid-stream to improve project outcomes. Chapter 4 discusses this lesson learned in more detail.

Lesson Eight: Benefits May Outweigh Additional Costs Incurred in Integration

Integration projects do not necessarily result in cost savings and may incur additional costs. Cost reduction is often a primary impetus for working toward transit integration and therefore cost savings is one of the primary assumed benefits that will result from an integration project. Many transit agencies have found, however, that integrating transit systems, programs, and services does not necessarily result in cost savings. In fact, these projects can lead to increased costs.

This increase is often because successful transit integration requires effort on the part of individuals at all participating agencies over an extended period of time. Effort comes at a cost of time, money, and other resources. Sometimes these costs are only upfront for planning and project setup, and over time costs do go down as a result of integration. Further, some of the efficiency improvements promised by integration projects take time to be realized, only occurring once the projects are mature and staff and processes at all the agencies have had time to align.

Even when projects result in permanently higher costs due to increased project management or ongoing coordination activities, the majority of the agencies studied in the research viewed the benefits of integration efforts as worth the additional costs they incur. In particular, they often cited the more qualitative benefits that cannot be readily measured such as a superior passenger experience, improved access to regional locations, and increased public and political support for transit. In addition, in cases where efforts *have* yielded cost savings, agencies sometimes opt to reinvest those savings into additional service.

This lesson underscores the significance of Lesson Seven, the importance of getting all stakeholders on the same page from the start about the goals of a project and the range of anticipated outcomes. For example, if the group determines that cost reduction is the sole motivator to do the project, then it may make sense to assess the likelihood of cost savings as an outcome before undertaking the project. Or, alternatively, if a range of desired benefits are identified, then even if a project incurs added costs, the team can still declare it a success if it achieves the other desired outcomes.

CHAPTER 4

Assessment of Costs and Benefits

"Not everything that counts can be counted, and not everything that can be counted counts."

—Albert Einstein

Many transportation agencies want to make sure that the benefits of the decisions that they make regarding integration or improvement are worth the costs associated with the project. However, as this research has shown, sometimes projects have benefits that may actually cost more than the status quo or benefits that are qualitative and not measurable in terms of cost. Even when cost is not the most important reason for undertaking an integration effort, assessing the success of a project can help agencies strengthen the public's trust that funds are being used effectively. This chapter uses examples from the research to present models of how agencies determined the costs and benefits of their integration projects.

This chapter identifies the costs and benefits from the project profiles and case studies, and reviews costs and benefits in some detail for the ORCA case study. A guide for evaluation of transit projects is included in Appendix I as supplementary information to this research report.

Analytical Approach

The framework for conducting the assessment of costs and benefits for the case studies consisted of gathering documented data and information from each of the six transit agencies, reviewing the information, developing interview questions for the site visits, gathering information from interviews, determining if the data and information were adequate, understanding whether cost and/or benefit information was used to evaluate the project, comparing qualitative costs and benefits for each case study, and determining how cost and benefit information could be used to support decision making. Data-gathering efforts and site visits were led by members of the research team.

Ridership, budget, and revenue data were requested in addition to agreements and formulas for cost and revenue sharing. The data/background information prompted questions specific to the cases which were asked as a part of the site visit process. The interviews were essential to establishing an understanding of costs and benefits for the cases studied. Sample interview questions regarding costs and benefits included:

- What benefits does the project have—for the community, various constituencies and stakeholders, riders, the agency's budget? Do you have any information (anecdotal or otherwise) to help us understand the benefits better?
- How was the project advertised or marketed to the general public and riders? What has been the response? Do you have any data to measure the response (rider surveys, customer satisfaction surveys, etc.)?
- Has the project accomplished the goals you set out to achieve? If so, do you have any information (metrics, data, etc.) to support your view?

- Were costs and/or benefits or business case analyses used to support project selection or implementation?
- For McAllen Central Station: Did vacancy rates around the transit facility change? Is there before and after data to support that finding?
- For McAllen Central Station: Did land values around the transit facility change? Is there before and after data to support that finding?

Based on the results of the interviews and the draft case study write ups, follow-up questions were asked of the transit agencies to clarify statements about costs and benefits and to obtain information to support statements made in the interviews. For example, one interviewee claimed that "millions of dollars were saved by consolidating contracts" and information to support that statement was requested.

With requested data/information and draft case study write-ups in hand, costs and benefits of the transit integration efforts were identified. Common themes among the case studies emerged and are documented in this chapter. Additionally, the results were used to inform how costs and benefits could be used in transit integration decision making and when other forms of evaluation may benefit both the decision-making process and project implementation.

Measuring Success: Costs and Benefits in Transit Integration

Many agencies consider cost effectiveness as a primary factor in the consideration of integration efforts. For large construction projects with federal funding, a cost-benefit analysis is required. However, when other more important aspects of the decision-making process need to be considered, a traditional cost-benefit analysis may not be the most useful tool. The case study research has shown that this is usually true of an integration project among transit agencies. That is why the selection of the type of evaluation to perform is an important one. In some cases, quantifying costs and benefits may display results that are necessary to win over decision makers. In other cases, it is more important to provide a qualitative analysis that helps those decision makers understand the overall benefits of the project. Additionally, attempting to monetize some costs and benefits can prove problematic for some integration efforts, as different ways of measuring achievement (results) can vary among agencies and by project (Weisbrod et al., 2007). For instance, some agencies are used to measuring performance in terms of their monetized amount (travel cost savings) and other agencies measure performance in qualitative terms (such as livability or customer satisfaction).

Finding a common understanding for the policy analysis may require a variety of evaluation tools and techniques. Different types of integration and coordination (e.g., functional vs. institutional) may need different analyses. For example, the coordination of fare structures or the use of a universal fare card may require different analytical parameters than the merger of two transit agencies into a single consolidated entity. Additionally, agencies undertaking complex, multi-year service and/or fare integration efforts may find it difficult to isolate the "cause and effect" data cleanly because of other factors that mask the results or influence the project itself.

However, all of the 19 agencies profiled in this research began their efforts with goals for success. None of the agencies entered into the effort believing that the integration effort would solve all of their problems or address all of the goals equally. Some, however, had very discrete goals they had hoped to achieve even if they had not fully developed an evaluative matrix to guide them. This is common for agencies that may intuitively understand the situation they are trying to fix.

Many agencies do not have available quantitative or qualitative information or an evaluation process to support an assessment of costs and benefits of integration projects. For example, while many agencies count passengers and transfer activity, they do not have the funding to perform

detailed studies to assess origin-destination activity, fare type utilization, or other metrics that would assist in evaluating a project's performance. It is also common for costs associated with contemplated integration efforts to be difficult to quantify for a public agency. Agencies may not have a detailed cost allocation model to help them understand the costs associated with service increases, for instance. Or, they may not know how much staff time is being allocated to individual projects. In these cases, the first step in assessing the outcomes of the integration effort will be determining the correct benchmarks for analysis given (1) the goals and/or objectives of the integration, (2) the stakeholders involved, (3) the data that is available, and (4) the usefulness of the analysis.

This leads to the question: What's the Best Way to Measure Success?

Agency Profiles: Overview

One constant remains throughout the agencies profiled or the cases studies examined: each agency believes that its integration effort was "successful." That means—absent any formal assessment or evaluation—the project sponsors believed that the integration efforts rendered benefits that they believed were worth the time, money, and political energy expended. Based on that construct, conducting post-implementation assessments of costs and benefits of integration projects is not as important to agencies as simply articulating the overall benefits expected or achieved even if the data to support the evaluations may be readily available. Further, stakeholders in one case even said they wouldn't have wanted to conduct a detailed assessment of costs and benefits when they began. They were concerned that tallying the costs and staff resources required to implement the integration project would have stopped the project, which in the end resulted in tremendous benefits to the agency and the public.

While only 3 of the 19 agencies stated that cost-benefit data was available, 17 of the 19 agencies have achieved their expected outcomes, some of which included cost savings, including:

- Seventeen projects have achieved their expected outcomes, while two projects' achievements are yet to be determined.
- Eight projects realized cost savings for agencies and/or passengers.
- Thirteen projects increased coordination between services and/or facilities, improving the efficiency of transit operations.
- Five projects increased ridership.
- One project realized livability, economic, and environmental benefits, such as a reduction in greenhouse gas emissions.

As determined in the site visits, the case study agencies all had information available on which to measure success. And, in all of the profiles, the success was typically measured in terms of benefit to the customer. In nearly every case, when systems integrate, passengers benefit. Some of these benefits can be confirmed, but others are less easily tracked. In some cases, saving money was not contemplated as a goal; rather, improved service delivery was the driving force. As stated by one representative from the Research Triangle case study from North Carolina, "Doing it right costs more money sometimes."

Some examples of customer benefits illustrated in the profiles include:

- **Jointly operated or coordinated routes—**Riders can get to more places, faster.
- **Joint facilities—**Riders can make connections to more services more easily.
- **Integrated fares—**Riders pay less and pay more easily, and the system overall is easier to understand and use.
- **Integrated information—**Riders more easily understand the system/network overall and how to use it.

- **Shared facilities**—Riders get faster and more reliable service and improved transfers.
- **Cross-boundary travel**—Services better match rider travel patterns which do not follow jurisdictional boundaries.

That is not to say that there were not cost savings that occurred as a result of the integration efforts undertaken. Several integration efforts documented in the 19 agency profiles indicated that cost savings were realized. And in several of the case studies, there were savings that occurred as a result of integration or consolidation. However, for these agencies, cost savings were more an anticipated outcome, rather than the impetus for change. In other cases, costs actually increased as a result of the integration effort, such as that undertaken in the Puget Sound region when initiating a regional transit pass. Cost increases may result from any integration effort where the goal is to improve service to the customer.

In several cases, the unexpected outcomes resulted in consequences that stymied the agencies' efforts to undertake integration. Whether it was jurisdictional reluctance to cede control, or additional funding needed to fully execute the integration effort, the unanticipated outcomes can become the risk factor that may prevent either successful integration or any integration at all. Table 4-1 presents an overview of the expected outcomes.

Table 4-1. Expected outcomes and results.

Profile	Expected Outcomes	Achieved
Valley Metro Phoenix Metropolitan Area, AZ	▪ Developed a regional transit system ▪ Developed unified brand (Valley Metro) ▪ Integrated fare system ▪ Integrated passenger information system ▪ Created a regional call center	Yes
Butte County B-Line, CA	▪ Resulted in cost savings ▪ Improved service quality	Yes
MTC Transit Sustainability Study, CA	▪ Reduced transit agencies' costs to be eligible for future funding ▪ Increased coordination through implementation of the institutional recommendations	TBD Yes
LYNX FlexBus, FL	▪ Increased suburban transit use ▪ Enhanced local travel connectivity ▪ Simplified regional transit network ▪ Provided FlexBus for localized travel	TBD
MORE TMCC, FL	▪ Facilitated seamless regional transit mobility management and service delivery, using multiple existing agencies and service providers ▪ Increased mobility ▪ Improved cost effectiveness in transportation service delivery ▪ Integrated service design	TBD
Quad Cities, IL, IA	▪ Linked the three transit systems with 10,000 passes sold annually ▪ Established new service (the Loop), which has generated 34,000 annual riders	Yes
CATA/Clinton Transit/ Eaton, MI	▪ Realized financial savings by eliminating long trips into Lansing through the transfer arrangement with CATA ▪ Retained local control by keeping vehicles and service within Clinton County	Yes
Suburban Transit Association (STA), MN	▪ Improved service quality and customer information ▪ Developed a uniquely branded transit system which is as integrated as possible	Yes
New Jersey Transit, NJ	▪ Expanded and strengthened intermodal connections ▪ Improved wayfinding ▪ Improved and increased signage ▪ Improved and increased passenger facilities ▪ Created an architecture that can support other regional planning efforts	Yes

(continued on next page)

Table 4-1. (Continued).

Profile	Expected Outcomes	Achieved
Durham Area Transit Authority (DATA), NC	▪ Provided a more seamless transit system ▪ Spent transit dollars more effectively ▪ Improved the level of transit service ▪ Increased customer boardings ▪ Improved farebox recovery ratio ▪ Decreased operating costs per rider ▪ Reduced regional redundancy in maintenance functions for five years	Yes
Northwest Transit Alliance, OR	▪ Improved service for customers ▪ Improved efficiencies for transit agencies ▪ Improved employer and employee attraction and retention ▪ Improved access to businesses ▪ Improved visitor experience ▪ Reduced vehicle miles traveled with related reductions in greenhouse gas emissions and fossil fuel use ▪ Increased ridership ▪ Lowered fossil fuel use and carbon emissions ▪ Leveraged a unique funding opportunity to take action to meet identified needs	Yes
PAAC Busways, PA	▪ Reduced operating costs for the transit agency (fewer service hours) ▪ Improved travel times for passengers ▪ Strengthened the regional transit network overall by sharing busways ▪ Established and strengthened relationships between systems ▪ Strengthened the Port Authority's reputation as a "team player" and supporter of regional services	Yes
McAllen Central Station, TX	▪ Centralized transportation at a single location ▪ Facilitated transfers between regional and international services to local bus routes ▪ Provided economic development benefits for local retailers on Main Street	Yes
Dallas-Fort Worth TRE Commuter Rail, TX	▪ Improved operating speeds and service reliability through infrastructure upgrades such as grade separation and double-tracking ▪ Facilitated regional fare that allows passengers to transfer between DART, The T, and DCTA services	Yes
Addison/Rutland County Connector, VT	▪ Increased ridership ▪ Developed new longer distance commuter services ▪ Resulted in cost savings ▪ Improved service quality	Yes
ORCA Universal Fare Card, Puget Sound, WA	▪ Improved operating speed ▪ Provided more accurate ridership data ▪ Improved revenue data ▪ Improved regional revenue reconciliation	Yes
Linx Mobility Management Co-op, Yellowstone, WY, MT, ID	▪ Increased regional mobility ▪ Increased ridership ▪ Increased revenues ▪ Increased awareness of transportation network	Yes
Urban Transit Association (ATUQ), Québec, Canada	▪ Influenced the passage of the Québec Public Transit Policy in 2006 ▪ Resulted in cost savings through group purchasing, with savings averaging 15% ▪ Purchased 509 hybrid buses (diesel and electric), which will begin to arrive in 2014 and continue delivery for years ▪ Established benchmarking used by members to implement corrective actions to improve performance	Yes
Madrid Regional Transportation Consortium (CRTM), Spain	▪ 50% increase in ridership since creation of CRTM while population has grown by 36% ▪ Supported the modernization of the city center ▪ Improved connectivity between Madrid and surrounding municipalities	Yes

Case Studies: Summary Findings

For the six case studies analyzed, agencies identified a range of benefits from the integration projects, some of which are quantifiable and some of which are described qualitatively. However, quantified cost data was provided only for capital projects that were the focus of the integration efforts in McAllen, Texas, and the Central Puget Sound region, Washington. Costs related to the staff time to implement integration projects were common to all case studies but were not quantified in any way.

Butte County B-Line was unique among the case studies in that the results of the consolidation of administrative functions were quantified. They reported a reduction in administrative costs as a percentage of the operating budget that went from 6% to 7% prior to consolidation to 3% after consolidation. Without further analysis, it is not clear whether the savings were due solely to the reduction of administrative costs or if the operating budget grew post-implementation at the same time that administrative costs, which tend to have more fixed variables, remained constant.

A summary of the costs and benefits identified in the six case studies is provided in Table 4-2.

As with the profiles, certain common themes were revealed by the description of the benefits reflected in the in-depth case studies. In all case studies, the integration effort was reported to benefit ridership, either by increasing or retaining ridership, improving passenger convenience, or making the system easier to use. More specifically, the following were some of the common benefits:

- Customer service improvements and customer convenience—such as better service through centralized call center, centralized ADA certification, and ease of use of fare cards—were identified in eight instances. Some case studies indicated more than one instance of this benefit.
- Cost savings from joint procurements and joint contracting were identified in six instances.
- A regional fare structure or fare instrument was identified six times.
- Simplification of the route structure and schedule and elimination of transfers were identified in five instances.
- Administrative cost savings due to consolidations or improvements were identified four times.
- More efficient use of facilities and equipment as a result of the integration was cited in four cases.
- Improved ability to secure funding was identified in four cases.

In addition to the common benefits reported, several overarching themes emerged from the case studies that warrant further discussion.

Before and After Studies

An analysis of the conditions prior to implementation and conditions after implementation are useful in determining the success of the project. The before and after conditions for joint capital projects are easier to demonstrate than many other coordination efforts. For example, intercity bus services stopped at different locations around McAllen, prior to construction of the Central Station. The conditions pre- and post-implementation can be shown visually through photographs, providing an evaluator with a basis for seeing some of the impacts of the station. Stakeholders claim that the project has revitalized downtown. While before and after photographs do not provide a quantitative basis for evaluation, they provide a valid basis for a qualitative evaluation.

Most case study agencies reported that the resulting condition is better than it was prior to the integration project, due to the benefits that the project has yielded. Some stakeholders asked themselves what it would be like without the project and find it hard to imagine. However, with

Table 4-2. Summary of case study costs and benefits.

Case Study	Costs	Benefits
Valley Metro, Phoenix, AZ	▪ Staff time to study and implement coordination projects ▪ Costs of branding, such as new signs, paint schemes, marketing materials	▪ Increased ridership ▪ Improved public perception of transit and public willingness to fund system expansion ▪ Simpler, more accessible system resulting from regional fare structure, consistent branding, and common passenger information ▪ Cost savings from joint contract between RPTA and City of Tempe realized from: –Shared contractor staffing –More efficient use of facilities and equipment ▪ Cost savings from consolidating senior staff functions due to organizational merger of Valley Metro Bus and Valley Metro Rail ▪ Reduced overall costs from consolidation of dial-a-ride program
Butte County B-Line, Butte County, CA	▪ Staff time to study and implement the consolidation ▪ Consultant study to assist with consolidation elements such as the cost-sharing formula, routing, and schedules ▪ Costs of branding and marketing	▪ Increased efficiencies and lower operating costs due to single contractor and single fleet ▪ More effective use of transit facilities and equipment ▪ Reduced administrative costs by consolidation, from 6%-7% of annual operating costs to 3% of annual operating costs ▪ Elimination of duplicate service ▪ Improved service productivity as measured by passengers per vehicle mile ▪ Simplified route structure and schedule making the system easier to use ▪ Timed transfers reduce total travel time for linked trips ▪ Comprehensive customer service ▪ Increased ability to secure outside funding
Twin Cities, Minneapolis, MN	▪ Staff time to implement coordination efforts such as coordinated fares, pooling vehicles, AVL integration, public information, establishing operating protocols on shared transit corridors ▪ Duplication of AVL equipment on bus rapid transit line due to lack of coordination ▪ Reduced flexibility for smaller suburban agencies to adapt to changing needs under the regional agency	▪ Common fare instrument makes system more seamless to riders ▪ Single fare structure is easier to understand ▪ More legible route network due to unified route numbering system ▪ More efficient use of transit vehicles due to single owner and streamlined fleet management ▪ Improved customer convenience through centralized regional transit information ▪ Increased operating efficiencies from shared scheduling and dispatch due to integrated AVL system for all but one operator ▪ Enhanced public information provided through real-time system implemented with AVL system ▪ Optimized flow of transit vehicles through coordinated operational protocols on dedicated downtown transit corridors
Research Triangle, NC	▪ Staff time to study and implement coordination projects ▪ Implementation of a new regional call center ▪ Implementation of regional software for automatic passenger counts ▪ Increased costs of overseeing merged transit service	▪ Increased customer satisfaction with regional call center ▪ Improved ability to bill cities for regional call center calls through new software ▪ Regional pass program makes travel easier and more cost effective for riders using more than one transit system by eliminating the transfer penalty

Table 4-2. (Continued).

Case Study	Costs	Benefits
		▪ Joint procurement of software for automatic passenger count data resulted in cost savings for some agencies ▪ Improved customer satisfaction with real-time information system ▪ Reduced customer information calls due to real-time information ▪ Improved customer experience by eliminating transfers among multiple paratransit providers ▪ Regional ADA certification makes the process easier for customers ▪ Contractual merger of transit system (DATA/TTA) improved on-time performance, service quality, service frequency, and fleet condition. Additional results are: –Reduced crime at a major transit hub –Cost savings due to bulk purchases
Central Station, McAllen, TX	▪ $4.9 million capital cost to implement in 2000 ▪ $2.4 million in upgrades in 2010 ▪ $492,000 annual operating and maintenance budget in 2001; $178,407 in annual lease and concession revenues from private sector (bus lines, advertising) budgeted for 2001; anecdotally, station operations is reported to "break even" currently ▪ Staff time to coordinate and develop the project prior to implementation	▪ Increased ridership ▪ Improved convenience and quality of passenger experience ▪ Improved bus circulation on downtown streets ▪ Improved passenger and vehicular safety ▪ Single facility improved operations for inter-city bus operators by: –Sharing costs and amenities; quality of facilities and amenities are perceived to have a greater value than the amount paid –Simplifying passenger transfers –Broadening the market ▪ Contributed to the economic vitality of downtown McAllen ▪ Facilitated opportunities for public transit operators in the region to collaborate on other initiatives such as joint procurement, regional radio system, and regional fare card
ORCA Universal Fare Card, Puget Sound, WA	▪ $42 million capital cost to implement ▪ $7.5 million annual operating and maintenance cost ▪ Staff time to coordinate and develop the project prior to implementation ▪ Staff time to coordinate ongoing operation ▪ Increased credit card fees	▪ High degree of customer satisfaction ▪ Simplification of fare media making it easier for the public and bus drivers to understand ▪ Updated image that appeals to "tech-savvy" riders ▪ Readily available and accurate data resulting in: –Increased confidence and accountability in revenue distribution –Reduced reconciliation and audit costs –Increased business account revenue –Reduced cash handling costs –Reduced bad debt –Reduced fraud by elimination of paper transfers –Redirection of customer service staff to other activities ▪ Faster boarding times that may reduce dwell time and therefore reduce operating costs ▪ Improved relationships with the business community ▪ Enhanced information sharing among transit agencies ▪ Improved ability to secure outside funding

the exception of Butte County B-Line, it is unclear that any of the agencies gave early consideration of a before and after analysis in the implementation of their integration efforts.

Contract Consolidations and Consolidation of Administrative Functions

Isolating the costs and savings of consolidated functions can be a complex undertaking. For example, two of the case studies reported cost savings from consolidation of service operations contracts. Specifically, both Butte County B-Line and Phoenix Valley Metro consolidated multiple ADA paratransit service contracts under a single larger contract, resulting in more cost efficiencies from reduced management and administrative staff, economies of scale in fuel purchases, and efficiencies in facility usage. While it is generally agreed that cost savings were realized, there is not much data to support that conclusion. One reason cited for the lack of good data is that cost savings were reinvested into additional service, making it difficult to isolate the cost savings realized. Even if gross costs remained the same, the cost per revenue vehicle hour should reflect a reduction due to the contract cost savings. Another reason cost data from contract consolidations is difficult to obtain is that variables other than contract consolidation can have an impact on cost. For example, fuel costs can increase or decrease outside the control of the public agency or private provider and can cause costs to rise. If the agency is not able to isolate this factor, the cost savings due to consolidation may be overstated or understated.

Cost savings due to administrative consolidations reported in the case studies are also difficult to confirm. The administration of most transit services is provided by public agency employees. When administrative positions are no longer required due to integration efforts, employees can be reassigned to other duties and not simply eliminated from the payroll. While the reassignment results in increased overall productivity for the agency, measuring the cost savings is often lost. For example, in Butte County, the City of Chico did not consider the cost savings from administrative consolidation because it did not track the administrative costs for managing transit services. Administrative costs were attributed to positions that had additional functions and the positions would not be eliminated due to the transfer of the transit function to the County. Thus, the City did not consider the transfer of the administrative function to be a cost reduction.

Cost Sharing and Revenue Sharing

All cases studied included some form of cost and/or revenue sharing as an important feature of the integration effort. The role of cost and revenue sharing in integration efforts as it relates to assessing costs and benefits is significant in the following ways:

- Agreed-upon formulas are proxies for quantifying the real or perceived benefits realized by participating jurisdictions. By negotiating a cost- or revenue-sharing formula that is deemed to be fair and equitable, each participant is acknowledging a benefit in some way from the shared cost or by sharing revenue. It often reflects the fact that they are willing to give up a share of revenue that they might have otherwise received, or that they are willing to pay more than they might have otherwise had to pay for a service due to the overall benefits from the integration project.
- Significant efforts are expended to arrive at and implement a fair cost- or revenue-sharing agreement. Staff time, legal services, accounting procedures, and reporting mechanisms to develop and maintain the agreements result in a cost to the integration project.
- Negotiations for cost- and revenue-sharing agreements influence the level of cooperation among jurisdictions to achieve integration. The results of the cost- and revenue-sharing negotiations can strain the partnerships needed for integration and may ultimately cause partners to "opt out" of the project. The agreement is a key element of the success or failure of an integration project.

Examples of the case study uses of cost- and revenue-sharing models demonstrate these points.

- For Twin Cities, the revenue allocation model has had a long and contentious history, illustrating the challenge of balancing suburban transit needs with urban transit needs and sharing tax revenues fairly within the region. Dating back to 1981, the revenue-sharing process has involved the state legislature, the Met Council, Suburban Transit Association, and local jurisdictions. Association members objected to the 2008 revision to the Met Council-imposed formula, but stakeholders believed that renegotiating the formula to be more equitable would be challenging and that funding was also not the most significant challenge of coordination. The history of these negotiations has colored the interagency relationships and affects the coordination efforts.
- For Valley Metro in Phoenix, a jurisdictional equity formula is at the heart of the coordinated regional service. The basis of the formula is to distribute sales tax revenues by jurisdiction to achieve equity. Over time the formula has been refined to account for multi-jurisdictional routes and projects by allocating tax revenues on a sub-regional rather than on a jurisdictional basis. The jurisdictional equity policy allows for sub-regions to exceed their allocated tax revenues by up to 2.5%.
- Fare revenues and operating costs for ORCA are shared by the seven participating agencies that use the smart card system. Fares are returned to the system used by the ORCA card holder. In the case where more than one transit agency is used for a trip (a linked trip), the fare revenue returned to each agency is proportional to the fare of the two trips. Agencies were concerned about the potential for revenue loss on interagency trips so Sound Transit committed to cover the revenue loss if fare revenues fell below 67% of historical intersystem fare revenue. Operating costs are shared using a formula based on each agency's share of ORCA trips. Sound Transit paid for the first two years of operating costs to encourage smaller agency participation in the project. Sound Transit's financial contributions to the project were vital to the participation of the smaller agencies and reflect the value Sound Transit placed on participation by all agencies in the ORCA system.
- In Butte County, existing cost-sharing agreements needed to be considered prior to the consolidation of services. The complexities of determining how to share costs caused the consolidation to be phased, with the administrative functions being consolidated first. It took another four years before a cost-sharing formula was agreed upon and the operations were consolidated. The policy committee's objective of sharing costs was to minimize the financial impact on any single jurisdiction while ensuring the formula was fair and equitable. The long negotiating process resulted in a cost-sharing formula for fixed-route services based on a jurisdiction's population (50%) and total service hours within that jurisdiction (50%). For paratransit services the formula is based on a jurisdiction's population (50%) and total boardings (ridership) within that jurisdiction (50%). Ultimately, the investment of resources in developing a cost-sharing agreement helped finalize the consolidation of services.

Lessons Learned: A Post-Implementation Approach

As mentioned earlier, it is not uncommon for transit agencies to implement significant organizational changes, such as those described in the case studies and agency profiles, without revisiting their decisions and/or outcomes. There are many reasons that this is the case. Public agencies and their elected officials may be reluctant to publicize decisions—even those made under the construct of transparency—that did not render the efficiency or effectiveness that was assumed. Additionally, with integration efforts, many stakeholders are active in the decision making. Public agencies typically act on implementing complex integration projects after a lengthy process involving the public, stakeholders, staff and/or consultant analysis, followed by a decision by the policymakers. As a result, the involved parties may believe that a consensus has been achieved and may consider it counterproductive to reopen the process.

Although outcomes might not be evaluated using a formal process and structure, agencies sometimes undertake a formal or informal "lessons learned" process where they report back on the integration efforts as a way to highlight the positive impacts and explain how the negative outcomes occurred. While useful in most cases in assisting agencies to understand the challenges that arose during implementation, the value of these lessons learned can suffer if they are overly sanitized to protect the decision makers or agencies themselves that may have had a role in the challenges. This may happen when the lessons learned are documented and made available publicly. The informal lessons learned at the staff level are often the most honest and revealing when the results are not being documented.

But, transit agencies can and do report on the data that is important to *them.* Of the 19 agencies profiled, all had some level of data that they believed could be used to supply a report card on the integration effort—primarily cost and ridership data. What may have been missing, however, were clear expectations and benchmarks for cost and ridership that were established when the integration effort was initially being considered. Benchmarks can assist decision makers in understanding the nature of their policy decision and provide a clear way to measure success either quantitatively or qualitatively.

Although all the profiled agencies reported to have collected ridership and cost data in some form, it is difficult to determine whether the agency data would be useful in measuring the outcome of the integration effort. Even in cases where benchmarks have been established, the data may not be useful. However, reviewing performance data and associated benchmarks may help agencies dig deeper into their results to determine whether additional analysis would be needed to assess transit integration's success. Perhaps the best example of the difficulty in attributing ridership changes to integration efforts is the use of ridership data. Nearly all public transit operators in the United States collect and report ridership to the National Transit Database. However, changes in ridership can be difficult or impossible to attribute to a service change due to the number of variables that influence ridership, such as concomitant fare changes, congestion, and market forces (e.g., gas costs, employment, travel demand). It is also difficult to isolate the impact of a service change if the implementation of the integration effort spanned multiple years, as external issues can have a significant effect. Similarly, available cost data is often not directly related to the cost of the integration effort but may reflect other market forces. This is where additional analysis may be needed to tease out the results being measured. For instance, while overall system ridership growth may not be the result of integration efforts alone, growth in submarkets, such as for trips beginning on one system and ending on another, can be attributable to integration if further analysis such as an on-board survey confirms that assumption.

Cost-Benefit Analysis in ORCA Case Study

As the case studies indicate, integration projects are not always undertaken based on an assessment of costs and benefits or with a plan for evaluating outcomes. ORCA provides a case where elements of such an assessment are present and are easily described.

ORCA Overview of Costs and Benefits Assessment

The ORCA card is a contactless smart card that can be utilized for fare payment on seven public transportation providers in the Puget Sound region in the State of Washington. The system took approximately 13 years to implement from the earliest feasibility studies in 1996 to its launch in April 2009.

This case study is a good example of how a well-planned and successful integration project relied on estimated cost and revenue impacts and detailed project goals and objectives in the

planning stages to support decision making but did not do post-ORCA assessment of costs and benefits.

Objectives and Initial Analysis

In January 1996, a Phase I Feasibility Analysis for Regional Fare and Technology Coordination for Central Puget Sound was completed (IBI Group, 1996). The report concluded that a smart card fare collection system can provide significant benefits to customers, employers, and participating transportation agencies. This report also included an analysis that estimated a range of potential cost savings and impacts that could potentially be realized through the implementation of a new smart card fare collection system. Because of the comprehensiveness and complexity of its fare program, King County Metro Transit was used as the primary model for the analysis. The intent was to prepare a comprehensive summary of specific needs, issues, impacts, and opportunities that, while focusing primarily on Metro's operations, would also be applicable to other agencies with similar program elements.

The feasibility analysis concluded that based on Metro's 1994 fare program operations and maintenance costs, the net future impact on these costs resulting from smart card system implementation (exclusive of new revenues) was estimated to range from a "best case" cost savings of approximately $360,000 per year, to a "worst case" cost increase of $88,000 per year. New revenue generation opportunities on the order of $613,000 to $995,000 per year were estimated. The report further cautioned that the estimates were preliminary only and that the estimates depended on several key assumptions. An estimate of capital costs of the system was included in the feasibility analysis as well.

The smart card system RFP was released in 1999; however, the procurement process was suspended for over a year due to the passage of a voter initiative (I-695) that severely reduced or eliminated funding for all bus agencies in the region. Once new funding sources were identified, the procurement process was re-started. A notice to proceed was issued to the selected vendor in 2003 and the card was officially launched in 2009. Needless to say, the features of the fare card system and the organizations involved in its implementation changed over the several years from vendor selection to project launch.

The 1999 RFP clearly summarized the objectives by which the success of the project would be measured, stating, "The project should:

- increase ridership and customer convenience
- increase agency revenues
- reduce operating costs, or provide demonstrable added value for cost increases." (King County, 1999)

Although the focus was clearly on costs, the RFP notes that "Many benefits to the planned fare collection system are not measurable, as they comprise as yet unexplored customer and business opportunities for the transit industry." In fact, the RFP further includes a list of 24 goals for the new fare collection system, some of which can be measured quantitatively or qualitatively.

Thus, the project was initiated with a cost and revenue analysis, clear objectives to reduce costs and increase revenues, and a list of 24 goals. In all, it was a good foundation for evaluation of certain elements of the project, if not of the project as a whole.

Post-Implementation Review

ORCA was universally affirmed to be worthwhile in all the stakeholder interviews conducted in the case study. The benefits of the fare card system were articulated at some length, while the

Table 4-3. Achievement of objectives for smart card system.

RFP Objectives	Achievement
Increase ridership	Undetermined
Customer convenience	Exceeded expectations
Increase agency revenues	Undetermined but possibly achieved
Reduce operating costs, or provide demonstrable added value for cost increases	Undetermined; operating costs probably not reduced, but added value may have been achieved

costs were acknowledged to be greater than originally estimated. With regard to the key objectives outlined in the RFP in 1999, the project had mixed results based on stakeholder interviews as shown in Table 4-3.

Of the 24 goals included in the RFP, none had quantified measures associated with them. For example, "increase ridership" was a goal; however, no quantifiable measure, such as "increase ridership by *x*%" was established. A simple evaluation of goal achievement was undertaken through the document review and interviews conducted for this research to determine if the goal was, was not, or may have been achieved. ORCA stakeholders indicated that seventeen to nineteen of the goals have been achieved, three may or may not have been achieved, and four were not achieved. All but one of the goals that were not achieved relate to technological capability or regulatory issues that were barriers to achievement. For example, the goal to install equipment and fare media adaptable to auto uses such as parking and bridge toll payment has not been achieved due to technology constraints of the existing system. Of the goals that were achieved, four were to explore the potential for various partnerships. Through stakeholder interviews it is apparent that exploration of these potential partnerships was completed, but none were deemed feasible due to technology limitations or regulatory barriers to implementation.

Two of the goals that may or may not have been achieved were to increase ridership and to reduce passenger boarding and bus dwell time. Both of these goals could have quantifiable measures associated with them, such as "increase ridership by *x*%" or "reduce dwell time by *x*%"; however, neither of these benchmarks was established. Also, even though ridership data is available pre- and post-implementation, there is no way to determine if ORCA increased ridership, due to many other factors that affected ridership over this period, such as the economic downturn and significant service changes; it would be nearly impossible to attribute causation to ORCA or any other single factor.

Similarly, data to support the goal to reduce passenger boarding and bus dwell times was not available. Even if data for average bus dwell times was available, it would be difficult or impossible to determine if changes to system-wide dwell times were caused by faster boarding times with ORCA or other operational changes. However, an additional detailed dwell-time analysis that measures time associated with fare payment by media type on the vehicle could potentially demonstrate the impacts of ORCA on dwell times and might be worth the additional data collection cost. By reducing dwell times, service hours can be reduced and the system can be made more efficient. This is an example of how data availability could be quite meaningful. Consequently, even though the data can be relatively expensive to collect, the impact of dwell time on service planning and its potential for reducing operating costs may well be worth the data collection investment.

The pre- and post-implementation system features/benefits of ORCA are so radically different, along with other administrative changes within the agencies, that it is not possible to do a determination of whether it is a cost-saving project. Even if the data was available,

an assessment of costs and cost savings cannot be done on the implementation of ORCA; however, ORCA stakeholders believe the project is successful based on the goals that were initially established.

It should be noted, however, that in the four years that ORCA has been operational, a range of reports on usage and costs is prepared for management of the system. Performance data is collected and reported regularly showing the growth in ORCA usage, the growth in business accounts, customer contact, and key activities for the period. Operating costs and revenues are reported monthly. These reports show increasing usage of the card and decreasing customer service activity, indicating that customers are gaining a better understanding of the system and are using it regularly.

Lessons Learned from the ORCA Case Study

The ORCA case study illustrates how a post-implementation assessment of costs and benefits of a transit integration project may not be important to managers and decision makers. Yet, goals and objectives established early in the planning process were important to guiding the project and in shaping the RFP. ORCA sponsors clearly believe the project is a success and that the goals have been fulfilled.

The lessons learned from this project helped identify potential improvements for evaluating the success of an integration project. The ORCA case study is used here as an example of how additional evaluation tools could be applied if the sponsors believed additional evaluation would be useful. For example, reductions in cash handling due to increased ORCA usage could have been measured and the associated cost savings could have been calculated. The goal to reduce cash and ticket payments could be measured by the percentage of fares paid by cash, while the target could be to reduce it to a certain percentage over time. Also, staff time could be relatively inexpensive to collect and would be useful in evaluating the project had the project sponsors wanted to track that data.

Additional data collection could be considered when its ultimate use is likely to affect major cost drivers. For example, data to show how increased ORCA usage could reduce vehicle service hours may be expensive to collect, but the potential outcome of reducing vehicle service hours could easily make the data collection effort cost effective, particularly for the larger transit operators—Metro and Sound Transit. In ORCA's case, post-implementation data collection for ORCA has appropriately focused on the performance of the system, and is not necessarily linked to the project goals. However, should policymakers or the community at large have desired it, certain additional data collection such as staff costs to coordinate the project, cash handling cost savings, and dwell time savings may have proved useful and cost effective in determining the impacts of the smart card on the transit systems.

Conclusions

The literature review and case study analyses show that traditional cost-benefit evaluations are not typically conducted by agencies undertaking integration projects. While all agencies considered the integration projects to be successful, citing numerous benefits, little measurable data or analysis was available to support that finding. These projects were expected to help resolve a problem or improve on the existing condition and implicitly the benefits were anticipated to outweigh the costs of the projects. Several of the agencies, such as Butte County, the Research Triangle, Valley Metro, and ORCA, did some limited post-implementation evaluation of parts of the integration project—for example, reductions in administrative costs

> "If a measurement matters at all, it is because it must have some conceivable effect on decisions and behavior. If we can't identify a decision that could be affected by a proposed measurement and how it could change those decisions, then the measurement simply has no value."
>
> —Douglas W. Hubbard, *How to Measure Anything: Finding the Value of "Intangibles" in Business*

in Butte County and Valley Metro and reductions in customer service inquiries at the other two agencies. However, a quantitative cost-benefit analysis was not considered as it was not perceived to be valuable to the decision-making process.

Is a formal assessment of costs and benefits or a cost-benefit analysis necessary for transit integration projects? With the exception of very large and costly projects, which may have their own state or federal requirements for such analyses, most transit integration projects probably do not need a traditional cost-benefit analysis or even a formal post-implementation evaluation. However, some form of evaluation is useful to demonstrate the value of the project to decision makers, project champions, funding agencies, and the public. For those reasons, establishing evaluation methods—with or without quantified costs and benefits—is an important consideration in developing transit integration projects.

CHAPTER 5

Conclusion and Actions for Implementation

In 2012, the U.S. recorded its second highest transit ridership since 1957, according to APTA. Convergence of this growing interest in transit with a reduced funding environment creates a ripe climate for transit agencies to pursue increased integration among multiple providers. By partnering with neighboring providers, transit agencies may be able to address shrinking funding without decreasing overall service. These same partnerships may actually improve service for riders by transporting them to desired destinations previously inaccessible because of jurisdictional boundaries.

This research has documented a variety of efforts by transit agencies around the country ranging from simple to complex to improve their customer service through increased integration. As evidenced by the research, where there are important ingredients such as leadership, trust, and commitment to a common goal, successful collaboration can lead to benefits for both the customer and the participating agencies.

The process for integration used by agencies studied in this research can be summarized by the flowchart in Figure 5-1.

As shown in Figure 5-1, action to begin integration most appropriately starts at the local level with a champion. The champion can be anyone: a key staff member, a member of the board of directors, a legislator, an advocacy organization, or even riders demanding changes. But someone needs to take the lead. This report and its accompanying Manual is a blueprint, based on on-the-ground experiences of others, for how to proceed once that initial leadership step has been taken.

Actions to Promote Integration at Agency, Organizational, and Governmental Levels

Local Actions

Transit Agencies

The greatest potential for success in improving integration lies with the transit agencies themselves. Changing the organizational culture to focus on the customer's needs rather than limiting service plans to the agency's jurisdictional boundaries is key to moving forward on integration. This cultural shift starts at the top with the general manager and the board of directors. It may be initiated by outside influences, but unless there is buy-in from the leadership in the transit agency, the effort will falter. Actions can include the following:

- Developing a cohesive internal vision that is supportive of integration
- Redefining staff roles and responsibilities to carry out the vision
- Encouraging staff to actively look for integration opportunities
- Providing board development to support the vision

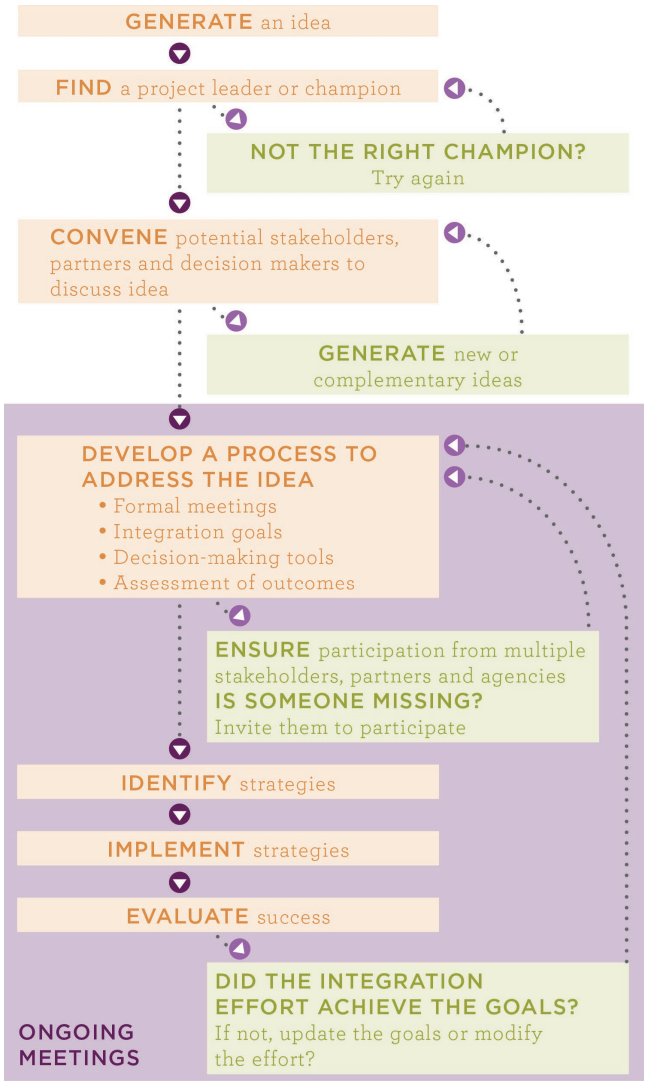


Figure 5-1. Conceptual process of integration.

This research will help transit agencies identify potential projects, assess the viability of projects from both a political and economic perspective, and determine how to initiate projects.

City and County Governments and Regional Organizations

The research identified a strong role for regional organizations to act as a convener about integration topics. An important function can include facilitating and mediating discussions among diverse transit providers to find common ground around goals that improve integration. Regional organizations can also assist with research about best practices on specific issues raised by the participating parties.

City councils and county supervisors who help fund local transit services with local dollars can use this research as a basis for requiring greater integration with surrounding operators both to provide more seamless service for their constituents and also potentially to reduce costs. The research can be a resource to respond to taxpayer associations and rider and environmental advocacy groups calling for greater transit integration in their communities. Local governments can facilitate integration by using existing or new forums to resolve conflicts about their differing

values or visions that may impede integration, such as issues about local control and local identity. Interlocal agreements can allow long-range commitments to joint projects, such as regional branding or shared funding of services and facilities. Local governments will also need to be involved when transit agencies cross their own jurisdictional boundaries and wish to operate on another jurisdiction's streets and set up signage and bus stops.

State Actions

Like regional organizations, the state can also take on the role of convener to instigate a discussion among counties and regions about increased integration. The state can back up its role by providing grants to jump-start local actions. The state can also create regulations or incentives to foster integration, such as funding credits for agencies that demonstrate collaboration.

The state may authorize the formation of a regional transit authority to work in conjunction with local transit operators. It can also authorize tax initiatives to support transit services across counties or regions. The state could use its powers to mandate increased integration through legislation, although this research has shown that top-down mandates should be coupled with opportunities to make local stakeholders feel valued in the planning and decision-making process.

Federal Actions

The federal government has a major influence on public transportation through its funding programs. Funding a successor bill to the Moving Ahead for Progress in the 21st Century Act (MAP-21) is the most effective action the federal government can take to keep transit a viable mobility option in this nation. Within its funding programs, credits could be awarded to transit agencies exhibiting projects that advance integration.

Actions for National and State Organizations

Nationally, the research can be a timely topic for the CEOs' committees for rail, commuter rail, and bus and paratransit within APTA. In addition, many public transit operators participate in similar organizations at the state or regional level. Regional transit conferences can be a good opportunity to present the Transit Integration Manual in training sessions. The research can be a feature in conferences, including the TRB's Annual Meeting. Hearing about the research's success stories and lessons learned can spur thinking about how it can be applied to participants' own transit agencies.

This research report, and the Manual, will be accessible on TRB's website. Articles in magazines aimed at the transit profession, such as Metro, Mass Transit, and Progressive Railroading, can make the research findings more widely known. Such publicity can be particularly helpful for smaller operators, which may not have the resources to produce their own studies or regularly attend national conferences.

National and state organizations can follow up with more detailed research on topics that surfaced during this research project. Three topics that lend themselves for more in-depth research are presented in the following section.

Topics for Future Research

The Role of Technology in Fare Integration

According to research on the ORCA card, federal banking rules prohibit an "open purse" for public transit fare cards, which would allow the card to be used for non-transit purchases as well. Although operators in New York, New Jersey, and Pennsylvania are piloting the use

of credit cards installed on smartphones for fare payment, there is an ongoing payment to the credit card companies that makes it expensive for smaller properties to use this technology. New research could focus on how technology will affect future fare payment methods. What are the opportunities for an open purse linked to the fare card that would make such a multiuse card attract new riders? What are the costs and challenges for transit agencies to implement such a card? Or is fare collection moving in an opposite direction, where customers use devices they already have in their pockets—debit cards, credit cards, phones—making coordinated fare structures less important or even irrelevant? The research could explore how other countries, which are ahead of the United States on open purse farecards but have a different regulatory climate, have implemented their fare payments, including changes that might be needed in U.S. regulations to model them. The research could also examine how smart cards or credit cards could be used to eliminate queuing altogether at the point of payment.

Using Technology for Service Integration

Two innovative projects were under development but not yet implemented during this current study: MORE TMCC, developed cooperatively by the Central Florida Regional Transportation Authority, and the LYNX FlexBus Demonstration in Central Florida. The MORE TMCC concept shifts coordination and integration of services to a scheduling-based function rather than forcing coordination at the agency level. The FlexBus operating concept is opposite that of traditional transit in that it uses a real-time dynamically routed system for scheduling, trip-booking, fare payment, and vehicle assignment functions. New research can examine the outcomes of these innovations as well as investigate other examples of how technology can be employed on a large scale to change the way service is delivered by multiple agencies joining together.

Guidance on Establishing an Integrated Service Plan

The Transit Integration Manual (Volume I) is a primer on the process of integration. New research could follow on by digging deeper into topics that agencies will face. How are variations in fleets reconciled when two agencies consolidate? How can joint maintenance be accomplished when fleets from more than one agency are involved—what kind of facility, tools, and training are needed? How are service standards applied across a region with different fleets, demographics, local funding, community priorities, etc.? How do agencies integrate services with different labor rules, including represented and non-represented employees? What are the legal impediments that could be encountered in cost sharing across jurisdictions and what model agreements have been successful to overcome these impediments? These are some of the topics raised by the current research on issues that case study properties faced. More in-depth research could result in specific guidance on the details of an integrated service plan.

Summary

Experience has shown that individuals and organizations learn by example. This research can bolster the confidence of others by reassuring them that successful integration can be a long process with change taking place incrementally. Success is made more likely by including a broad base of stakeholders in the process and maintaining flexibility to retain a measure of local control and identity. With the benefit of lessons learned by successful peer agencies, the findings of this research project will help agencies shorten the learning curve of transit properties wishing to advance integration in their regions.

Abbreviations, Acronyms, Initialisms, and Glossary

Abbreviations, Acronyms, and Initialisms	
ADA	Americans with Disabilities Act, 1990
ATUQ	Urban Transit Association (Association du Transport Urbain du Québec)
AVL	Automatic Vehicle Location
BCAG	Butte County Association of Governments
CATA	Capital Area Transportation Authority
CRTM	Madrid Regional Transportation Consortium (Consorcio Regional de Transportes de Madrid)
FTA	Federal Transit Administration
GPS	Global Positioning System
MPO	Metropolitan Planning Organization
MTC	Metropolitan Transportation Commission, San Francisco Bay Area
ORCA	One Regional Card for All
RFP	Request for Proposals
RPTA	Regional Public Transportation Authority
TRE	Trinity Railway Express
TTA	Triangle Transit Authority
UK	United Kingdom

Definitions of Terms	
Circulator	Streetcars, rubber-tire trolley lines, and buses that connect urban destinations and support redevelopment. Service is often operated in a closed loop, usually three miles or less in length. Frequent headways, simple schedules, and frequent stops define the systems.
Consolidation	Merged transit service based on time and cost efficiencies and savings based on redundant routes, administrative mergers, and others.
Deadheading	Non-revenue movement of transit vehicles, often traveling between routes and base.
Dynamically routed	Advanced transit routing that considers current traffic conditions and adjusts based on time of day and particular conditions.
Fare integration	Allows the use of one fare to travel between more than one transit service or on more than one agency/operator's service.
Fare media	Examples include: tickets, tokens, passes, stored value card, smart card, contactless card, electronic fare card, and others.
Farebox recovery ratio	The percentage or amount of the operating costs that are met by passenger fares.
Fixed guideway	Transit systems where vehicles operate using and occupying a separate right-of-way or rail.

Definitions of Terms	
Interlocal agreement	Contracts that allow government agencies, often within the same region, to share portions of their budgets for mutually beneficial services.
Interoperability	Ability for one medium to be used for many connected uses. In this example, smart card's use for a variety of transit and other services.
Millage tax	The tax rate, as for property, assessed in mills (one-tenth of a cent) per dollar.
Mobility management	Strategic transit service coordination between agencies and other service providers such as taxi and private operators.
Next bus	Real-time passenger information about transit vehicle arrival using GPS-enabled AVL technology. Important information to reduce negative travel and wait time perceptions.
Open payment	Systems that allow users to pay transit fare using a smart card linked to their bank account. Tapping card deducts payment from their bank account and allows one card for all card purchases.
Transfer penalty	The cost of making a transfer, including the lost time and productivity, uncertainty, discomfort, and any other inconvenience or emotional stress related to transferring from one vehicle to another.
Wayfinding	Signage and other geographic information that communicates location, distance, and other environmental relationships to orient and guide people.

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Appendixes

Appendixes A through I are not published herein but are available on the TRB website by searching for TCRP Report 173, Volume II. These appendixes are as follows:

- Appendix A: Phoenix Metropolitan Area, AZ
- Appendix B: Butte County, CA
- Appendix C: Twin Cities, MN
- Appendix D: Research Triangle, NC
- Appendix E: McAllen, TX
- Appendix F: Central Puget Sound Region, WA
- Appendix G: Literature Review
- Appendix H: Agency Profiles
- Appendix I: Guide for Evaluation of Transit Integration Projects

Abbreviations and acronyms used without definitions in TRB publications:

A4A	Airlines for America
AAAE	American Association of Airport Executives
AASHO	American Association of State Highway Officials
AASHTO	American Association of State Highway and Transportation Officials
ACI–NA	Airports Council International–North America
ACRP	Airport Cooperative Research Program
ADA	Americans with Disabilities Act
APTA	American Public Transportation Association
ASCE	American Society of Civil Engineers
ASME	American Society of Mechanical Engineers
ASTM	American Society for Testing and Materials
ATA	American Trucking Associations
CTAA	Community Transportation Association of America
CTBSSP	Commercial Truck and Bus Safety Synthesis Program
DHS	Department of Homeland Security
DOE	Department of Energy
EPA	Environmental Protection Agency
FAA	Federal Aviation Administration
FHWA	Federal Highway Administration
FMCSA	Federal Motor Carrier Safety Administration
FRA	Federal Railroad Administration
FTA	Federal Transit Administration
HMCRP	Hazardous Materials Cooperative Research Program
IEEE	Institute of Electrical and Electronics Engineers
ISTEA	Intermodal Surface Transportation Efficiency Act of 1991
ITE	Institute of Transportation Engineers
MAP-21	Moving Ahead for Progress in the 21st Century Act (2012)
NASA	National Aeronautics and Space Administration
NASAO	National Association of State Aviation Officials
NCFRP	National Cooperative Freight Research Program
NCHRP	National Cooperative Highway Research Program
NHTSA	National Highway Traffic Safety Administration
NTSB	National Transportation Safety Board
PHMSA	Pipeline and Hazardous Materials Safety Administration
RITA	Research and Innovative Technology Administration
SAE	Society of Automotive Engineers
SAFETEA-LU	Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (2005)
TCRP	Transit Cooperative Research Program
TEA-21	Transportation Equity Act for the 21st Century (1998)
TRB	Transportation Research Board
TSA	Transportation Security Administration
U.S.DOT	United States Department of Transportation