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Tapping In: Leveraging Open-Loop Fare Payments to Increase Financial Inclusion

Author

Broader, Jacquelyn

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Tapping In: Leveraging Open-Loop Fare Payments to Increase Financial Inclusion

Author Jacquelyn Broader, University of California, Berkeley

Advisor Karen Trapenberg Frick, University of California, Berkeley

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16. Abstract

In the United States, public transit agencies are increasingly growing interested in deploying open-loop payment systems for public transit fare payments. This interest is based on the benefits these systems can offer, from faster boarding times to the potential of attracting more riders. Open-loop fare payment systems' popularity is evidenced by the growing number of American public transit agencies who have deployed them; most of whom (63%) are located in California. The overlap between public transit riders who are both transit-dependent and financially excluded (i.e., have no or limited access to financial services) creates the opportunity for public transit agencies deploying open-loop payment systems to leverage these systems to increase financial service access for transit dependent, financially excluded riders. Individuals who are both transit-dependent and financially excluded are typically low-income, identify as part of a racial or ethnic minority group, immigrants, and/or women. As a result of these demographic characteristics, this work focuses on these populations. Additionally, financial inclusion, especially for these populations, is a critical step for economic and social mobility in the United States. This research focuses on California and explores how to leverage public transit agency deployment of open-loop payment systems to increase riders' financial service access. This research is comprised of a literature review, expert interviews (n=11), population needs mapping, and partnership proposals. In general, public transit agencies can strategically work with financial sector-based partners who focus on serving the transit agencies' priority rider groups.

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About the Pacific Southwest Region University Transportation Center

The Pacific Southwest Region University Transportation Center (UTC) is the Region 9 University Transportation Center funded under the US Department of Transportation's University Transportation Centers Program. Established in 2016, the Pacific Southwest Region UTC (PSR) is led by the University of Southern California and includes the following partners: California State University, Long Beach, Northern Arizona University, Pima Community College, University of California, Berkeley, University of California, Davis, University of California, Irvine, University of California, Los Angeles, University of Hawaii, and University of Nevada, Las Vegas.

The Pacific Southwest Region UTC conducts an integrated, multidisciplinary program of research, education and technology transfer aimed at *improving the mobility of people and goods throughout the region.* The program is organized around four themes: 1) technology to address transportation problems and improve mobility; 2) improving mobility for vulnerable populations; 3) Improving resilience and protecting the environment; and 4) managing mobility in high growth areas.

US Department of Transportation Disclaimer

Disclosure

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EXECUTIVE SUMMARY

Today, open-loop payment systems for public transit fare payments are gaining in popularity. These systems allow fares to be paid for via a bank card that meets EMV standards, which ensures that they are secure and globally interoperable. Open-loop payments offer benefits to transit agencies and riders alike (e.g., increased transit accessibility) and are supported by other external changes (e.g., increased contactless payment adoption during the COVID-19 pandemic). Approximately 63% of American public transit agency open-loop payment system deployments have occurred in California. Today, seven California public transit agencies have open-loop fare payment systems, while numerous others are in the process of deploying them. A key question in open-loop fare payment system deployment is how to include unbanked and underbanked riders (i.e., those with no or limited access to financial services, respectively). However, this question can be reframed and instead ask how open-loop fare payment systems can be used to increase financial service access among transit riders.

Public transit agencies are well positioned to serve as a critical connector of riders to financial services since a high percentage of riders, especially those who are transit dependent, are also financially excluded. This overlap results in public transit serving as a resource this population accesses and pays for frequently. The overlap of transit dependent and financially excluded riders can be further broken down, revealing that this population typically comprises of those who are low-income, identify as a racial or ethnic minority, immigrants, and/or women. As a result, this research explores potential partnerships designed to best reach and support financial inclusion for each of these subpopulations.

Four research methods were used to complete this research including: 1) a literature review, 2) expert interviews (n=11), 3) population-specific financial needs and strategy mapping, and 4) proposed partnerships. The literature review provided a high-level overview on the population that is both transit dependent and financially excluded. This information identified that individuals who are low-income, racial and ethnic minorities, immigrants, and women are likely the key benefactors of increased financial inclusion via public transit systems. The expert interviews provided insight on the open-loop payment deployment process, and necessary resources to maximize the systems' benefits. The needs mapping tool compensated for the lack of financial institution expert interviews, and revealed differences in financial needs and strategies for individuals who are low-income, racial and ethnic minorities, immigrants and women.

Collectively, this information helped inform the proposed partnerships. These partnerships are designed to leverage different parts of the open-loop deployment process, from planning to implementation. In general, the partnerships work to use existing resources to better reach riders and provide them with necessary information and resources. In some cases, the partnerships help increase affordability for agencies and/or riders, such as lowering bank card fees. The goals targeted by these partnerships can

help agencies maximize the benefits of open-loop payment systems as they are deployed and improve financial access throughout California. This report is comprised of nine sections:

1. **Background:** Synopsis of open-loop fare payments and their growth in the U.S.;
2. **Methodology:** Overview of the literature review, expert interviews, needs mapping, and partnership proposal methods used to inform this report;
3. **Potential Research Uses:** Proposal of different ways this research and its takeaways can be used;
4. **Literature Review:** Summary of the history of financial inclusion in the U.S. and connection between transit dependent and financially excluded populations;
5. **Financial Needs and Strategy Mapping:** Characterization of the financial needs and best strategies to meet the needs of individuals who are low-income, racial or ethnic minorities, immigrants, and/or women;
6. **Expert Interview Findings:** Description of the insights from the expert interviews including available fare products in open-loop systems, lessons learned in deployment, and desired partnerships and resources;
7. **Potential Partnership Structures:** Outline of the potential partnerships public transit and financial stakeholders can engage in to increase financial inclusion in the U.S.;
8. **Future Research:** Description of areas and ways future research can complement this report's findings; and
9. **Conclusion:** Summary of the report's methodology, findings, and key conclusions and takeaways.

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TAPPING IN: USING OPEN-LOOP FARE PAYMENTS TO INCREASE FINANCIAL INCLUSION

Today, many public transit agencies throughout the United States (U.S.) are exploring open-loop fare payment options (Visa Economic Power Institute , 2023). Open-loop payments are built upon EMV standards, which is an international technical standard for smart payment cards that allows payments to be globally interoperable and secure. Open-loop payment systems accept payments from various physical bank cards (e.g., Chase Visa card, Venmo Mastercard debit card) and digital wallets (e.g., Apple Pay) (Mastercard). Open-loop payments can be seen in everyday transactions at retailers (e.g., buying a coffee at a cafe) and service providers (e.g., paying for a haircut at a salon). Inversely, closed-loop cards are typically proprietary, issued by a single entity, and can only be used at specific retailers or agencies. For example, Los Angeles Metro's TAP card cannot be used to pay for fares on the Bay Area Rapid Transit (BART) system in San Francisco. Today in the U.S., closed-loop fare cards are one of the predominant ways to pay for public transit fares. These cards allow for fare products (e.g., single ride ticket, discounted senior pass) to be pre-purchased, loaded onto the designated card, then tapped or otherwise validated/used when a rider boards a transit vehicle.

Discussions of open-loop fare payment system deployment often include considerations for supporting unbanked and underbanked transit riders (i.e., individuals without or with limited access to banks and financial services, respectively). In many cases, the strategies discussed revolve around how to continue to meet these riders' needs, such as continuing to accept cash-based fare payments. However, public transit agencies and other stakeholders can use the shift toward open-loop fare payments as an opportunity to leverage open-loop payment systems and new partnerships to increase financial access for riders.

Increased financial access can be critical for financial and social mobility. Financial access can equip individuals with the means to save and spend money more efficiently (e.g., helping build credit to support home loan applications). This is especially important in the U.S. context, where a history of systematic racism has limited the advancement of certain demographic groups. The U.S.'s history of systematic racism and resulting immobility cycles have contributed toward populations who are both transit dependent[1] and financially excluded. Research has found that transit dependent populations tend to be low-income, racial and ethnic minority groups, immigrants, and women (Anderson, 2016; Feigenbaum, 2021; Lubitow, Rainer, & Bassett, 2017; Soria, Edward, & Stathopoulos, 2023; He, Rowangould, Karner, Palm, & LaRue, 2022; Los Angeles Metro , 2019; Hanson, 2010). In parallel, individuals who are financially excluded are usually those who are low-income, racial and ethnic minority groups, immigrants, and women (Boel & Zimmerman, 2022; Federal Deposit Insurance

[1] In this report, transit dependency is defined as individuals who do not have vehicles available to them to make trips.

Corporation, 2021; Joint Economic Committee of Democrats, 2022; Baugh, 2019; New York City Department of Consumer Affairs, 2013; Bogan & Wolfolds, 2022; Women's World Banking, 2023). Public transit agencies are well positioned to connect these subpopulations to financial services as transit dependent and financially excluded populations are likely to frequently use and pay for public transit service.

This research focuses on how to leverage open-loop payments to increase financial access for individuals who are low-income, racial or ethnic minorities, immigrants, and/or women. This access can be critical for helping people increase financial and physical mobility. While this research uses information from across the U.S., the focus and partnerships ideas are specific to California. The California focus is due to the statewide efforts to advance open-loop fare payment deployment and to increase the scope of work's feasibility in the given timeframe. This report is comprised of nine sections:

1. **Background:** Synopsis of open-loop fare payments and their growth in the U.S.;
2. **Methodology:** Overview of the literature review, expert interviews, population-based needs and strategy mapping, and proposed partnership methods used to inform this report;
3. **Potential Research Uses:** Proposal of different ways this research and its key takeaways can be used;
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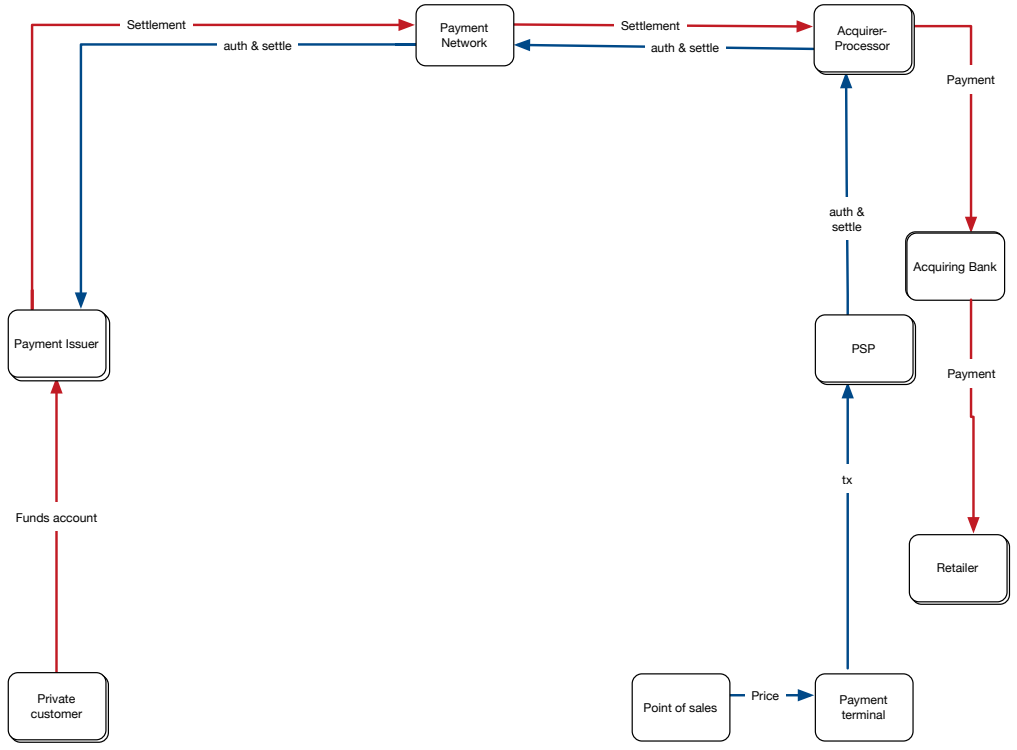
Open-Loop Fare Payment System Background

Open-loop payments are payments that are made by a scheme or series of partners (e.g., banks, card issuers) that meet EMV standards. EMV standards were originally set by Europay, Mastercard, and Visa (which has been subsequently shortened to "EMV") and maintain an interoperable, secure standard for all payment types. This standard helps improve organization and coordination across payment stakeholders (e.g., for authentication, authorization) (Burgess, 2022). Today, many standard retailers accept open-loop payments (e.g. grocery stores, cafes). This acceptance was amplified by contamination concerns and resulting higher contactless payment adoption rates during the COVID-19 pandemic (National Retail Federation, 2020).

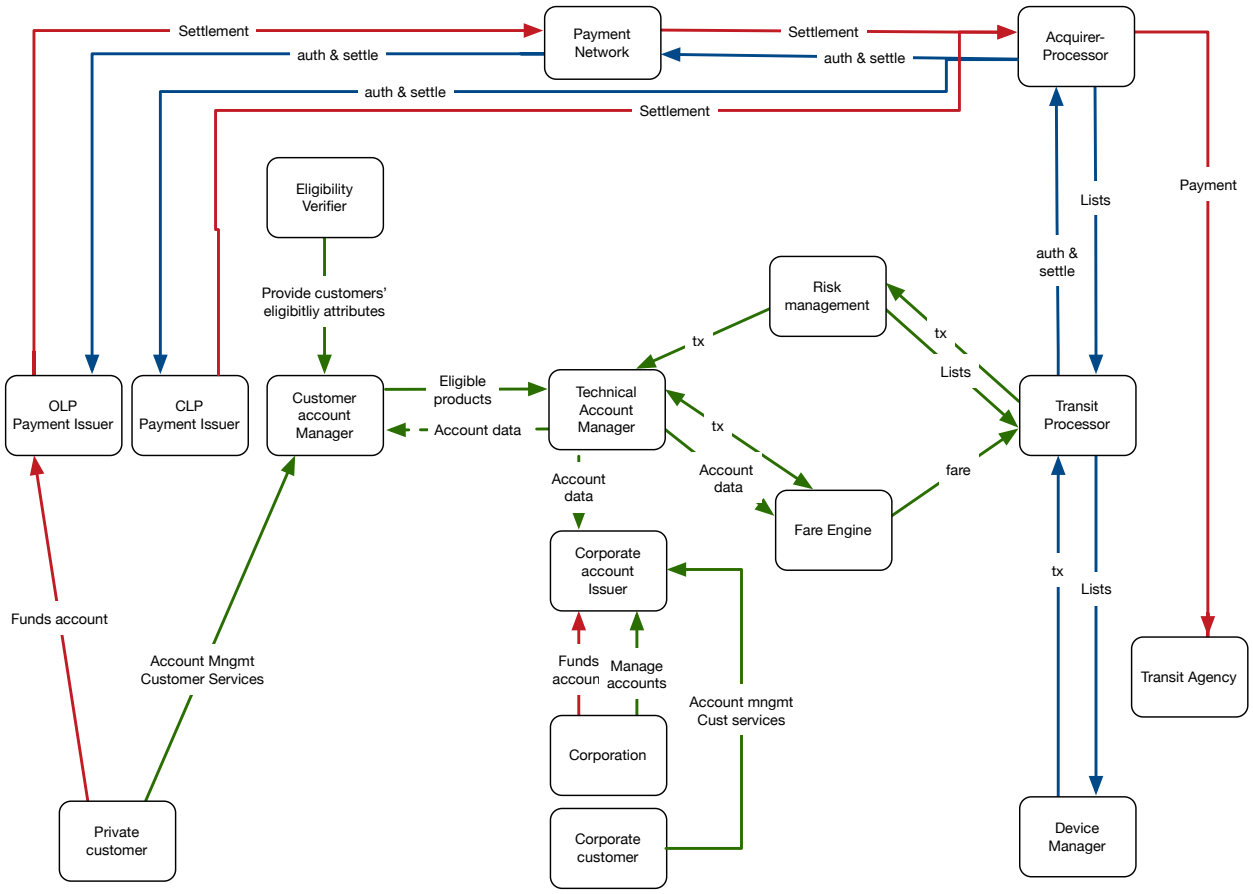
Unlike traditional retailers, U.S. public transit agencies have been slow to adopt open-loop payment systems. This delay is largely in part because payment acceptance is a more complex process for public transit agencies. This complexity is due to necessary additional system requirements like verifying eligibility (e.g., to ensure a rider paying for a senior discounted ticket meets the age requirements) and facilitating group discounts (e.g., for families traveling together). The additional requirements necessitate public transit agencies coordinate with a larger number of stakeholders and implement complex processes. Figure 1 and Figure 2 illustrate an overview of open-loop system use for purchases at standard retailers and public transit agencies, respectively.

Figure 1. Standard Retail Transaction Using an Open-Loop System



Source: Work from Rebel Payments, Mobility & Insights

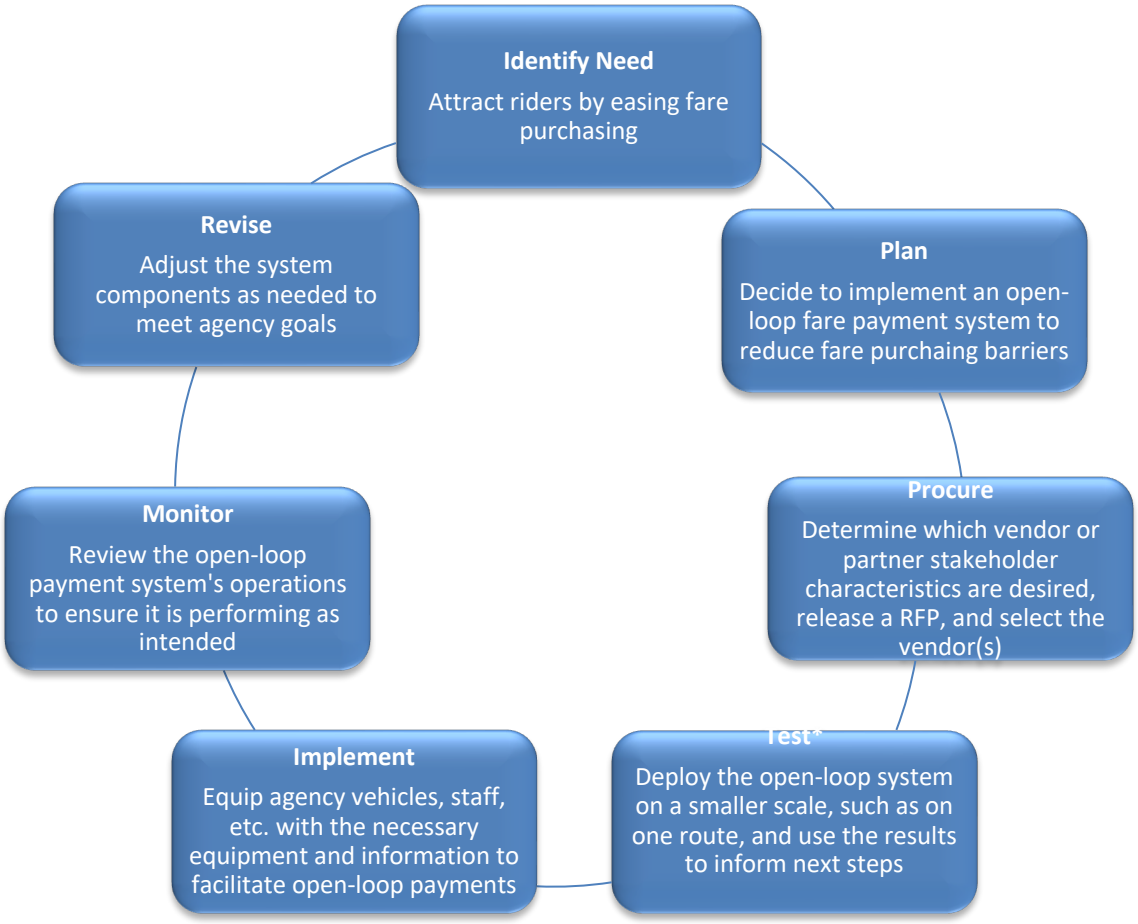
Figure 2. Public Transit Fare Transaction Using an Open-Loop System



Source: Work from Rebel Payments, Mobility & Insights

The number of stakeholders public transit agencies must coordinate with to enable and deploy open-loop payment systems is furthered complicated by public agency planning and procurement processes. These processes often require additional steps (e.g., issuing Requests for Proposals [RFPs] to ensure that public agencies are using a fair, competitive procurement process) and more time. Figure 3 summarizes the procurement process, with examples for open-loop adoption.

Figure 3. Public Transit Agency Technology Deployment Process



*The technology testing phase is not a necessary part of the process and some agencies may choose to forgo it.

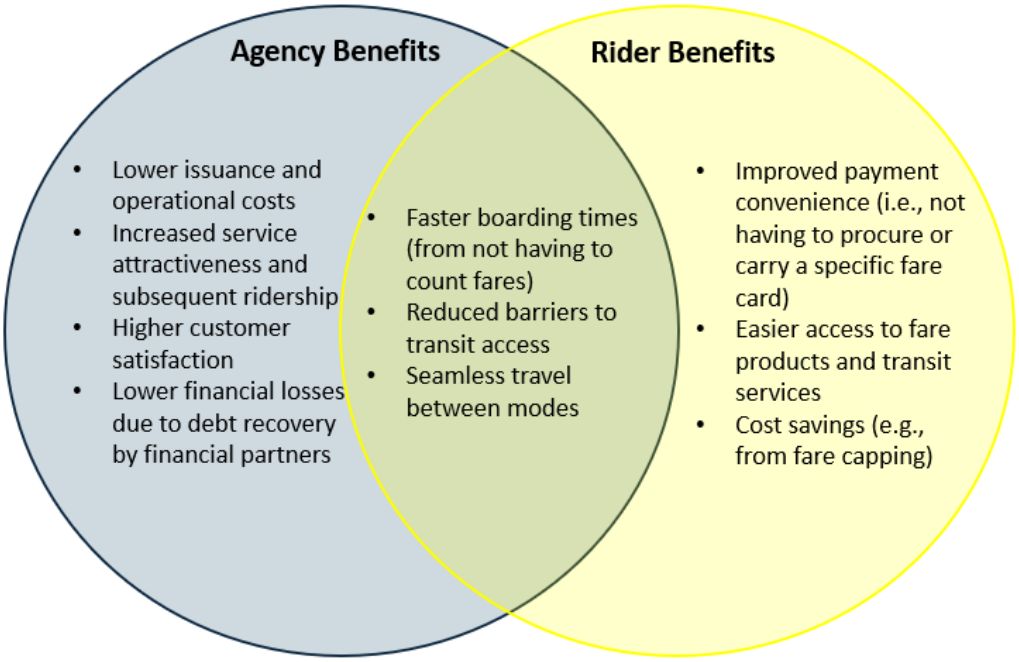
Source: National Center for Applied Transit Technology, 2022

While open-loop fare payment systems may be more complicated for public transit agencies to deploy, continuing with closed-loop fare systems can add additional barriers for riders, potentially reducing public transit use. These additional barriers include riders needing to: identify their preferred fare product, locate a retailer, ensure that the rider has the correct funds available on the right funding type (e.g., cash, debit card), pay for the fare product, load the fare product to the designated fare card, then validate the fare card/product. In short, closed-loop fare payment systems often lack the convenience and speed of other standard open-loop retail purchasing options. As public transit agencies work to address depleted ridership rates and farebox revenue from the COVID-19 pandemic, providing easy and attractive rider experiences is key. Open-loop fare payment systems can help deliver these experiences.

Additionally, shifts toward open-loop transit fare systems are often supported by transit agency policies, such as fare capping, which can help provide riders with cost savings.[2]

Open-loop payments can provide other various benefits. These benefits were noticed in London, where Transportation for London (TfL) was the first public transit agency to deploy open-loop fare payment options with their Oyster card system debut in 2012 (MasterCard, 2022). The transition to an open-loop system allowed TFL to reduce their fare collection costs from 14% to 7% of operational costs (Transport for London, 2014). Fare collection costs can be lowered by reducing the necessary costs for counting cash, facilitating secure cash transportation and deposits, and maintaining specialized machines for sorting. Open-loop payments can also result in operational efficiencies, such as faster vehicle boarding times (Allam, 2020; Balaban, 2023; Flowbird, n.d.; Visa Economic Power Institute , 2023). Additionally, the technology that enables open-loop payments is evolving and becoming increasingly more available and affordable (ReportLinker, 2024). Some of the benefits of open-loop fare payments advantage both public transit agencies and riders. Figure 4 summarizes common open-loop fare payment benefits and their beneficiaries.

Figure 4. Open-Loop Payment Benefits



Sources: Flowbird (n.d.), Burgess (2022)

[2] Fare capping is a payment model that provides riders with the cost savings of a pass (e.g., once they have reached the daily cap of $7.00, the equivalent cost of a day pass, they can continue to tap their fare payment card but will not be charged for the additional trips).

Open-loop fare payment system adoption is also being encouraged by external events. The COVID-19 pandemic increased open-loop payment opportunities as many businesses encouraged customers to use bank cards rather than cash to help reduce contamination. This advocacy helped increase riders' adoption of open-loop payment options and the feasibility of having transit riders pay for fares via bank cards (Allam, 2020). The pandemic also led to a decrease in transit riders, which resulted many transit agencies today pursuing open-loop payments to make transit more accessible and attractive to riders. These efforts by transit agencies include reducing the number of steps necessary to obtain a ticket and improving services with faster boarding times (Pike, Turner, Chin, & Nguyen, 2024). Many public transit agencies, especially those in California, are also contending with their farebox contracts expiring, necessitating agencies invest in new ones. This need creates the opportunity to more easily move away from traditional farebox capabilities that only accept proprietary fare cards to new ones that facilitate open-loop payments.

Open-Loop Fare Payment Systems in the United States

Increasing interest in open-loop fare payments in the U.S. is evidenced by the implementation of open-loop public transit payment systems by different public transit agencies. The American Public Transit Association (APTA) estimates that over 150 major cities are considering transitioning their existing transit fare systems to open-loop ones (American Public Transit Association). Table 1 summarizes the U.S. agencies that currently have open-loop transit payment systems or are planning on deploying them within the year. It is important to note that all of the agencies listed only have open-loop payment options available for their fixed-route services, but not their demand-responsive services. The majority of these agencies (63%) are located in California, and tend to be small- (i.e., less than 100 vehicles) to medium-sized (i.e., 100 to 300 vehicles) agencies offering bus services. However, outside of California, the agencies that have open-loop systems are larger (i.e., over 300 vehicle fleets), located in urban areas, and offer both bus and rail services.

Table 1. U.S. Transit Agencies with Open Loop Payments

Agency Name	Agency Location	Transit Type(s)	Fleet Size*	Fare System Name	Launch Date
Metropolitan Transportation Authority (MTA)	New York City, New York	Bus Rail	Bus: 6,386 Rail: 6,719	OMNY	2020
Monterey-Salinas Transit (MST)	Monterey and Salinas counties, California	Bus	113	n/a	2021
Anaheim Transportation Network (ART)	Orange County, California	Bus	82	Tap2Ride	2023
Capitol Corridor Joint Powers Authority (CCJPA)	Alameda, Contra Costa, Placer, Sacramento, San Francisco, Santa Clara, Solano, and Yolo counties, California	Rail	n/a	Tap 2 Ride	2023

Agency Name	Agency Location	Transit Type(s)	Fleet Size*	Fare System Name	Launch Date
Coast Regional Transit Authority (Coast RTA)	Georgetown, Horry, and Willamsburg counties, South Carolina	Bus	n/a	n/a	2023
Far North Group (Humboldt Transit Authority [HTA], Lake Transit Authority [Lake Transit], Mendocino Transit Authority [MTA], Redwood Coast Transit Authority [RTA])	Del Norte, Humboldt, Lake, Mendocino, counties and Inland communities, California	Bus	*Total:* 111 HTA: 30 Lake Transit: 32 MTA: 33 RTA: 16	n/a	2023
Santa Barba County Association of Governments (SBCAG)	Santa Barba County, California	Bus	17	Tap to Ride	2023
Santa Barbara Metropolitan Transportation District (SBMTD)	Santa Barbara County, California	Bus	118	Tap to Ride	2023
Tri-County Metropolitan Transportation District of Oregon (TriMet)	Portland, Oregon	Rail	Bus: 696 Rail: 147	Hop	2023
Metropolitan Transportation Commission (MTC)	San Francisco Bay Area, California	Bus Rail	n/a**	Clipper	2024†
Central Puget Sound Regional Transit Authority (Sound Transit)	King County, Washington	Bus Rail	Bus: 316 Rail: 210	ORCA	2024†

*Fleet size based on available revenue vehicle counts.

**Fleet sizes are not available for MTC as they are the coordinating body for the region.

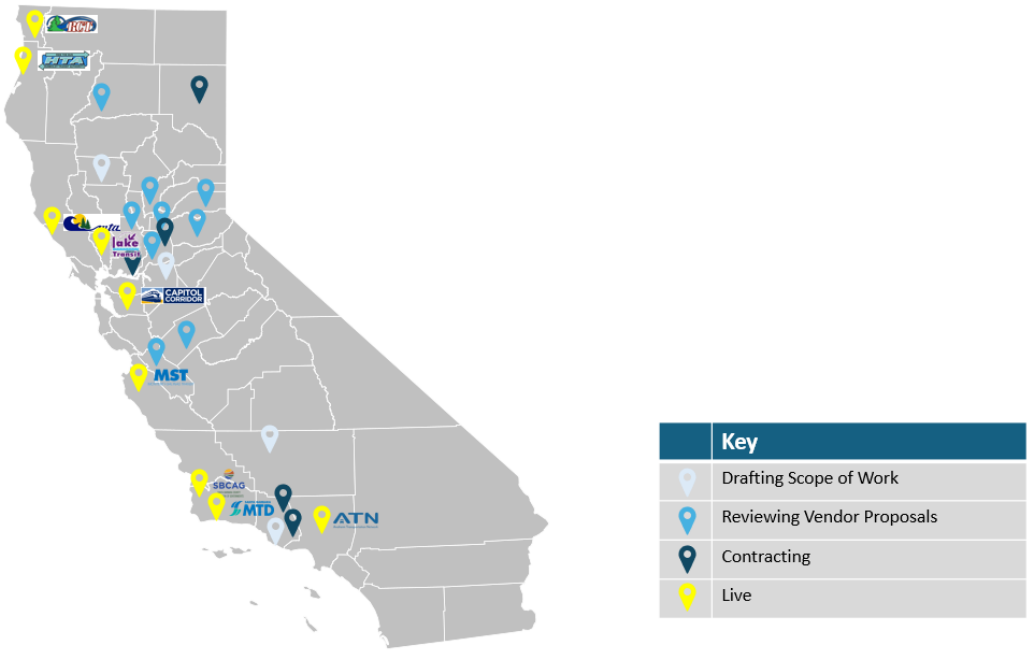
†Forthcoming.

Open-Loop Fare Payment Systems in California

In California, the momentum building behind open-loop fare payments is further demonstrated by the creation of the California Integrated Travel Project (Cal-ITP). Cal-ITP is funded by the California Department of Transportation (Caltrans) to support transit technology adoption. Increased transit technology adoption is being achieved by addressing commonly faced challenges (e.g., closing connectivity gaps necessary to support open-loop payments) (California Integrated Travel Project). Many public transit agencies throughout the state who have deployed open-loop payment systems have been able to do so due to Cal-ITP's support (Monterey-Salinas Transit, 2023). Other, additional public transit agencies are working with Cal-ITP in the open-loop system deployment process (e.g., reviewing vendor proposals). Figure 5 illustrates the California public transit agencies currently working on open-loop payment system deployment (see Table 1 for a list of the California agencies). Also, in an effort to address access for financially excluded riders, Cal-ITP is working with public transit agencies to explore

alternatives to cash-based fares, including ways to more directly connect these riders to financial services.[3]

Figure 5. California Public Transit Agencies Exploring Open-Loop Payments



Major urban areas with relatively extensive public transit networks in California are also echoing support for open-loop systems. For example, the fare payment system for the San Francisco Bay Area's public transit network is Clipper. Clipper is overseen by the Metropolitan Transportation Commission (MTC), the region's Metropolitan Planning Organization (MPO). MTC uses the Clipper system to facilitate and accept fare payments for 24 public transit agencies throughout the region. In 2024, MTC plans to deploy Clipper 2.0, which is the next generation of Clipper and allows for open-loop payment acceptance (Bay Area Toll Authority). Clipper 2.0 will accept fare payments made both with the proprietary Clipper card and other EMV enabled cards. MTC is pursuing these payment options to help improve transit accessibility and increase ridership. As open-loop fare payment systems continue to be deployed, understanding how to leverage them to connect riders to financial services can maximize these systems' benefits.

Californian and American public transit agencies have had a decade to learn from TfL's deployment of open-loop payments in 2012. This has allowed resources to be devoted to answering questions, such as regarding operational challenges and equity considerations (Abdoli, Burke, & Leung, 2022). Most notably, for this research, early open-loop payment system deployments led to the question of whether

[3] Information based on work from the Payments, Mobility & Insights venture from Rebel Consulting.

or not riders who typically pay with cash (e.g., due to lack of access to financial services like credit lines or understanding of how to use this system) would be excluded in these new systems. Early research identified solutions to these populations' needs, such as offering prepaid debit cards to cash-based riders (Perlmutter, 2015). More recently, California-based research revealed that of unbanked passengers who typically pay with cash, 50% are willing to pay with prepaid debit or government issued ID cards. An additional 30% of unbanked riders are open to paying with mobile phone apps (e.g., PayPal) (Pike, D'Agostino, & Flynn, 2022). These findings shift the equity and inclusion question from *if* cash-based riders can be included in open-loop systems, to *how to best* include these riders.

KEY TAKEAWAYS

- **Open-Loop Fare Payment Systems in the United States:** TfL was one of the first open-loop fare payment system deployers in 2012. Since then, the understanding of open-loop fare payment system benefits (e.g., reducing cash collection costs, improving operations) and external influences (e.g., contactless payment support during the COVID-19 pandemic) have encourage open-loop fare payment system deployment in the U.S.
- **Open-Loop Fare Payment Systems in California:** Today, 63% of agencies with open-loop fare payment systems are located in California. Support from organizations like Cal-ITP are encouraging increasing open-loop fare payment system deployments.

METHODOLOGY

This research was achieved by employing four tools:

1. **Literature Review:** A review of relevant documentation on open-loop payments, financial inclusion, and transit riders;
2. **Expert Interviews:** Interviews with representatives from public transit agencies and financial sector representatives to offer insight in key areas;
3. **Financial Needs and Strategy Mapping:** Summary of the needs of and strategies to support populations that are low-income, racial and ethnic minority groups, immigrants, and women; and
4. **Potential Partnership Structure Development:** Proposals of different potential partnership structures based on the previous findings.

These methods are further described below. However, this research scope was focused on California due to its large share of agencies with open-loop fare payment systems deployed, to make the approach feasible in the given time frame (roughly nine months), and comply with funding source requirements. When a California focus was not possible, the method was expanded to the entirety of the U.S.

LITERATURE REVIEW

The literature review is intended to provide information on the transit dependent and financially excluded populations in California. This review includes professional reports, academic findings, peer reviewed journal articles, and gray literature. Potential sources were limited to those focused on the United States, to give more context to where this research is being conducted. Findings were also limited to largely include those from the 2000s and later, to ensure their accuracy to today's context.

The literature review was conducted by searching key terms (e.g., "United States financial inclusion exclusion history") on general and academic specific search engines. The results were then filtered to meet the aforementioned parameters and reviewed to ensure their relevancy. Reviewing the results revealed that four key demographic groups are both transit dependent and financially excluded – individuals who are low-income, racial and ethnic minority groups, immigrants, and/or women. As a result of this finding, the remainder of the literature review and research focused on these populations. Information on the attributes of these groups were identified through the same literature review methodology listed above. Collectively, the literature review findings were synthesized and organized into the relevant literature review category.

EXPERT INTERVIEWS

This research was designed to include two sets of expert interviews: 1) interviews with representatives from U.S. public transit agencies who have implemented open-loop payment systems (n=10), and 2)

interviews with experts representing financial institutions that have products and services specifically designed to meet the needs this study's populations (i.e., individuals who are a racial minority, low-income, immigrant, and/or female) (n=1). Collectively, interview goals were to understand the opportunities and challenges associated with open-loop payments, characteristics of financial products designed to target specific demographics, and potential partnership structures. The public transit agency interviews were able to be conducted as anticipated. However, the financial institution expert methodology had to be redesigned. Further information on these processes can be found in the subsections below.

Public Transit Expert Interviews

The public transit experts that were targeted for interviews represent U.S. agencies that have or are in the process of implementing open-loop fare payment systems. A total of 12 agencies were reached out to, and interviews were conducted with representatives from 10 agencies, yielding a response rate of 83%. The agencies that were interviewed and their respective locations and transit service type are summarized in Table 2.

Table 2. Transit Agencies Interviewed (n=10)

State	Counties Served	Agency Name	Transit Service
California	Alameda, Contra Costa, San Francisco, San Mateo, and Santa Clara	Bay Area Rapid Transit (BART)*	Rail
	Alameda, Contra Costa, Placer, Sacramento, San Francisco, Santa Clara, Solano, and Yolo	Capitol Corridors Joint Power Authority (CCJPA)	Rail
	Humboldt	Humboldt Transit**	Bus
	Alameda, Contra Costa, Marin, Napa, San Francisco, San Mateo, Santa Clara, Solano, and Sonoma	Metropolitan Transportation Commission (MTC)	Bus Rail
	Monterey and Salinas	Monterey-Salinas Transit (MST)	Bus
	Humboldt	Redwood Transit Authority (RTA)**	Bus (commuter)
	Santa Barbara	Santa Barbara County Association of Governments (SBCAG)	Bus (commuter)
	Santa Barbara	Santa Barbara Metropolitan Transit District (SBMTD)	Bus
New York	Bronx, King, New York, Queens, and Richmond	Metropolitan Transportation Authority (MTA)	Bus Rail
Oregon	Multnomah	TriMet	Bus Rail

*Part of the Metropolitan Transportation Commission (MTC).

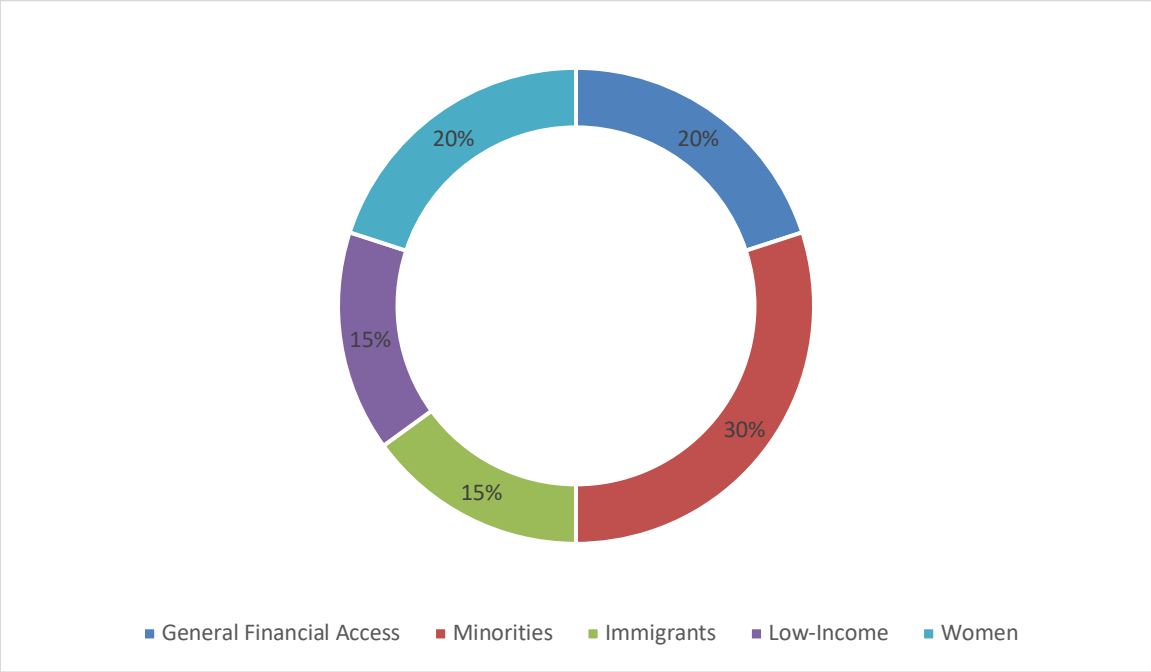
**Part of the Far North Group.

Representatives from the public transit agencies listed above were contacted in mid-January 2024. If experts did not respond to initial interview requests, a follow up email was sent approximately two weeks later. If there was no response after this point, an alternative contact in the organization was identified and the same outreach process was conducted. A total of 10 experts responded and interviews were scheduled with them and conducted from January through April 2024. These interviews were held virtually and lasted about 45-mintues each. The interviews followed the protocol listed in Appendix A – Public Transit Agency Expert Interview Protocol.

Financial Institution Expert Interviews

The financial institution expert interviews were designed to target institutions that specifically serve the demographics this research studies. These financial institutions were identified via searches of financial product aggregators, including Forbes and NerdWallet. The searches resulted in a total of 20 institutions. Many of these financial institutions are financial technology (FinTech) companies. An overview of FinTech and the potential role it plays in equity improvements is available in Appendix B – Financial Technology as an Equity Resource. The breakdown of which demographics the identified institutions serve are summarized in Figure 6.

Figure 6. Financial Institution Stakeholders (n=20)



The outreach methodology for these experts was the same as the public transit agency experts – initial outreach in mid-January 2024 with a follow-up email approximately two weeks later. If there was not a response, another contact was identified and reached out to. However, the response rate for this

stakeholder group was significantly lower. Some experts did not respond, while others responded that they were not interested in participating and unwilling to forward the request to someone else within their organization. Only one expert interview, with a financial institution that focuses on serving women, was conducted, yielding a response rate of 5%.

As a result of the limited response rate, the information on different demographics' financial needs and effective strategies to meet them was developed through a literature review and can be found in the Population-Based Needs and Strategy Mapping section. More information on this methodology is available in the following subsection.

Financial Needs and Strategy Mapping

Since the experts were unavailable to provide information on specific rider segment needs, an additional literature review was conducted. This literature review functioned similarly to the initial one – the reviewed material included various document types and were limited to U.S.-focused literature. The included findings were further refined to only include those from the past 20 years (roughly 2004 to present), to reflect the most recent and accurate information possible. The review focused on each demographic group in turn, with search terms like "women financial needs." The identified literature review information was summarized and synthesized to inform these rider profiles.

Proposed Partnerships

The information resulting from the literature review, expert interviews, and needs mapping was used to inform the proposed partnerships. These partnerships are designed to use open-loop fare payment systems as a tool to support increasing financial access for riders, especially those are low-income, racial and ethnic minorities, immigrants, and women. The proposed partnership structures provide high-level goals that are intended to be refined based on stakeholders' individual needs and constraints. The partnerships target many aspects of open-loop payment systems and financial inclusion, from initial research to deployment support. For brevity, the proposed partnerships were divided into two categories which highlighted whether public transit agencies or financial institutions were task lead.

Limitations

While this research contributes to the literature by more clearly outlining transit-based opportunities for financial inclusion, there are some limitations that are important to note. To begin with, this research was conducted in a relatively short time frame (September 2023 through May 2024). As a result, the findings may not be as robust if more time was dedicated. Also in part becuase of the timeframe, the scope of the work was narrowed to only focus on California. As illustrated by the public transit agencies represented in the expert interviews, deployment and exploration of open-loop public transit payments is being done elsewhere in the U.S. (and globally). However, reviewing these efforts in depth was not feasible given the time constraints of this work. Future efforts can work to fill this gap. Additionally, by

nature of the California focus and the transit agencies within the state who have deployed open-loop payment systems, the findings may be more relevant to smaller agencies that exclusively provide fixed-route bus services. As larger public transit agencies and those who provide additional services (e.g., rail, demand-responsive) deploy open-loop payment systems, future work can repeat the methodology employed here and gather information from varied experiences.

The California focus was maintained as much as possible, but in some cases, information was not available (e.g., financial needs of immigrants in California), so the research was expanded to include findings from the broader U.S. This information helped to build out more detailed rider segment characterizations but may have missed the nuances of California-specific needs. Additionally in the literature reviews, both the original one and one that was added to the compensate for the lack of financial institution expert interviews, some material may have been inadvertently missed.

Regarding the expert interviews, while transit agency stakeholder engagement was relatively high at 83%, financial sector engagement was low (5%). This limited the information available to inform partnership structures and necessitated a literature review-based financial needs and strategy mapping approach. This gap may be filled by future work that: a) researches how to better engage with financial stakeholder industry representatives, b) deploys these best practices, and c) uses the findings to fill existing research gaps.

Gaps in available demographic information also limited research findings. Despite research identifying the same populations that are transit dependent and financially excluded, clear demographic data demonstrating the overlap is not widely available. Future research efforts (e.g., from studies, surveys deployed by transit agencies) can work to collect this demographic information. This information can help support the case for future work in this research area. Similarly, this research did not include direct conversations with the populations in question. Future work can fill this gap and add tools like surveys, focus groups, and interviews to the methodology to create more robust findings. Lastly, the rider segments focus on four distinct groups (those who are low-income, racial and ethnic minority groups, immigrants, and women), but does not touch upon intersectionality of these groups. Research on this is limited and may need to be filled by future work.

POTENTIAL RESEARCH USES

In general, this research highlights the overlap between transit dependent and financially excluded populations. Additionally, this work supports existing efforts for open-loop payment adoption by describing the additional potential benefit of and challenges in achieving greater financial access for riders. More specific uses for various stakeholders of the research outcomes are summarized in Table 3.

Table 3. Research Outcomes and Potential Uses

Research Method	Finding	Potential Uses
Literature Review	Characterization of the transit dependent and un and underbanked U.S. populations and explanation of overlaps to clearly explain the relationship between these populations	Lay the foundation for future work in this area or other gap-filling subject areas Allow public transit agencies to better understand their riders' needs
	Identification and description of the subpopulations of those who are transit dependent and financially excluded	Analyze existing rider demographics and segments to determine which characteristics align with the studied subpopulations and use the subpopulations findings to inform future practices (e.g., fare policy, partnership development)
	Identification of a lack of demographic information that clearly illustrates the overlap between transit dependent and financially excluded populations, despite research identifying the similarities in these demographic groups	Design future research efforts and studies to collect this information and more quantitatively demonstrate their relationship
	Identification of areas with available quantifiable information and future efforts to help fill this gap	Include questions that probe transit rider's access to different payment methods into surveys and make concerted effort to fill research gaps
Expert Interviews	Description of lessons learned from agencies who have engaged in open-loop payment implementation	Inform the processes and decision making of other agencies who are considering or implementing open-loop payments are undergoing
	Limitations from low engagement with financial sector stakeholders decreased the robustness of the research and proposed partnership structures	Focus future efforts in the field to determine how to more productively engage with stakeholders external or tangential to the transportation industry
Financial Needs and Strategy Mapping	Identify and map the specific financial considerations of and potential strategies to support individuals who are low-income, racial and ethnic minority groups, immigrants, and women	Implement the findings into future decision making and planning
Proposed Partnerships	Partnership ideas proposed to enhance open-loop fare payment benefits and increase financial inclusion in the U.S	Leverage existing ideas to inform future partnerships, including identifying which community organizations to work with and how to effectively reach certain populations

KEY TAKEAWAYS

- **Literature Review:** The literature review included various document types (e.g., journal articles, gray literature) to provide information on the California population that is transit-dependent and financially excluded. The review revealed that this population is typically comprised of individuals who are low-income, racial or ethnic minorities, immigrants, and/or women.
- **Expert Interviews:** The expert interviews were designed to gain insights on open-loop fare payment system deployment and potential partnership structures. The interviews targeted U.S. public agencies who have deployed open-loop fare payment systems and financial stakeholders that serve populations that are low-income, racial or ethnic minorities, immigrants, and/or women. The public transit agency expert interviews provided information on challenges with system deployment and desired resources. The financial sector expert interviews had to be revised and were replaced by a financial needs and strategies approach.
- **Financial Needs and Strategies Mapping:** To fill the gap caused by the lack of financial sector expert interviews, the financial needs and strategies for individuals that are low-income, racial or ethnic minorities, immigrants, and/or women were completed through a literature review. This approach revealed varied needs and strategies for each group.
- **Proposed Partnerships:** The proposed partnerships were informed by findings from the literature review, expert interviews, and financial needs and strategy mapping. The proposed partnerships help stakeholders maximize open-loop fare payment system benefits.
- **Limitations:** The research and its findings are limited predominantly by the project timeframe, California focus, low financial sector expert interviews, and limited demographic information availability.
- **Potential Research Uses:** The research lays the foundation for understanding the needs of populations who are transit dependent and financially excluded. Future work can further quantify these findings and build upon this foundation to deploy tailored approaches.

A History of Open-Loop Payments and Margin: A Literature Review

The following subsections summarize the initial literature review findings including on the overlap between transit dependent and financially excluded populations. The literature review also includes a summary of what financial inclusion and exclusion means, their evolution in the U.S., and an overview of their characteristics today.

Overlap of Transit Dependent and Financially Excluded Populations

Today, public transit plays a critical role in addressing equity by improving access to vital resources including employment options, medical care, nutritious food, and social opportunities for transportation riders (Heaps, Abramsohn, & Skillen, 2021). According to the American Public Transit Association (2017), U.S. public transit rider demographics include: communities of color (60%), women (55%), individuals without access to a personal vehicle (46%), single person households (26%), and households with annual incomes less than $15,000 (21%, which is relatively high compared to the rate of U.S. households with annual incomes below $15,000, which is 13%). Table 4 summarizes the characteristics of transit users and un and underbanked (i.e., financially excluded) households in the U.S.

Table 4. Transit User and Un and Underbanked Demographics

Characteristics		Average Transit User	Average Un or Underbanked Individual
Race	*White*	48% in metro areas 53% elsewhere	60% underbanked 59% unbanked
	Hispanic	25% in metro areas 17% elsewhere	22% of underbanked 19% of unbanked
	Black	22% in metro areas 26% elsewhere	15% of underbanked 15% of unbanked
Income	*Less than $50,000 annually*	44% in metro areas 69% elsewhere	56% of underbanked 78% of unbanked

Source: Work from Rebel Payments, Mobility & Insights

In California, where this research is focused, public transit ridership tends to follow similar trends of higher public transit ridership by racial and ethnic minority groups, women, zero-vehicle households, and low-income households (Taylor, et al., 2020). As of 2021, 60% of Californians who commute via public transit have annual household incomes of less than $35,000 (i.e., are low-income) (Tolkoff, 2023). Furthermore, Californians who are not only transit users but also transit dependent (i.e., do not have access to personal transportation and/or are unable to drive) are typically individuals who are low-income and non-White (Tolkoff, 2023; Pang, 2019). California public transit ridership also tends to be high amongst recent (i.e., within the last five years) immigrants, especially those from Latin America (Taylor, et al., 2020). Key explanatory factors for these communities' high use of public transit ridership

include the high cost of personal vehicle ownership (e.g., maintenance, insurance) and desire to live in more affordable locations (Federal Transit Administration, 2013).

This information parallels statistics on Californians who are un and underbanked. In the state, workers with hourly incomes less than $15 are 81% of unbanked individuals. Additionally, Black and Hispanic Californians are three times as likely to be un or underbanked, compared to White Californians (Fry, 2023).[4] This overlap positions transit well as a conduit to increase access to financial services for riders, especially those who are transit dependent and low-income and/or racial and ethnic minority groups.

In summary, transit dependent riders tend to be those who are low-income, racial and ethnic minority groups, immigrants, and women who may lack access to non-transit modes. These groups parallel those of communities who have historically been financially excluded (see *An Overview of Today's Financially Excluded Populations* section for more information). As a result, targeting public transit riders can be a key way for expanding public transit benefits and increasing financial inclusion.

Public transit system's potential to improve equity is well known and the basis of many transportation plans. For example, the U.S. Department of Transportation's 2022 to 2026 Strategic Plan states that transportation can play a critical role in increasing equity for individual riders and broader communities (United States Department of Transportation, 2022). Many public transit agencies also are working to expand their equity impacts. Karner and Levine (2021) list common strategies for this, including:

- **Advisory Committees:** Establish groups designed to guide the agency's decision-making in line with equity best practices,
- **Advocacy Groups:** Build relationships with community organizations and trusted community partners (e.g., religious institutions) to more effectively reach and communicate with communities,
- **Capital Planning:** Strategically design projects to maximize the benefits to communities of focus (e.g., deploying more frequent service in low-income communities),
- **Innovative Modes:** Work with emerging transportation modes (e.g., bikesharing, microtransit) to enhance the public transportation network, and
- **Metropolitan Planning Organization (MPO) Plans:** Partner with regional agencies to understand communities' transportation needs across a broader area.

These strategies can also be used to increase transit riders' financial service access (e.g., working with advocacy groups to understand what their transit and financial needs are and what partnerships or products can be built to meet these needs).

[4] This approximation of transit dependent and un and underbanked individuals has to serve as the comparison basis as no work has been done on how many transit dependent riders are un and underbanked and vice versa.

Financial Inclusion is a Tool to Support Marginalized Populations

The potential of open-loop payment systems to increase financial access can help support marginalized U.S. populations. The literature, summarized below, explains how populations of people who are low-income, racial and ethnic minority groups, immigrants, and women have historically been excluded. For many of these populations, U.S. public transit already serves as a critical resource, often connecting them to valuable locations and resources (e.g., employment centers, medical offices). This supportive role can also grant access to financial services. Financial service access can be important for growing financial and social mobility, while overcoming historic barriers. The following subsections describe the history of financial exclusion some U.S. populations face and the influence this history has had on today's populations' financial service access.

The United States' History of Financially Excluded Populations

For years research has identified that financial exclusion, especially of low-income individuals, has grown in the United States (Leyshon & Thrift, 1994). Historically, financial services in the United States have focused on serving white, middle class, suburban communities while avoiding or withdrawing from communities of poorer, urban, and racial and ethnic minority groups (Leyshon & Thrift, 1994). These exclusionary policies have also been extended to immigrants, who often face barriers due to immigrant status or documentation, language fluency, financial fluency, predatory products or actors, limited education, and poor or nonexistent credit history (Lin, 2022; Zhang, 2023; Paulson, Singer, Newberger, & Smith, 2006). These barriers have been instituted on behalf of protecting credit and investments, but at the detriment to these communities. As a result, communities, typically constituted of poor racial and ethnic minority groups or immigrants, with no or limited access to financial institutions were created (Leyshon & Thrift, 1994; Lin, 2022).

Women have been similarly excluded from U.S. financial institutions. Women were not allowed to open a bank account until the passage of the Equal Credit Opportunity Act in 1974, decades after the 19th Amendment allowed women to vote (Adam & Aldrich, 2023). Despite the legal right, many banks refused to let women open an account without their father or husband's signature. As a result, a 2004 study found that female-headed households in the U.S. tend to have lower savings amounts (Conley & Ryvicker, 2004). These challenges have been amplified by the feminization of poverty, or the disproportionate representation of women and children, compared to men, in the lowest income sectors (Christensen, 2019). Predominant reasons for this phenomenon include: the historic lack of women's accesses to financial resources and tools, higher at-home work burdens, lower earnings, socio-economic mobility constraints (e.g., labor barriers), workforce participation disruptions, and greater likelihood of living with children (e.g., increasing divorce rates that leave custody with mothers) (Chant, 2004; Christensen, 2019). Many women continue to be excluded from financial services and are adding to the population ignored by financial institutions.

Despite advocacy to create alternative financial infrastructure and tools (e.g., credit unions, community development banks) to bridge these gaps and expand financial inclusion, these marginalized communities (individuals who are low-income, racial and ethnic minority groups, immigrants, and women) have continually been subject to hurdles to gain financial service access, such as high minimum balance accounts (Ozili P. , 2020). Additionally, most financial inclusion research been concentrated in low- and moderate-income countries (Galvez-Sanchez, Lara-Rubio, Verdu-Jover, & Mesegueer-Sanchez, 2021).

United States-oriented financial inclusion research has furthered the case for improving financial inclusion. For example, the U.S. is a member of the Organization for Economic Cooperation and Development (OECD).[5] A 2005 study that used data from the Luxembourg Income Study and U.S. Congressional Office to evaluate annual disposable income's purchasing power found that of the wealthiest OECD countries, the U.S. had the highest level of inequality (Smeeding, 2005). This is likely a product of government policies, such as not developing social institutions and lowering social service spending (Smeeding, 2005). These inequities are exacerbated by U.S. regulations (e.g., tax laws) (Chambers & O'Reilly, 2022). Other challenges that have contributed to this include banking deserts (i.e., census tract areas or neighborhoods without a banking branch located within it or within 10 miles of its center) and predatory lending practices (i.e., practices that impose unfair and abusive loan term on borrows like high-interest rates and fees to lower their equity) (U.S. Congress Joint Economic Committee, 2022).

An Overview of Today's Financially Excluded Populations

The financial inclusion research that has been conducted in the U.S. has revealed large access disparities. A 2022 report by the U.S. Congress Joint Economic Committee found that racial and ethnic minorities and low-income communities are disproportionately harmed by banking and financial exclusion (U.S. Congress Joint Economic Committee, 2022). Also as of 2022, approximately 20% of U.S. adults are unbanked[6] and underbanked[7] (U.S. Congress Joint Economic Committee, 2022). These populations tend to include individuals who are: low-income, Black, Hispanic, working-age with a disability, and/or single-mothers and have lower levels of educational attainment (Federal Deposit Insurance Corporation, 2021). For example, approximately 40% of Black, 29% of Hispanic, and over 30%

[5] The OECD is a membership-based organization of nations with democracies and market-based economies who collaborate to promote sustainable growth. Other examples of OECD countries include those from Asia (e.g., Japan), Australia (e.g., New Zealand), Europe (e.g., Belgium, Luxembourg), North America (e.g., Canada, U.S.), and South America (e.g., Colombia, Mexico) (Smeeding, 2005).

[6] Unbanked refers to an individual who does not have access to a checking or savings account at a Federal Deposit Insurance Cooperation (FDIC) insured corporation (Federal Deposit Insurance Corporation, 2021).

[7] Underbanked refers to an individual has a checking or savings account with a FDIC insured corporation, but regularly uses alternative financial services (i.e., financial services outside of traditional banking institutions like check-cashing outlets and pawnshops) (Federal Deposit Insurance Corporation, 2021).

of households with incomes lower than $25,000 annually are un or underbanked (U.S. Congress Joint Economic Committee, 2022). Similarly, at all income levels, differences by ethnicity exist in the likelihood of having a credit card or personal loan. For example, among households with annual incomes between $50,000 and $75,000, 65% of Black and 71% of Hispanic households had a bank account or personal loan, compared to 81% of White households (Federal Deposit Insurance Corporation, 2021).

Key reasons for not maintaining a bank account include lacking the money necessary to meet account minimum requirements, distrusting banks, and increasing personal privacy by avoiding banks (Federal Deposit Insurance Corporation, 2021). Other barriers include a lack of credit records, which can make accessing mainstream lending forms (e.g., mortgages) challenging and discourage credit applications. This discouragement may be amplified by previous experiences with credit applications. In 2021, 46% of Black and 37% of Hispanic individuals reported being denied credit or being approved for less credit than requested, compared to 25% of White individuals (U.S. Congress Joint Economic Committee, 2022). This exclusion can result in a variety of negative impacts.

Consequences of Financial Exclusion

Financial exclusion can perpetuate and amplify existing disparities, especially as this barrier tends to be experienced by historically marginalized populations (U.S. Congress Joint Economic Committee, 2022). Additionally, these barriers may limit the effectiveness of other efforts to increase equity (e.g., increasing housing and educational affordability (U.S. Congress Joint Economic Committee, 2022). A lack of financial service access can make individuals more dependent on their social circles, rather than traditional financial institutions (Salampasis & Mention, 2018).

As a result of financial exclusion, un and underbanked households tend to use alternative financial services (Federal Deposit Insurance Corporation, 2021). Unbanked households, when compared to fully banked households, have higher mobile banking service adoption (49% versus 43%) (Federal Deposit Insurance Corporation, 2021). Compared to fully banked households, underbanked households are less likely to have a credit card and more likely to have both bank and nonbank personal loans (Federal Deposit Insurance Corporation, 2021). Other alternative financial services un and underbanked individuals use include rent-to-own services, payday lenders, pawn shops, tax fund anticipation, and auto title loans (Federal Deposit Insurance Corporation, 2021). In addition to potentially predatory practices, these services can result in unreliable financial access and higher fees. For example, prior to the COVID-19 pandemic, un and underbanked households alone spent roughly $189 billion in banking fees and interest on financial products (U.S. Congress Joint Economic Committee, 2022).

Literature-Based Strategies for Financial Inclusion

Financial inclusion is understood as having access to and using a diverse range of quality financial products and services (Cabeza-Garcia, Del Brio, & Osacaona-Victorio, 2019). Moving from financial exclusion toward financial inclusion can have drastic equity impacts. Generally, financial inclusion an

contribute to economic grown by stimulating entrepreneurship, increasing saving opportunities and overall savings, and broadening investment opportunities (Grant, 2023; Lewis & DeFilippi, 2023). It can also increase overall economic growth, create jobs, reduce unemployment, increase macroeconomic policy development, and improve financial stability (Hassan Alnabulsi, Salameh, & Rafat, 2021). Financial inclusion has also been cited as a key strategy for achieving goals designed to target the most vulnerable populations, such as those classified as Millenium Development Goals (Chibba, 2009). Especially for women, financial inclusion and participation can result in: reductions in equity gaps, higher rates of economic development, and improvements to physical and social wellbeing (Cabeza-Garcia, Del Brio, & Osacaona-Victorio, 2019).[8]

To date, much of the research on financial inclusion has focused on global examples, particularly in low- and moderate-income countries (Ozili P. , 2020). Of the research that has been U.S.-oriented, much of it has advocated for policy changes, especially at the federal level (Kabakova & Plaksenkov, 2018; U.S. Congress Joint Economic Committee, 2022; Chambers & O'Reilly, 2022). Some more tangible steps include: improving everyday transaction access, easing credit access, encouraging long-term wealth accumulation, and preparing against key risks (Florant, Julien, Stewart, Yancy, & Wright, 2020). However, there is growing interest in leveraging financial technology (Fintech) tools to increase financial inclusion (Arner, Buckley, Zetzxche, & Veidt, 2020). Similarly, actionable, applicable tools are increasingly being viewed as important drivers for financial inclusion (Porter, 2011). Other key strategies include spreading awareness of available tools and increasing education (Hassan Alnabulsi, Salameh, & Rafat, 2021). Future polices will also likely need to target friction points to financial inclusion (e.g., inconvenient banking access (Barajas, Beck, Belhaj, & Naceur, 2020).

KEY TAKEAWAYS

- **Overlap of Transit Dependent and Financially Excluded Populations:** Demographic information on transit dependent populations and un and underbanked households reveal that they tend to be low-income, racial and ethnic minorities, immigrants, and women.
- **Financial Inclusion as a Tool to Support Marginalized Populations:** Increasing financial inclusion for populations that are low-income, racial and ethnic minorities, immigrants, and women can help increase financial and social mobility.
- **The United States' History of Financially Excluded Populations:** Historically, populations in the U.S who are financially excluded are those who are racial and ethnic minorities, immigrants, and women.
- **An Overview of Today's Financially Excluded Populations:** Currently, the populations that have been historically financially excluded remain excluded but have expanded to include low-income populations.

[8] Social wellbeing is defined as supportive, healthy relationships that can play a critical role during difficult times (e.g., poor health) (Cabeza-Garcia, Del Brio, & Osacaona-Victorio, 2019).

- **Consequences of Financial Exclusion:** Continuing to financially exclude select populations can perpetuate existing disparities and increase financially excluded populations' use of alternative financial services.
- **Literature-Based Strategies for Financial Inclusion:** Previous research has found that increasing financial inclusion can result in many broad, societal benefits and can be achieved by strategically changing policies and leveraging existing resources.

Population-Based Needs and Strategy Mapping

As described in the literature review, the population of individuals who are both transit dependent and financially excluded can be further broken down into subpopulations of individuals who are low-income, racial and ethnic minority groups, immigrants, and women. These subpopulations' financial characteristics and needs vary. In parallel, the necessary resources to overcome these challenges also vary and one single solution may not address all needs (Williams, 2004). As a result, a nuanced understanding of these populations' needs is imperative to shaping effective partnerships and programs. The following subsections summarize literature findings regarding financial needs and strategies for individuals who are low-income, racial and ethnic minority groups, immigrants, and/or women.

Population-Based Needs for Financial Inclusion

In general, vulnerable populations (i.e., individuals who are low-income, racial and ethnic minority groups, immigrants, and women) face challenges regarding insufficient funds to open a bank account, inability to save, higher vulnerability to emergencies, and higher use of more expensive and shorter terms financial products (Barr M. , 2004). These challenges are amplified by the fact that vulnerable populations tend to reside in neighborhoods that predominantly have access to expensive, alternative financial service providers. These businesses are often located here to fill the void left by more traditional financial institutions that can offer more secure financial products (Sawyer & Temkin, 2004). In addition to these generalizations, more unique needs may also exist. Table 5 summarizes financial needs by subpopulation and further information can be found below.

Table 5. Financial Characteristics and Needs by Population

Category	Characteristic	Low-Income	Racial and Ethnic Minority Groups	Immigrants	Women
Financial Products Used	Alternative	X		X	
	Expensive	X			
	Risky	X			
	Short-Term	X	X		
Financial Barriers	High account minimums	X	X		
	Lack of resources to invest (e.g., liquid assets)	X	X	X	
	Limited or poor credit history	X	X	X	
	Limited financial literacy	X	X	X	
Sentiments	Belief that financial products are not for them		X	X	
	Concern about the financial future (e.g., savings)	X			X

Category	Characteristic	Low-Income	Racial and Ethnic Minority Groups	Immigrants	Women
	Documentation/privacy concerns	X		X	
	History of financial stressor		X		
	Lack of trust in financial institutions		X	X	
	Negative associations of financial products		X	X	
	Risk averse			X	X
External Factors	Lack of digital fluency			X	
	Language barriers			X	
	Vulnerability to emergencies (e.g., violence)	X		X	

LOW-INCOME

Most research on low-income households has focused on their use of credit and other traditional financial services but not their access to these services (Hogarth & Lee, 2000; Dzigbede & Young, 2019; Birkenmaier, Curley, & Kelley, 2011). The research findings that are available have revealed that, in summation, it costs more money to be low-income due to the dependency on expensive, risky financial options (Barr M. S., 2004). Low-income individuals' access to financial services historically has been limited by the services' high costs (e.g., account minimums, late fees), physical inaccessibility (e.g., absence of financial institutions in residential neighborhoods with a large population of low-income residents), and concerns regarding proper documentation and/or privacy protection (e.g., using the provided documentation for policing) (Barr M. , 2004). As a result of these access challenges, low-income households are more likely to live paycheck to paycheck, which makes it difficult for them to invest time and money into financial advancements, such as learning financial management skills and about home ownership options (Barr M. S., 2004). Additionally, due to living paycheck to paycheck and having limited savings, these populations are more vulnerable to emergencies (e.g., hospital visit, car accident), which can lead to financial instability (Barr, 2004).

Paycheck dependency and limited savings can lead low-income individuals to be dependent on short-term, more expensive financial services, such as check cashing services that are accompanied by high fees and payday loans. Using these services can then lead to a debt trap (Barr M. , 2004). Low-income individuals' use of costly services may also be influenced by their lack of desire to ask peers, especially younger generations, to borrow money (Blanco, Ponce, Gongora, & Duru, 2015). The use of expensive, short-term services, and occasional resulting debt, can also lead to poor credit histories that increase the challenge of financial service access. This lack of access can also be furthered by low-income populations limited financial literacy and understanding of other financial options (Barr M. , 2004).

Racial and Ethnic Minority Groups

Robust amounts of academic research has not focused on the financial needs of racial and ethnic minority populations, but early gray literature and institutionally based research has uncovered some findings. These preliminary findings reveal that racial and ethnic minority groups are more likely to have affordability and externally based (e.g., racist policies) contributing to financial exclusion. For example, research from Merry Lynch (2023) found that, compared to Caucasian populations, racial and ethnic minority groups have more frequently encountered financial stress (e.g., sudden job loss), which has only increased in the years since the onset of the COVID-19 pandemic. Racial and ethnic minority groups also have less financial literacy, lower trust in financial institutions, more limited credit access, fewer liquid assets, and greater focus on near-term gains (Barcellos & Zamarro, 2021; Zhan, Anderson, & Scott, 2008; Florant, Julien, Stewart, Yancy, & Wright, 2020; Abrams, Muvezwa, Sibanda, & Stewart, 2022). This subpopulation also typically faces challenges with confusing bank and financial product information, high minimum account balances, and poor credit histories due to multiple overdraft fees (Barcellos & Zamarro, 2021; Abrams, Muvezwa, Sibanda, & Stewart, 2022).

These experiences have led many minority individuals to feel overwhelmed and overpowered by creditors (Myers & Chan, 2018). The lack of financial literacy has also likely contributed to a pessimistic view of financial products, as racial and ethnic minority groups are less likely to intuitively see various products and services' benefits (Myers & Chan, 2018). The challenges faced and perceptions held by racial and ethnic minority populations may be more acutely present in single parent households (Seidman, Hababou, & Kramer, 2005).

Immigrants

Findings on immigrant populations mirror some of the findings from minority and low-income populations. Similar to racial and ethnic minority groups and low-income populations, immigrants tend to have strong rates of mistrust in and barriers to accessing financial institutions (e.g., lack of credit history). These challenges tend to be more prevalent for older generations (Nam, Sherraden, Huang, Jeong Lee, & Keovisai, 2019). Immigrants are also worried about having proper documentation and policing concerns (Barr M. S., 2004; Seidman, Hababou, & Kramer, 2005). Meanwhile, similar to low-income populations, immigrants tend to have higher use of alternative financial services, particularly pawn shops and money order to pay bills (Seidman, Hababou, & Kramer, 2005).

Immigrants' financial literacy is influenced by their background. Those who come from countries with weak financial institutions, have little experience with financial institutions in their origin countries, are a more recent immigrant, or reside in metro areas with large proportion of immigrants are less likely to have bank accounts and financial service access (Paulson, Singer, Newberger, & Smith, Financial Access

for Immigrants: Lessons from Diverse Perspectives , 2006; Solheim, et al., 2022). Immigrants with less stable incomes and lower risk intolerance are also less likely to pursue financial service access and investment options (Chatterjee & Zahirovic-Herbert, 2012). Inversely, longer U.S. residency increases immigrants' odds of financial asset ownership (Chatterjee & Zahirovic-Herbert, 2012).

In general, immigrant populations have less financial capability (from a combination of financial literacy, access, and assets) and have difficulties meeting basic needs (Huang, Nam, & Jeong Lee, 2015). They also have a higher propensity believe that they do not need to understand financial management as they have few assets to maintain (Nam, Jeong Lee, Huang, & Kim, 2014). Additionally, immigrants may also be more vulnerable to a combination of family and relationship stressors (e.g., significant impact of one person's job loss) (Solheim, et al., 2022). These stressors may be amplified by immigrants' increased vulnerability to job losses and constrained resource access due to lack of proper documentation, fear of making a mistake, language barriers, and lack of digital fluency (Solheim, et al., 2022). Immigrant populations also tend to be vulnerable to risk of robbery and crime, due to living in more affordable but higher-crime neighborhoods (Singer & Paulson, 2004).

Women

Research on women's financial needs is the most limited and mostly revolve around their concerns (e.g., long-term savings). Malone et al. (2009) found that women have more conservative buying behaviors, desire being financially independent, and are worried about their financial futures (Malone, Stewart, Wilson, & Korsching, 2009). These considerations are amplified by women in family structures of single mothers, cohabitors, and stepfamilies and by younger women with less education and lower incomes (Malone, Stewart, Wilson, & Korsching, 2009). Additionally, single mothers are less likely to believe they had secure financial plans and be more concerned about long-term savings (Malone, Stewart, Wilson, & Korsching, 2009).

Population-Based Strategies for Financial Inclusion

As previously discussed, strategies to engage these subpopulations are similarly nuanced to their varied financial needs. The strategies that have been identified to best meet these populations' needs are summarized in the subsections below and Table 6. It is important to note that some strategies may be applicable across populations but were not explicitly mentioned in the available literature and were accordingly excluded.

Table 6. Financial Inclusion Strategies by Population

Category	Strategy	Low-Income	Racial and Ethnic Minority Groups	Immigrants	Women
Services	Offer advice	X			
	Manage debt		X		
	Provide education	X	X		X
	Manage wealth	X	X		

Category	Strategy	Low-Income	Racial and Ethnic Minority Groups	Immigrants	Women
Product Characteristics	Addresses immediate needs				X
	Grows personal wealth		X		
	Has a simple design/operation	X	X		
	Has a clear purpose	X			
	Helps with money saving			X	
	Is convenient to use			X	
	Is tailored to clients' needs		X		
	Offers clients more control	X			
	Uses an alternative fee structure/design		X		
Outreach	Build trust	X		X	
	Employ lessons learned from previous cases	X			
	Engage with the community	X		X	
	Expand upon existing resources	X		X	
	Increase physical access		X		
	Introduce new providers		X		
	Offer digitally based options	X	X		
	Target younger generations			X	
	Use inclusive and culturally relevant marketing		X		
	Work with unique partners	X		X	

LOW-INCOME

Research on how to best support low-income populations and has built a strong case for community engagement and trust building. This trust can be built with financial institutions to help address privacy

and policing concerns (Chan & Grifffin, 2018; Seidman, Hababou, & Kramer, 2005). Generally, low-income individuals also want financial institutions to provide advice and education, as well as actual money management services (Chan & Grifffin, 2018). Ideally, the services that these institutions would offer would be simple in design and operation and have a clear, direct purpose (e.g., store and grow money in easily accessible savings accounts). Additionally, these services should default to offering the client more control (e.g., no initial automated paycheck withdrawal amount) (Chan & Grifffin, 2018).

To target low-income individuals specifically, unique partnerships can be developed. For example, workplaces can be a productive access point as financial services (e.g., education, money savings) can be built upon existing platforms (e.g., payrolls) (Seidman & Tescher, 2003). Leveraging workplaces can help provide programs with a large supply of people, which is necessary to justify programmatic expenses (Seidman & Tescher, 2003). Alternatively, non-traditional partners can be explored, such as with retailers serving as depository locations (e.g., ATMs at 7-Eleven retailers) and community-partnerships (e.g., Operation Hope) (Seidman & Tescher, From Unbanked to Homeowner: Improving the Supply of Financial Services for Low-Income, Low-Asset Customers, 2003). Financial service access can also be granted by expanding the reach of existing tools, such as offering digital rather than in-person options and building on existing infrastructure (e.g., ATMs) (Barr M. S., 2004; Seidman & Tescher, 2003). Increasing financial service, especially bank account, access can be a critical point for reducing low-income individuals' financial vulnerability (Seidman & Tescher, 2003).

Lessons learned from previous partnerships and services can also inform future program designs. For example, historically low-income financial training programs have focused on budgeting behavior and credit card use. However, these programs have not focused on financial practices, such as leveraging opportunities to build savings and invest funds (Zhan, Anderson, & Scott, 2008; Barr M. S., 2004). Future efforts can work to close these gaps. Additionally, Low-Income Credit Unions (LICUs) are specifically designed to serve low-income communities (e.g., cross-selling products like underwriting loans and recruiting business for special loan plans). As a result, LICUs can offer valuable insight on outreach, programmatic, and service design (Williams, 2004). Other programs have also found that leveraging stored value cards to use across networks can offer a safe place to house funds while maintaining liquidity (Seidman & Tescher, 2003; Barr M. , 2004). This may be used in future financial access.

Racial and Ethnic Minority Groups

Research on racial and ethnic minority groups have found that they have a particularly high interest in growing and protecting their personal wealth (Abrams, Muvezwa, Sibanda, & Stewart, 2022). This desire may be fueled by historic exclusionary and discriminatory practices limiting opportunities to generationally close financial gaps (Abrams, Muvezwa, Sibanda, & Stewart, 2022). Compared to Caucasian individuals, racial and ethnic minority groups also prioritize getting out of debt (12% to 19%, respectively) (Merrill Lynch, 2023). Racial and ethnic minority groups also tend to be more concerned about saving for emergencies and not burdening families with debt if they prematurely die (Caswell, 2022).

Digital options may be a strategy to best target racial and ethnic minority groups. Compared to the general population, racial and ethnic minority groups are 27% more interested in exploring financial products via digital channels, such as FinTech options (Myers & Chan, 2018). This is backed by findings by Abrams et al. (2022), who found that 14% of Black Americans consider digital banks to be their primary provider (compared to 8% of white Americans) (Abrams, Muvezwa, Sibanda, & Stewart, 2022). Similarly, racial and ethnic minority groups are 10% more interested in services advertised to them through social media and 7% more interested in options recommended by peers (Abrams, Muvezwa, Sibanda, & Stewart, 2022). Racial and ethnic minority groups are also more likely to get information from television (de Rubio, 2013). While digital options are important, it will likely also be beneficial for institutions to maintain some physical footprint and ensure that their staff represents the demographics they are working to serve (Stewart, 2023).

In addition to this information, research by Abrams et al. (2022), Perkins (2023), and Zinn et al. (2023) found that keyways for financially serving racial and ethnic minority groups include:

- Developing and personalizing holistic financial products according to customers' income profiles and needs;
- Providing viable alternatives to high-interest, punitive short-term solutions (e.g., payday loans, high-fee check-cashing services);
- Altering or eliminating fee structures (e.g., no overdraft fees for accounts with less than $200 in them, no advisory fees for wealth lower than $10,000);
- Offering continuous financial education;
- Simplifying the processes and requirements to open and manage accounts;
- Working with trusted minority institutions;
- Ensuring that customer service and marketing campaigns are inclusive and demonstrate cultural awareness; and
- Optimizing financial institutions' presence in minority communities.

IMMIGRANTS

To support immigrants, financial services can build on the services and programs immigrant populations already use. For example, financial institutions can focus on offering remittance payments, in addition to standard banking products, as remittances are something many immigrant populations use (Singer & Paulson, 2004); Seidman & Tescher, 2003; Bair, 2003). Similarly, financial products' design can be informed by the resources immigrant communities already use, such as Electronic Funds Transfer (EFT) or electronic benefit transfers. These transfer options provide prepaid debit cards, easily transfer funds, have low or no minimum monthly fees, and no monthly balances (Barr M. S., 2004). Immigrants are also more willing to use family and community based resources to meet their financial needs (Solheim, et al., 2022). Reaching immigrants in their communities – whether residential or workplace – can also be an effective outreach approach. This can be accomplished by expanding ATMs into these communities, as this is relatively cost effective and low maintenance (Barr M. S., 2004).

Immigrants may also benefit from programs and services specifically designed to meet their needs, especially when they are associated with or endorsed by trusted or recognized sources (e.g., public health centers) (Paulson, Singer, Newberger, & Smith, Financial Access for Immigrants: Lessons from Diverse Perspectives , 2006; Pisnanont, et al., 2015). Strategies in this area could include making desired services (e.g., check cashing) available, reaching out to second generations to serve as ambassadors or educators, leveraging employment centers with high rates of immigrant employees, and targeting specific neighborhoods (Paulson, Singer, Newberger, & Smith, Financial Access for Immigrants: Lessons from Diverse Perspectives , 2006).

Programs that provide financial literacy training programs and build trust in financial institutions also can be helpful (Zhan, Anderson, & Scott, 2009). Additionally, immigrant populations have expressed interest in services that are convenient, cost-saving, secure, and available in a friendly environment with a staff of financial services (Zhan, Anderson, & Zhang, 2012). Regardless of which approach is chosen, immigrants are a currently untapped and growing market that can be beneficial for businesses and communities alike (Singer & Paulson, 2004). Evidence has shown that once tapped in to (i.e., once a bank account is opened) immigrants' financial knowledge and management skills tend to increase, due to a desire to efficiently oversee their assets (Abrams, Muvezwa, Sibanda, & Stewart, 2022),

Women

Women's financial priorities are likely to vary by family structure and race. A study of African American women found that their financial priorities are paying bills and debt, saving, purchasing a home, and helping others (Starkey, Keane, Terry, Marx, & Ricci, 2012). Research on Chinese American women found that women had less financial literacy and had less input in household financial decisions (Zhao, Sun, Devasagayam, & Clendenen, 2018). Across the board, though, women want more financial assistance and education (Starkey, Keane, Terry, Marx, & Ricci, 2012)

Key Takeaways

- **Population-Based Needs for Financial Inclusion:** In general, individuals who are low-income, racial or ethnic minorities, immigrants, or women struggle with a lack of funds to open bank accounts or save money, are vulnerable to emergencies, and use expensive and/or risky financial products. The risks these subpopulations face may be amplified by residency in areas without access to other financial services.
    - **Low-Income:** In particular, individuals who are low-income lack the funds to access safer financial products and instead live paycheck to paycheck and rely on riskier financial products.
    - **Racial or Ethnic Minorities:** The discriminatory history individuals who identify as a racial or ethnic minority have experienced has reduced their trust in the financial system, lowering their experience with and understanding of financial products and services.

- **Immigrants:** Many immigrants share the financial needs of low-income and racial and ethnic minority populations. Additionally, immigrants' financial needs are influenced by their experiences with financial institutions in their country of origin and interpersonal stressors.
- **Women:** Women's financial needs are not well understood, but their concerns regarding being financially independent tend to be amplified by being a member of non-traditional family structures.

- **Population-Based Strategies for Financial Inclusion:** All of the subpopulations who are transit dependent and financially excluded can benefit from financial institutions that offer lower cost but secure financial products and services as well as culturally relevant financial education.
  - **Low-Income:** Low-income individuals are most likely to benefit from simple but effective financial products and services. The cost of providing these services can be reduced by leveraging existing resources, such payrolls to reach a large number of people.
  - **Racial and Ethnic Minorities:** Financial products that prioritize personal wealth management, especially debt management and recovery, are likely best suited for racial and ethnic minorities. These products are also likely to be more effective if they are provided digitally and by an organization whose staff represents the demographic they are trying to reach.
  - **Immigrants:** Similar to low-income populations, immigrants can best be served by financial service access provided through the resources these populations already use, such as reminiscences and EFTs. Immigrants may also benefit from approaches that focus on increasing financial literacy and building trust between parties.
  - **Women:** Strategies that accommodate familial structure and race considerations are likely to be most effective for increasing women's financial service access.

Expert Interview Findings

The experts interviewed discussed their experiences with open-loop payment system deployment, which can help guide practitioners and inform potential partnerships. All of the public transit experts were motivated to implement open-loop fare payment systems to make public transit more convenient for and accessible to riders. However, the specific rider demographics these agencies targeted vary. For example, one agency was interested in increasing transit accessibility for tourists, while encouraging local residents to continue to use the traditional closed-loop fare payment card. However, another agency focused on increasing ridership after the COVID-19 pandemic and increasing transit accessibility via open-loop payments for all new riders. The fare products currently available on open-loop fare payment systems, lessons learned in deployment, and desired resources are summarized in the following subsections.

Fare Products Available on Open-Loop Fare Payment Systems

Despite varied rider segmentation focus, all of the agencies have made their standard fare products (e.g., full fare, single ride) available on their open-loop fare system. Overtime, the experts and their agencies are working to add more fare products to their open-loop systems (e.g., discounted rides, monthly passes). This transition period is necessary to continue to acclimate riders to the open-loop system and the available offerings. The transition period also allows the agencies to work within or around the technological constraints of their respective fare systems. One public transit representative noted that ensuring the system is consistently functional is key to gaining rider trust and adoption, which is especially critical for transit dependent riders.

Most of the agencies' open-loop transition decisions (e.g., adding senior discounted fares) have been informed by their understanding of their riders' needs. Other than making existing fare products available via open-loop payments, most of the agencies have not had the capacity to explore new partnerships or products to target specific rider segments. Especially in the years after the COVID-19 pandemic, the agencies have very limited resources and must focus on other operational priorities (e.g., employing more vehicle operators, reinstating service). Despite the fact that not all fare products are available on the existing open-loop systems, all of the agencies have witnessed an exponential adoption of open-loop payments since their deployment. This indicates that the new fare payment systems are serving certain riders well, but riders in other areas may require additional support. About half of the agencies want all rider segments to have access to and a choice in using open-loop fare payment options.

Open-Loop Fare Payment System Deployment Lessons Learned

All of the agencies stated that regional and stakeholder coordination were the largest challenges for open-loop implementation. Especially in areas like the San Francisco Bay Area, where numerous operators use the same fare system, aligning fare products and reconciliation processes took significant

time. The agencies interviewed have all been limited to working with larger, traditional financial institutions, namely Visa, Mastercard, American Express, and Discover. This limitation is a result of the timing of open-loop deployments (e.g., these were the credit cards most people had access to) and partnership agreements (e.g., lower negotiated fees for transit purchases). However, interest exists in working with new financial institutions to more effectively target riders (e.g., accepting JCB cards, which are popular amongst tourists from Asia).

Open-Loop Fare Payment System Next Steps

In terms of future partnerships, public transit agencies are interested in redistributing responsibilities with financial partners. While the agencies are interested in and see the value of increasing financial inclusion for their riders, the pandemic has severely impacted their capacity to work in these areas. As a result, partners can play a key role in furthering these endeavors. The experts provided information on partnership ideas and structures. These ideas include:

- **Varied Financial Products:** Accepting new financial products and requiring the respective company to conduct research on that rider segments' needs,
- **Regional Coordination:** Requiring new financial partners to work on fare payment and acceptance across the region and not just for one agency,
- **Devoted Resources:** Establishing a point of contact at the financial institution to serve as the key communicator throughout the partnership duration,
- **Resource Exchange:** Providing prime advertising space (e.g., popular train lines during the holiday season) in exchange for lower fees for transit purchases, and
- **Timed Partnership Deployment:** Strategically timing partnerships with open-loop system changes to maximize the benefits for all involved stakeholders (e.g., financial product uptake, open-loop payment use).

Outside of financial partnerships, over half of the experts also advocated for support at the state and federal levels. The biggest desire voiced was distributing benefits (e.g., CalFresh, Medical) via contactless payment cards. Currently, benefits are distributed via magnetic striped cards, which cannot be used on open-loop systems.

Benefit distribution via open-loop cards could help equip vulnerable riders with contactless payment options and help educate them on the process of using these payment methods. Three experts also expressed the desire for eligibility verification processes to occur at the state level. This could reduce the time it currently takes agencies to verify that riders are eligible for the programs, products, and passes (e.g., discounted monthly senior pass) they apply for. The reallocation of eligibly verification responsibilities to state agencies can help streamline the processes across agencies and free up agency resources to focus on other efforts. Eight of the California agencies are supported by Cal-ITP, and all of representatives from these agencies acknowledge the critical role this support played. Additionally, these representatives wanted Cal-ITP to continue their efforts, especially in resource and information distribution.

KEY TAKEAWAYS

- **Fare Products Available on Open-Loop Fare Payment Systems:** All of the interviewed public transit agencies who have deployed open-loop fare payment systems have their standard fare products available for purchase on them. These agencies are working to ensure system functionality as they add more fare products.
- **Open-Loop Fare Payment System Deployment Lessons Learned:** When deploying their open-loop fare payment systems, the public transit agencies interviewed faced the greatest challenges with regional coordination and limited experience working with varied financial sector stakeholders.
- **Open-Loop Fare Payment System Next Steps:** The public transit experts expressed interest in overcoming their current resource and capacity limitations by working with financial and public sector stakeholders to better meet riders' needs (e.g., through greater access to open-loop fare payment options).

PROPOSED POTENTIAL PARTNERSHIPS

Today, most financial access programs today have been focused on strategies that: 1) expand education and awareness, 2) increase the affordability of financial services, 3) expand accepted payment options to build understanding and trust in non-cash payment options, and 4) connect riders to financial services that may best fit their needs. Table 7 summarizes recent California examples in these areas.

Table 7. Traditional Partnership Examples

Method	**Example**		
	Stakeholder *Location*	*Description*	*Impact*
Expand Education and Awareness	Valley Clean Air Now (Valley CAN) *San Joaquin Valley, California*	In 2023, Valley CAN worked with Cal-ITP to provide selected program participants with funds available on prepaid cards that could be used for various mobility options (e.g., public electric vehicle charging, bikesharing).	An exit survey revealed that 74% of participants agreed that the cards helped them build familiarity with bank cards.
Improve Financial Service Affordability	BankOn *California*	Cal-ITP is helping partner stakeholders with BankOn, an initiative to offer consumers safe and affordable bank accounts, to public transit agencies to facilitate easier access to contactless payment options.	Of the 250 banks that are BankOn certified, most offer contactless or mobile wallet payment options that can be used to pay for transit.
Expand Accepted Payment Options	Capitol Corridor Joint Powers Authority (CCJPA) *Sacramento and San Francisco Bay Area, California*	In 2023, the CCJPA, who manages Amtrak's Capitol Corridor line, began allowing fares to be paid via contactless options.	The goal of the fare system change was to increase service access and improve equity through fare capping.
Connect Riders to Financial services	Sacramento Regional Transit District (SacRT) *Sacramento, California*	In 2021, SacRT offered a promotional $1 fare on SacRT rides for travelers paying with a contactless debit or credit card, mobile wallet, or Cash App Boost on their Visa Cash App Card to increase the adoption of these payment options.	At the end of the promotion, cash payments remained the predominant fare payment form for low-income riders.

Sources: California Integrated Travel Project (2023), Sacramento Regional Transit (2023), Capitol Corridor (2023), California Integrated Travel Project (2022)

The efforts summarized in Table 7 have been effective increasing riders' understanding of and comfort with financial services. However, they are broad stroke programs designed to support as many riders as possible. These strategies may be even more effective when tailored to specific demographic groups, specifically low-income households, racial and ethnic minority groups, immigrants, and women. Partnerships' effectiveness may be furthered by strategically designing them based on open-loop systems' deployment phase (see Figure 3 for more information).

The findings from the literature review and expert interviews informed different partnership structures that can be explored. These partnerships can help leverage open-loop fare payment systems to increase financial inclusion for riders. While the strategies listed below can be tailored to meet rider needs across segments, the population they can most effectively target or are particularly tailored to meet is demarcated with an X. The proposed partnerships are also organized by deployment phase to maximize their effectiveness. However, not all deployment phases are represented since the partnership structures focus on the initial deployment steps. The strategies are divided into Table 8 and Table 9, which indicates whether a transit agency or financial institution is the lead in developing the partnership.

Table 8. Proposed Partnership Strategies – Transit Agency Lead

Deployment Phase	Proposed Partnership	Description	Demographic Group			
			Low-Income	*Racial and Ethnic Minority Groups*	*Immigrants*	*Women*
Identify Need	**Understand Riders Needs**	Conduct rider surveys or work with key community partners to understand what riders' needs are	X	X	X	X
Plan	**Accept Digital Payments**	Allow fares to be paid directly through digital accounts, whether that is paid via contactless tapping or loading funds to a fare card	X	X		
	Simplify Product Offerings	Focus on providing, clear, intuitive fare products supported by stakeholders that offer similar financial products	X	X	X	
	Reduce Fare Costs	Encourage paying via open-loop payments by offering cost savings			X	
Procure	**Provide Prime Advertising**	Incentivize partnerships with new demographic specific organizations by providing profitable advertising space in exchange	X	X	X	X
Procure	**Specialize Requests for Proposals (RFPs)**	When seeking partners through RFPs and other mechanisms, specify partner and contractor characteristics (e.g.,	X	X	X	X

Deployment Phase	Proposed Partnership	Description	Demographic Group			
			Low-Income	*Racial and Ethnic Minority Groups*	*Immigrants*	*Women*
		which demographics they serve)				
Procure	**Require On the Ground Support**	Require partners to provide in-person and on the ground support to address technical challenges	X	X	X	X
	Expand Payment Options	Negotiate with financial providers for lower transit fees and accept payments made via these providers on transit	X	X	X	X
	Selective Partnerships	Work with partners that offer the specific products and services the target demographics needs (e.g., debt management, wealth management)	X	X		X
	Seek Regional Partnerships	Engage with other regional agencies to have partnerships span multiple agencies	X	X	X	X
Implement	**Combine Outreach**	Work with financial partners that target specific demographic groups to conduct outreach and education on transit options and financial products	X		X	
	Offer Physical Access in Transit Stations	Allow ATMs and other physical service kiosks to be available to riders and financial institution clients nearby or inside transit stations		X		
Test	**Educate Stakeholders**	Ensure that stakeholders (e.g., financial institutions, benefits providers) understand the foundations of how open-loop payments work so they can	X	X	X	X

Deployment Phase	Proposed Partnership	Description	Demographic Group			
			Low-Income	*Racial and Ethnic Minority Groups*	*Immigrants*	*Women*
		prepare their systems accordingly (e.g., merchant codes)				

Table 9. Proposed Partnership Strategies – Financial Sector Lead

Deployment Phase	Partnership	Description	Demographic Group			
			Low-Income	*Racial and Ethnic Minority Groups*	*Immigrants*	*Women*
Identify Needs	**Understand Rider's Needs**	Conduct community outreach (e.g., surveys, tabling) to understand community member's open-loop concerns to help inform partnerships	X	X	X	X
Implement	**Target Employers**	Leverage individual employers and employer hubs to ensure that there is a large enough population	X	X	X	X
	Provide Information	Publicize information about available financial products that can be used for transit payments	X	X		X
	Tailor Marketing	Use culturally relevant marketing to advertise payment options and financial products		X		

Future Research

The limitations encountered in this work help identify areas where further research is needed. These limitations revolve around three critical areas: 1) California focus, 2) available demographic data, and 3) low financial sector engagement. Summaries of how future research can help fill these gaps are available in the subsections below.

Expanding Outside of California

As evidenced by open-loop fare payment deployment by public transit agencies as far as New York and England, this adoption is occurring on a national and global scale. As a result, the California-based findings of this research can serve as the foundation for future efforts that research the same populations and subjects but in other areas throughout the U.S. and world. Further work can also explore trends based on agency characteristics, such as those who offer both bus and rail service and the service area characteristics of the deploying agencies (e.g., urban, rural).

Quantifying Demographic Information

Additional work is also needed to more clearly quantify the populations that can most benefit from leveraging open-loop fare payment systems for financial service access. There is very limited quantifiable information available on the intersection between transit dependent and financially excluded populations. There is even less quantifiable information regarding the make up of this overlapped population by subpopulation demographic group. As a result, future research can work to close these gaps through efforts, such as cross tabulating survey data and asking specific questions to public transit riders. Future work may also add robustness to this research's findings by directly engaging riders in these demographic groups, such as through focus groups.

Financial Sector Engagement

Future work can also more robustly engage stakeholders in the financial, and other relevant, sectors. This research may need to start at a more foundational level of better understanding how to engage with these stakeholders, before further exploring the stakeholders' interests in being involved in public transit agencies' open-loop fare payment deployment. Additional research in this area may test the proposed partnerships and further refine them to improve their efficacy.

Key Takeaways

- **Expanding Outside California:** Future research can build upon this work's findings and apply the same methodology to explore the same subjects in other U.S. states and international regions.

- **Quantifying Demographic Information:** While information on the overlap between transit dependent and financially excluded riders their subpopulations' characteristics exists, it is limited and lacks quantifiable date. Future research and help close this gap.
- **Financial Sector Engagement:** Future research can identify how to better engage financial sector stakeholders then apply these lessons learned.

CONCLUSION

Today, open-loop fare payment systems for public transit agencies are gaining popularity. These systems allow fares to be paid for via a bank card that meets EMV standards. Open-loop payments offer benefits to transit agencies and riders alike, such as increased transit accessibility and faster boarding times. As a result of these benefits and other external motivators (e.g., support for contactless payment during the COVID-19 pandemic) many U.S. public transit agencies are deploying open-loop fare payment systems. In California, seven public transit agencies currently have open-loop systems, while others are in the process of deploying them. A key question in open-loop fare payment system deployment is how to include un and underbanked riders. However, this question can be reframed and instead ask how open-loop fare payment systems can be used to increase financial service access among transit riders.

Public transit agencies can serve as a critical connector to financial services since a high percentage of riders, especially those who are transit dependent, are financially excluded (i.e., un or underbanked). This overlap can be further refined to show that riders who are transit dependent and financially excluded are typically those who are low-income, racial or ethnic minorities, immigrants, and/or women. As a result, this research explores potential partnerships to best reach and support these populations.

This research was accomplished through four research methods: 1) a literature review, 2) expert interviews (n=11), 3) financial needs and strategy mapping, and 4) proposed partnerships. The literature review further explained the overlap between populations who are transit dependent and financially excluded. While limited information exists on the precise intersection of these populations, the literature review provided a high-level overview on the demographics that are both transit dependent and financially excluded. This information highlighted individuals who are low-income, racial and ethnic minorities, immigrants, and women as the key benefactors of increased financial inclusion via public transit systems.

The expert interviews further probed open-loop fare payment system deployment and the possibility of using them to increase financial inclusion for individuals who are low-income, racial and ethnic minorities, immigrants, and women. Despite being designed to target both public transit agency and financial institution stakeholders, response rates resulted in the expert interview findings being confined to mostly those from public transit agency interviews. The interviews revealed increased transit accessibility was the key motivator for all of the agencies who currently have open-loop payment systems in place. The agencies are interested in further improving their open-loop fare systems to increase equity for riders, but face challenges, mostly stemming from resources constraints, to do so. As a result, many of the partnerships proposed by the transit agency experts focus on accessing more resources via partner support and leveraging the resources available to the agencies.

The financial needs and strategy mapping tool was implemented as a result of the limited financial expert interviews. The mapping focused on populations who are low-income, racial and ethnic minorities, immigrants, and women and identified their financial needs and the most effect strategies to address these needs. The needs mapping revealed different needs across populations including: low-income populations' needs are centered in a lack of funds to access financial products and services, racial and ethnic minorities are most impacted by a history of and experience with discriminatory practices; immigrants have similar needs to low-income and racial and ethnic minority groups and immigrants' financial literacy is impacted by their country of origin; and women have some of the least information available regarding their needs but their concerns are most likely to be amplified by family structures. Similarly, the financial inclusion strategies varied by population. Low-income individuals are best served by financial services that provide simple but effective services. Meanwhile, financial products and services that prioritize wealth management are best suited for racial and ethnic minorities. Alternatively, leveraging financial services that are already used by immigrants is most suitable for them. Lastly, women can be most effectively reached by financial services that accommodate different family structure and race considerations.

Collectively, this information was used to help inform proposed partnerships. These partnerships are designed to leverage different parts of the open-loop deployment process, from pre-deployment research to post-deployment revisions. In general, the partnerships work to use existing resources to better reach riders and provide them with necessary information and resources. In some cases, the partnerships help increase affordability for agencies and/or riders, such as lowering bank card fees. The goals targeted by these partnerships can help agencies maximize the benefits of open-loop payment systems as they deploy them and improve financial access throughout California.

Future work can help apply these takeaways to public transit and financial sector experts. Additionally, research can help close the gaps identified in this research including its California focus, lack of quantifiable demographic data, and limited financial sector stakeholder engagement. Collectively, these efforts can support open-loop fare payment system deployment, financial inclusion, and improved equity.

APPENDIX A – PUBLIC TRANSIT AGENCY EXPERT INTERVIEW PROTOCOL

Introduction

1. Can you tell me a little bit about your role with your agency?

Financial Products

2. What was the motivation behind moving to an open-look payment system?
3. What were some of the opportunities and challenges that this shift resulted in?
4. What demographics do you think the open-loop system serves well?
    a. How does the open-loop system help meet their needs?
5. What demographics would you like to capture in the future?
    a. What changes to your fare policies, products, system, etc. do you think are needed to reach these demographics?
6. What other resources would be helpful to target to capture these demographics?

My research focuses on how transit payment options can serve as avenues to connect riders to other resources like supplemental nutrition, and in this case banking and financial services. This is enabled by various factors, but namely the role of open loop payment systems (i.e., those that allow payments to be made with options like fare cards and credit cards).

7. How do you think financial technology (Fintech) firms or other personal finance businesses could serve as a stakeholder or partner to support your targets to expand the reach of your financial products?

Closing

8. Is there anything else you'd like to add?
9. Is there anyone else you suggest I speak with?

Appendix B – Financial Technology as an Equity Resource

U.S. financial service access been limited by discriminatory and predatory practices. These practices have been maintained by requiring physical access to banks and their services. However, in recent years, increasing awareness of financially excluded populations (e.g., racial and ethnic minority groups, women) has led to the development of banks and other financial institutions specifically designed to meet their needs (Terentev, 2021). These institutions have been able to overcome some of the challenges plaguing many brick-and-mortar institutions, such as limited client reach and general products and services (United Nations, 2023). Additionally, financial technology (FinTech) innovations have been shown to address some of these traditional access challenges while improving equity outcomes (U.S. Congress Joint Economic Committee, 2022).

FinTech Overview

FinTech is a blend of financial innovation and technology that improves and automates financial service delivery and use (Kagan, 2023). Examples of Fintech include robotic advisors (e.g., Betterment) and mobile applications and web platforms for payments (e.g., Gig Wage), peer-to-peer lending (e.g., LendingClub), and investment (e.g., Kiva). In general, FinTech can increase financial service access by: providing greater personal financial control, facilitating faster financial decision making, easing the ability to make and receive payments, and increasing banking convenience (Durai & Stella, 2019; Kagan, 2023). FinTech can improve financial equity by closing the gap between un and underbanked and fully banked households, expanding access to the global economy, providing financial services to the historically excluded and underserved, and moving toward a more equitable society (Salampasis & Mention, 2018; Demir, Pesque-Cela, Altunbas, & Murinde, 2022). Algorithm-based fintech advancements have also been shown to result in less bias than face-to-face lenders but are still subject to biases (U.S. Congress Joint Economic Committee, 2022). Additionally, loans from online financial service companies can grant borrowers who would otherwise be classified as subprime access to better loans with accompanying lower priced credit. In this example, consumer can pay smaller spreads and therefore experience greater affordability, compared to traditional loans (Jagtini & Lemieux, 2017). FinTech can also help reduce class and geographic (e.g., urban versus rural) inequities, but is unlikely to improve gender equity (Wang Tok & Heng, 2022). FinTech can also help increase GDP per capita (Kanga, Oughton, Harris, & Muridae, 2022).

Today, FinTech companies have proven to be more agile than traditional banking services due to their ability to:

- Ease day-to-day financial management by using quicker processes to more efficiently deliver financial services;

- Operate under less stringent regulations (due to them not handling deposits like traditional banks), allowing them to work on process improvements, reduce costs, and offer emergency funds to low-income populations (due to the lack of lengthy credit assessments);
- Partner with traditional financial institutions to continue to lower operational costs and improving product quality, increasing their sustainability and processes; and
- Improve convenience by operating remotely (e.g., via online platforms) and offering day-to-day financial management options (due to Fintech firms not handling deposits like traditional banks) (2018).

FinTech's agility allows them to become increasingly specialized to expand the reach of institutions designed to target historically excluded populations (e.g., low-income households, women) or create new services unique to these needs. These efforts may be particularly impactful as FinTech adoption is often characterized by increased financial performance and lower effort expectancy (Senyo & Osabutey, 2020). In order for FinTech companies to most effectively work with public transit agencies, they will likely need to refine their products and services to meet the needs of the populations who are transit dependent and un and underbanked.

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