Transit to parks initiatives in the U.S. and Canada: Practitioners' perspectives

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ARTICLE INFO	ABSTRACT
	As large open spaces, such as national and regional parks, have become popular as recreational destinations, car dependency to access those open spaces has created capacity challenges. Due to these issues, transit-to-parks (T2P) initiatives—public transportation services connecting populated areas to large parks—have gained global traction. Limited research has examined these sustainability initiatives, and more knowledge is needed about how these initiatives are created and function. To address these gaps, this study explores motivations, facilitators, and challenges related to T2P initiatives in the U.S. and Canada. We conducted semi-structured interviews with 28 practitioners involved in the planning or operation of T2P initiatives in the two countries. Motivations for T2P included parking and congestion issues, environmental concerns, equity, and economic development. Facilitators of T2P initiatives included robust partnerships, community engagement, and advocacy efforts, emphasizing the importance of tailored narratives and coalition-building. The primary challenges mentioned were limited funding and labor, inadequate infrastructure, and siloed agencies and politics. This study reveals the complex dynamics of T2P initiatives and provides practical implications for transit agencies, public lands agencies, and community advocates seeking to enhance more sustainable and equitable access to nature.

1. Introduction

Engaging in outdoor activities and participating in nature-based tourism offers crucial benefits to individuals, communities, and society, thereby contributing to the promotion of sustainability (Nutsford et al., 2013; Halecki et al., 2023; Tian et al., 2021; Douglas et al., 2017). Accessing larger open spaces, such as national parks and forests and regional parks, offers diverse opportunities for physical, cultural, and social activities, leading to a broader array of health and social benefits (Brown et al., 2014; Markevych et al., 2017; Rundle et al., 2013; Jansen et al., 2017). As the popularity of parks and protected areas grows among tourists and residents, these spaces face significant capacity and sustainability challenges, especially concerning automobile use to access these spaces (Monz et al., 2016; Song et al., 2022; Newton et al., 2020). Over-reliance on cars has led to parking demand exceeding capacity during peak seasons, resulting in traffic congestion, pollution, safety hazards, and a degraded visitor experience (Gramann, 1982; Swanteson-Franz et al., 2020; Pettebone et al., 2011). Moreover, there is a significant disparity in accessing large, quality parks based on

socio-economic status, as individuals with limited mobility options and financial constraints have fewer opportunities to visit these parks (Donaldson et al., 2016; Park et al., 2021; Wen et al., 2013).

To address these issues and increase accessibility to nature, organizations in various countries have implemented transit services, including the U.S., Canada, Germany, Australia, England, Iceland, Norway, Austria, and Kenya (Gühnemann et al., 2021; Hassan et al., 2020; Herford, 1989; Høyem, 2020; Kassilly, 2008; Lumsdon et al., 2006; Manning et al., 2014; Thórhallsdóttir et al., 2021). The term "transit-to-parks" (T2P) refers to transit services (e.g., buses, shuttles, trains) connecting populated areas (e.g., cities, towns) to expansive public outdoor spaces. T2P services provide opportunities for diverse outdoor recreational activities, including hiking, biking, skiing/snowboarding, picnicking, camping, and hunting, among others. In the U.S., these initiatives were initially promoted by the National Park Service (NPS) to address traffic congestion and limit ecological impacts in environmentally sensitive areas, not only including the connectors within the park, between parks, and also some from nearby communities to parks (Holding and Kreutner, 1998; Monz et al., 2016; National Park

Service, 1999; Pettebone et al., 2011; Manning et al., 2014). More recently, sustainability and transit advocates have called for transit connections to parks in both urban and rural areas globally, particularly in the U.S. and Canada (Arakaki et al., 2019; Swanteson-Franz et al., 2020; Metro Vancouver Regional Park, 2020).

In the context of the U.S. and Canada, the reliance on automobiles for accessing large parks and open spaces is particularly pronounced, presenting a distinct sustainability challenge shaped by the prevailing car-centric culture and urban planning prioritizing vehicular transportation (Buehler, 2010; Furman, 2013; Hugill and McShane, 1995). This over-reliance is exacerbated by the geographical location of national parks and forests and regional parks, often situated at considerable distances from major transit networks (Lumsdon et al., 2006; Arakaki et al., 2019; Jakle and Sculle, 2004). The car-centric culture ingrained in these societies has amplified the significance of personal vehicles in park travels, creating a unique landscape where alternative modes of transportation are less prioritized (Anderson et al., 1996; Gosens and Jan, 2018; Kenworthy and Laube, 1999; Wells, 2013). These spatial and cultural dynamics underscore the critical need for effective transit-to-parks (T2P) initiatives in the U.S. and Canada.

Despite the growing importance of Transit-to-Parks (T2P) initiatives, academic literature on this topic is relatively sparse (Park et al., 2021; Høyem, 2020). Research has found that accessibility to large parks via transit is inequitable, showing that predominantly white and younger communities have better access (Park et al., 2021). Other studies have highlighted that the main motivation for using public transit to reach outdoor recreation areas is the desire to avoid the challenges of parking and traffic congestion, with environmental benefits being a secondary motivator (Høyem, 2020; Nelson et al., 2008; Pettebone et al., 2011). In addition, traveling by transit to parks can reduce the stress associated with parking and driving in heavy traffic (Taff et al., 2013). Besides these studies, much of the existing knowledge about T2P initiatives comes from reports by advocacy organizations or press coverage (Arakaki et al., 2019; Sierra Club, 2021; Scauzillo, 2018; Scruggs, 2021; Swanteson-Franz et al., 2020). Notably, there has been no comprehensive research examining the various types of T2P initiatives or analyzing their planning and operational aspects.

To address these gaps, our study investigates T2P initiatives in the U.S. and Canada, focusing on three key research questions: What are the main motivations for implementing T2P initiatives? What facilitators support the implementation of T2P initiatives? What challenges hinder the implementation of T2P initiatives? Our analysis seeks to provide valuable insights for transit agencies, public land managers, and sustainability advocates working to improve access to open spaces. In the following section, we offer an overview of T2P initiatives in the U.S. and Canada, setting the stage for a detailed exploration of the motivations, facilitators, and challenges associated with these initiatives.

2. The landscape of T2P initiatives in the U.S. And Canada: a web search

As part of a larger research project, we conducted an extensive web search in 2022 to identify T2P initiatives in the U.S. and Canada. For this search, we used a range of term combinations, such as "transit (or shuttles or buses) to parks," "transit to trails," and synonyms of "transit" and "parks".

Through this web search, we identified 106 T2P initiatives, including 74 in the U.S. and 32 in Canada. We subsequently classified these sustainable transportation initiatives into six main types: seasonal transit programs, permanent transit routes, informational campaigns, micro-transit on demand in areas with parks or trails, system-wide plans or studies, and legislation/funding programs (see Table 1). The most common T2P initiative type is seasonal transit programs, followed by permanent transit routes (Table 1).

The T2P initiatives we identified are mostly located in densely populated regions, especially in the western U.S. and Canada (see

Table 1

Types of T2P initiatives implemented in the U.S. and Canada (n = 106).

Initiative type	Initiative description	Number of initiatives
Seasonal transit programs	Dedicated routes that operate during a specific time of year (e.g., summer) to provide connections to open space destination(s).	51
Permanent transit routes	Permanent transit systems that connect to specific parks, forests, or other forms of open space. These services often utilize existing public transportation infrastructure.	25
Informational campaigns	Informational maps, applications, blog posts, or other communication materials highlight which parks, trails, and other forms of open space are accessible via transit.	16
On-demand, micro-transit services	Technology-assisted transit systems that utilize pooled vehicles (e.g., vans, shuttles) to provide on-demand transportation services to outdoor spaces.	6
System-wide plans or studies	Documents that propose several changes to transit service to connect people with the outdoors.	6
Legislation/funding programs	Legislation and/or funding aimed at improving transit access to parks and open space, typically through the provision of funds for transit and/or green space projects.	2

Fig. 1). Notably, these initiatives are implemented in large metropolitan areas (e.g., Los Angeles, Vancouver) as well as in smaller resort towns. T2P programs in rural areas generally offer less service level — often using a micro-transit or on-demand model — compared to services offered in metropolitan areas. In addition, nearly all T2P initiatives for which we found funding information relied on public resources to run. In terms of service cost, the fee of T2P services varied considerably, ranging from no cost (about half of the sample) to more than 50 U.S. dollars.

3. Materials and methods

3.1. Recruitment and data collection

In this qualitative study, we conducted semi-structured interviews with professionals actively involved in T2P initiatives in the U.S. and Canada. The web search mentioned earlier helped us identify potential interviewees. We began by emailing individuals from our established contact list, which included people within our networks. Additionally, we reached out through general contact information found on organizational websites, requesting to be directed to the most appropriate contacts and assessing their willingness to share information about their T2P programs.

To recruit participants, we used a combination of snowball and purposive sampling. The snowball sampling method involved asking interviewees to refer us to other potential participants (Heckathorn, 2011). The purposive sampling strategy was employed to diversify our sample based on initiative typology, locations, and types of hosting agencies (Palinkas et al., 2013). We sought to recruit professionals working in transit agencies, public land agencies, and advocacy organizations working on either transit or public lands. We employed a thematically focused expert interview approach, known for its openness in capturing insiders' global knowledge (Wroblewski and Leitner, 2009; Trinczek, 2009). This method delves into the communicative practices within insider groups, revealing nuanced procedures of negotiating opinions and unveiling field-specific patterns of expert knowledge (Wroblewski and Leitner, 2009; Trinczek, 2009).

After obtaining informed consent via email, we conducted interviews

Fig. 1. The location of T2P initiatives across Canada and the United States. The map was produced using Google MyMaps (n = 106) (Link to the interactive web maps).

via Zoom, each lasting 45–60 min. We audio-recorded the interviews and transcribed them using an artificial intelligence program, otter. ai, subsequentially checking the transcripts for accuracy. Interview questions focused on motivations, facilitators, and challenges of T2P initiatives, aligning with the three research questions (see Appendix I for a list of interview questions). We developed a semi-structured interview guide, including core questions and several probe questions for each main research question to ensure comprehensive coverage. Each interview was conducted by a lead interviewer, while a second interviewer took detailed notes. The lead interviewer used core questions to guide the conversation and probing questions selectively for deeper exploration. Once a topic was sufficiently explored, we transitioned to the next section to keep the interview focused and productive. At the end of each interview, we summarized what we learned orally and asked interviewees to provide feedback on our main takeaways (see Appendix I). This process, known as member checking, enhances the credibility of the results of qualitative research (Korstjens and Moser, 2018).

In total, we interviewed 28 individuals, with 18 working in the U.S. and 10 in Canada. Of these, 15 (54%) were affiliated with transportation-oriented organizations and 13 (46%) with public lands and environmental organizations. Government agencies represented 16 (57%) interviewees, while 12 (43%) worked in nonprofit organizations, providing a diverse sample across sectors.

3.2. Data analysis

We conducted content analyses of the interview transcripts (Leech and Onwuegbuzie, 2008). We used deductive and inductive coding to

make sense of the interview transcripts. Deductive coding focused on content directly related to research questions, such as content about motivations, facilitators, and challenges, and content from the limited literature about this topic (e.g., equity motivations for T2P initiatives). Inductive coding involved identifying other relevant content via a bottom-up approach, including content we did not expect to hear and that provided useful information to answer our research questions.

As part of this process, we developed a codebook (see Appendix II), comprising both deductive and inductive codes, in which we categorized codes based on research questions. Codes in the codebook describe the main findings for each research question, as summarized in Fig. 2 (see section 4). To ensure dependability, three researchers participated in the data analysis process, which consisted of regular team meetings during which they reviewed coding decisions, discussed disagreements, and resolved rare discrepancies (Korstjens and Moser, 2018). The relative simplicity of the codebook, which is organized based on the three research questions (see Appendix II), also helped improve consistency in the data analysis process. We used Taguette, an open-access qualitative data analysis program, to carry out the coding process (Rampin et al., 2021).

4. Results

Our analysis highlighted a series of key motivations, facilitators, and challenges to the implementation of T2P initiatives in the U.S. and Canada (see Fig. 2). As shown in Fig. 2, T2P initiatives might be undertaken due to one or more motivations (e.g., parking and traffic congestion, equity in access to parks), and several facilitators and
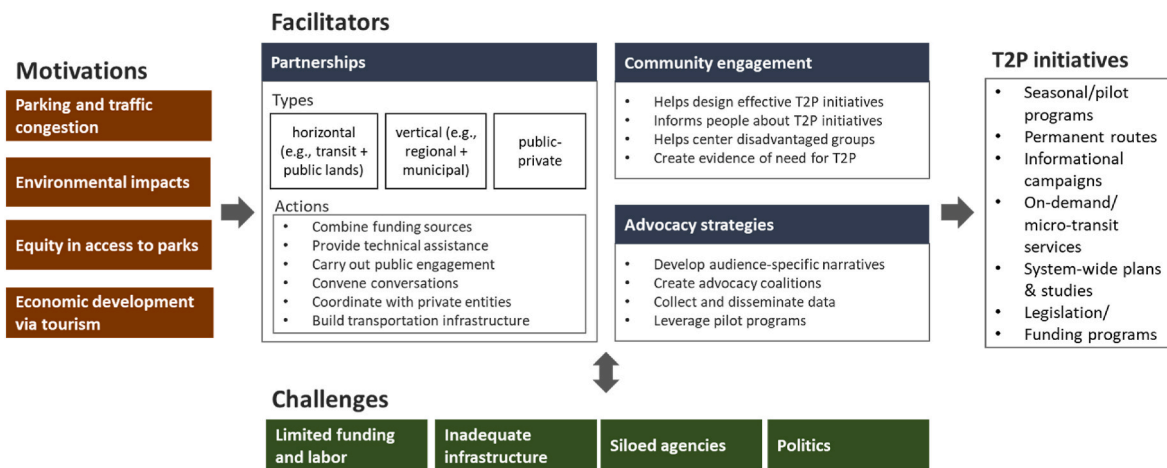
Fig. 2. Summary of the main motivations, facilitators, challenges, and types of T2P initiatives in the U.S. and Canada.

challenges determine whether and how such initiatives are implemented. The findings in the sub-sections below are organized based on motivations, facilitators, and challenges.

4.1. What are the main motivations for implementing T2P initiatives?

Our analysis of practitioner interviews revealed four types of motivations behind the implementation of T2P initiatives in the U.S. and Canada: parking and traffic congestion, environmental impacts of traffic, equity, and economic development via tourism.

Parking and traffic congestion. Participants noted that traffic congestion and parking demand exceeding capacity result in hundreds of cars idling in traffic, which creates unnecessary pollution and safety hazards, while also degrading the experience of visiting regional or national parks. As such, we found that a strong motivation of many T2P initiatives is to reduce traffic congestion and parking issues by providing sustainable alternatives such as public transit, thus preventing subsequent management problems. One interviewee working at a public park agency stated, "*A lot of our rec trailheads get pretty overwhelmed with people parking. And so we're working with the trails, open space, and parking and transit to try and develop more long-term solutions on how to alleviate some of the parking concerns at trailheads.*" Other interviewees explained that illegal parking can create safety issues, as exemplified by one participant: "*a couple of years before we implemented transit to trails, people were parked in the roadway, and emergency vehicles could not get through.*"

Environmental impacts. A related motivation of T2P initiatives involves environmental concerns related to traffic. By providing an alternative to driving, transit to parks can help reduce harmful emissions, noise, and deterioration of water, soil, and air quality. Calls to reduce the use of cars in parks and protected areas by promoting transit also involve conversations about "carrying capacity," which describes how many cars and visitors a specific park can host without degrading its environmental features. Several participants in this study linked concerns related to traffic and parking to environmental degradation. One from public park management agency noted, "*reduce roadside parking … of course, you can imagine the impacts on the ecology, the off-road ecology, and flora and fauna.*" Another interviewee mentioned, "*we want to think about things that we can do to reduce carbon emissions. So carpooling, mass transit, and bicycling.*"

Some interviewees underscored the environmental protection mandate associated with parks featuring sensitive and valuable ecological resources, which restricts their ability to expand parking facilities. Consequently, public transit is a means to accommodate more visitors without the need to increase parking availability. As one respondent working at a regional government expressed, "*Because of our commitment to protecting the park system, the notion of utilizing sensitive ecosystems for additional parking development is not aligned with our objectives.*"

Equity in access to parks. As a third motivation, some T2P initiatives aimed to increase equitable access to the great outdoors via transit. Several interviewees noted that their initiatives are motivated by equity goals and aim to connect people with limited access to private cars, such as low-income people of color, to nature. These equity-focused initiatives specifically consider the needs of transit-dependent populations and underserved areas, and/or aim to increase the diversity of people visiting open spaces. The quotes below exemplify equity motivations, such as providing access to the great outdoors, removing transportation barriers, and moving toward health equity by increasing access to the outdoors for marginalized communities.

And in that outreach, what was learned was that folks felt cut off from the mountains, there wasn't a lot of access to them. … [Several organizations] started to look at transit as a solution to close the gap in access.

The purpose of the … legislation is disproportionately beneficial to Latino communities who own cars in lower numbers, who in higher numbers lack access to larger public lands or parks, and who are disproportionately overweight and diabetic. Having access to outdoor recreation is been shown repeatedly to have direct positive impacts [on these health issues.]

Access to nature is super important, hence [the program name]. So because we realize that a lot of there are a lot of barriers to getting people into the regional parks, there's a lot of obstacles that they face, whether it's a lack of funds or they just can't get there. Transportation was a huge barrier to getting to the regional parks.

One T2P initiative shows an integration of different motivations, as they were initially driven by the need to relieve parking congestion, but then advocates made the case for considering equity issues.

The [initiative] started to address the parking problem at some of the most popular sites along the mountain corridor. … So that summer, we [nonprofit organizations] started an effort to build partnerships with groups like outdoor for Latino Outdoors, Outdoor Asian, all these various cultural affinity groups, and then groups that served some historically underserved areas within the region. … And transportation is often a barrier to getting to the outdoors. So we looked at [the T2P initiative] as an opportunity, a literal vehicle that could help them more easily connect their communities to nature experiences. So we tested that that first year, we did outreach, we also established some core partnerships with these groups to help provide some funding to support staff time in planning trips, but then

also provided transit cards. … we saw this shift within the transit agency that the initiative was no longer just about addressing a parking problem. But we got them to shift and look at it more as an equitable access solution to expanding equitable access to open spaces.

Economic development via tourism. The fourth motivation, economic development via tourism, was mentioned on rare occasions by our interviewees. In this context, T2P initiatives are seen as a means to provide more convenient access to outdoor recreation for recreationists and tourists than driving. In some highly congested locations, ski resorts and national and regional parks have found that traffic congestion contributes to degrading the visitor experience. As such, ski resorts have contributed to funding T2P initiatives (see also section 4.2). One participant highlighted that advocating for T2P programs serves as a strategy to boost local tourism without significantly escalating traffic congestion. "*I would say now keeping the [T2P service] would be because of obviously tourism, getting busier and trying to keep more vehicles down to a minimum just to help with visitors' experience in [the park]*".

4.2. What are the facilitators for implementing T2P initiatives?

Three key facilitators emerged from our analysis: policy advocacy, partnerships, and community engagement. We present these facilitators in the above order because such order somewhat represents the temporal order in which actions related to these facilitators occur.

4.2.1. Policy advocacy

We found that many T2P initiatives were the results of advocacy efforts from nonprofit organizations, public parks, transit agencies, or a combination of those. Also, our findings show that advocacy efforts to encourage the implementation of T2P initiatives are linked to the motivations described in the previous section because such motivations are often parts of policy narratives used in this space. Based on our interviews, the main policy advocacy strategies used to push for T2P initiatives included developing policy narratives about the need for such initiatives, creating advocacy coalitions, collecting and disseminating data showing the need for such initiatives, and leveraging pilot programs (e.g., seasonal shuttle) as a proof of concept to generate more funding. We discuss each strategy in the paragraphs below.

Narratives. We found that advocates see developing audience-specific narratives as a key strategy to push for T2P initiatives. Some interviewees pointed out the need to focus on economic development narratives when talking about T2P initiatives in politically conservative cities and states. Additionally, other interviewees suggested developing narratives focused on the public health benefits of T2P initiatives. Some noted the emphasis on affordable riding fares and good in-vehicle experiences will promote T2P initiatives to residents and tourists effectively. Other organizations have developed narratives that center on the T2P experiences of individuals from marginalized groups. For example, one interviewee described the creation of videos that were disseminated via social media to show how difficult it can be to access parks via transit in a certain place, "*… park equity videos, where we had folks take transit to get to parks and tell their story. And I'll tell you, those were wildly popular on social media.*"

Advocacy coalitions. Numerous interviewees talked about the importance of coalitions when advocating for T2P initiatives with elected officials, parks agencies, and transit agencies. In the transit to parks space, we learned that coalitions generally include nonprofits that work on environmental issues or access to open spaces and nonprofits that advocate for transit service. For example, an interviewee working at an environmental nonprofit stated, "*we joined a great group called the […] coalition, a super strong voice for transit and at the state level, and they have a wide network of folks that they activate, and bring together on their issues.*" Also, some interviewees highlighted the advantages of coalitions between environmental organizations and transit organizations, as

explained in this quote: "*I think the coalition that we were able to put together for the legislation brings together trail groups, outdoor recreation businesses, and environmental nonprofits, that all provide kind of different and distinct perspectives, but all support the same issue.*"

Data. Interviewees who work in policy advocacy for T2P initiatives also highlighted the importance of using data to make the case for such initiatives. The main data types are maps created via geographic information systems (GIS) to show service gaps in T2P access, but some respondents also mentioned interviews and focus groups to describe transit riders' experiences. In response to gap analyses, some transit agencies have made changes to their services to provide better access to open space via transit from low-income communities. The quote below describes a GIS analysis and subsequent qualitative research to identify service gaps,

> So a couple of years ago, we did a GIS analysis of transit access to parks. … we found that [part of a region] had a lot of gaps in access, which is where a lot of our BIPOC [Black, Indigenous, and People of Color] and low-income communities live. So it wasn't very surprising, but it really emphasized the need to do more advocacy and investment in those places. So that was more of a quantitative analysis. And then more recently, we did a community needs assessment. This was more of a qualitative way of getting community feedback and more information on their needs and preferences for reaching parks on the bus. … We worked with a number of community partners and those community partners led focus groups and conversations with their community members. And then we recently published … a report, which is now available to the public, and we just really highlighted some of the needs that community members have related to parks and transit.

Pilot programs. In some regions, T2P advocates used pilot programs such as seasonal shuttles to push for more extensive T2P services. Specifically, advocates worked with transit agencies, corporate sponsors, and volunteers to establish shuttle programs that reached a few popular destinations, evaluated ridership and other factors (e.g., parking), and used evaluation findings to advocate for more T2P programs. One participant who used this strategy noted,

> And so we brought that premise [transit access to parks] to the [mountain area], and we did a pilot shuttle in 2016. That was very popular. We only were able to do it for three weekends. But out of that, we were able to say, 'hey, there's something to this.' And we had a lot of public involvement and public interest. We had scoping meetings, we did an after-action review on that. And we invited a lot of our stakeholders and partners, a lot of them more local communities, up against the foothills of the [mountain area]. We talked to them. And they were very enthusiastic. (Public land agency staffer).

Some pilot T2P initiatives in California resulted in the development of a federal bill in the U.S. Congress titled the "Transit to Trails Act" (Transit to Trails Act, 2021), which is yet to be adopted as of June 2024. One interviewee explained the genesis of this bill, "*The bill [Transit to Trails Act] started from a community-based pilot program [a transit to parks shuttle] and having conversations with federal legislation for legislators.*"

4.2.2. Partnerships to implement T2P initiatives

Respondents reported that partnerships between nonprofits and public agencies, as well as between different public agencies, are key to the implementation of T2P initiatives. Based on the web search and interviews, we identified different types of partnerships to implement T2P initiatives. First, we found some *horizontal partnerships* that include government agencies that operate at the metropolitan, state/provincial, and/or federal levels. For example, these partnerships include collaborations between metropolitan transit agencies and federal land managers. Second, we found examples of *vertical partnerships* between larger public agencies (metropolitan, state, or federal levels) and smaller governments, such as municipalities. These partnerships generally

involve a transit agency (metropolitan level) working with the parks department of a municipality or a state agency providing funding for a municipality-run transit service. Third, we found numerous examples of *public-private partnerships* wherein public agencies worked with non-profits and/or businesses/corporations.

We found that organizations within partnerships collaborate to carry out the following activities: 1) Combining funding sources, 2) Providing technical assistance and support, 3) Convening conversations among public agencies and nonprofits, 4) Building transportation infrastructure, and 5) Coordinating transportation services with private entities in parks.

Combining funding sources. This practice is observed across all three partnership types mentioned earlier. An instance of combined funding in a *vertical partnership* is evident when a regional transportation agency or a private transportation provider secures funding from the state or provincial government, enhancing the financial sustainability of T2P services. An interviewee managing a private shuttle service to national parks emphasized the significance of public subsidization and support for program viability: *"A private sector cannot operate without a key government partnership … If they choose to take the shuttle, that would be subsidized … it's kind of important because it probably can't be done without the* support *of [federal park agency]; it would be tough to implement privately."* Government financial backing via *public-private partnerships* during the initial phase determines long-term feasibility, especially when facing unforeseen financial challenges, such as the impact of COVID-19.

Technical assistance. Partnerships in which one organization provided technical assistance to another involved statewide transportation organizations helping transit agencies optimize frequencies for T2P services, helping coordinate road closures with local police departments, and providing transportation planning services to public land agencies. This quote exemplifies how partnerships led to technical assistance, *"This current season, we're [state transportation agency] working with [city police department] and [transit agency] on a bus bypass service. … Their police department is escorting buses up to the mouth of the canyon so they can bypass all of that congestion."*

Convening conversations. Participants also noted that some public agencies create partnerships by promoting convenings among public agencies and nonprofits. These convenings might be focused on solving transportation in a specific location (e.g., a canyon, or a national park) or creating broader partnerships. State/province agencies coordinate regular meetings with agencies across different sectors, such as transportation, public lands, public safety, and recreation. The quote below provides additional details about such convenings.

> The true power of [state transportation agency] is in our consensus with our jurisdictions. So how we get things done is through partnerships and through planning, and so that's how we do that. … And we'll certainly convene … beyond just the policymakers, the stakeholders. And so we go through a rigorous process of going through a 35-member stakeholder council. … And we try our darndest to insert ourselves with conversations [between various agencies].

Coordinating transportation services with private entities in parks. Several partnerships involved transit agencies coordinating transit initiatives with private entities (e.g., ski or summer resorts) located in publicly-owned natural areas, which are major destinations in mountain towns and some metropolitan areas. This type of work involved private entities paying part of the fares of transit riders, implementing paid parking, and/or creating dedicated bus lanes to access these destinations. As a public sector planner in a mountain town explained,

> We're working with the [ski resort] on ways to reduce single occupancy or even multiple-person occupancy. They have proposals for increased parking charges, and we support that. We've been working with loading and unloading areas for transit. Previous to this, we are actually having a lot of transit delays … buses would get stuck in the

same traffic. So our team … developed a plan that gave a bus a free lane into there. And that was just implemented this winter. And we saw our delay go down from sometimes 30 minutes of delay per route, which is pretty high to around five to 10 minutes at the worst.

Building transportation infrastructure. Some partnerships involved public agencies working together to implement capital improvement projects that facilitated T2P services. These partnerships are needed because roads that provide access to open spaces such as national forests are often owned and operated by cities or counties. One interviewee explained this situation,

> And they're [public park agency] working closely with [public works department], for example. They want to widen, at one point, the road that gets you to [name] trailhead. … But they wanted to make improvements [to make it possible for buses to get there] to that road, and they were going to apply for a grant. And they were both working collaboratively. So I do think there is an appetite and a desire to work more closely.

4.2.3. In-depth community engagement

Multiple interviewees stated that it was critical to conduct thoughtful community engagement with the future users of a T2P initiative when designing such an initiative. The quote below provides important details about lessons learned concerning how engaging closely and wisely with local community can help shape an impactful and effective T2P initiative:

> I think some of my biggest takeaways … is really good community engagement. All of the things that you can miss seem very small, but absolutely create a huge barrier for people participating. … One of those important things that I've learned is just how communities have so many good ideas for how to better serve their communities with parks and transit and almost everything. But if [transit] agencies really want to serve the people that they're saying they want to serve, they should be listening, and holding themselves accountable to doing what the communities are saying.

Many respondents also stressed the importance of community engagement to inform the public about new or existing T2P initiatives. In other words, community engagement needs to continue after T2P initiatives are implemented to ensure that communities of interest are aware of such services. As exemplified in the quote below, interviewees noted that advertising existing opportunities is a convenient way for transit agencies to help boost ridership.

> We found that there actually are a lot of good routes that just aren't advertised very well. And we've been talking with the county on doing some kind of awareness campaign … where they could put up signs at bus shelters, and light rail stops that say, 'Here's a park a really great park, you can get to within half an hour, if you get on right here.' I just think there's not a lot of information out there on these opportunities. And so that's an easy, relatively easy gap that could be filled.

Some interviewees also mentioned that in-depth community engagement is particularly important to understand the recreational and transit needs of groups experiencing disadvantage, such as low-income people, people of color, and people with disabilities. This quote from a practitioner working for a government agency below exemplifies these points.

> If you're going to have a meeting to get public input, you need to advertise it well in advance. You need to have it at a location that's easily accessible. You need to have Spanish and sign language translation and any other language translation that's needed. You need to have word-of-mouth campaigns and flyering campaigns to hand out information to get people to come, you need to think about other ways to advertise. We send flyers home with the kids at school,

we walk door to door to carry flyers to houses, we provide kids activities at evening meetings, and we provide full dinner at evening meetings. These are not things that the government is used to doing.

4.3. What are the main challenges to implementing T2P initiatives?

Interviewees noted that the implementation of T2P initiatives faces many challenges, and some of such challenges are similar to those faced by transit in general. The four main challenges mentioned by participants are 1) limited funding and labor, 2) inadequate infrastructure, 3) siloed agencies, and 4) politics. The first and fourth challenges affect most transit services, whereas the second and third seem more specific to T2P initiatives.

Limited funding and labor. Transit agencies in the U.S. and Canada struggle to secure enough funding to provide basic transit services, and such struggles seem particularly strong for T2P initiatives, which are seen as less essential than transit to jobs and educational settings. Some interviewees noted that funding has become a bigger issue after the onset of the COVID-19 pandemic, which has seen decreased transit ridership and lower revenue for transit agencies. One noted, "*There's not a lot of* funding *overall. And I think a lot of it has also been diminished because of COVID. So there are not many resources, generally speaking, for people to get great access to parks.*" Other barriers related to funding deal with the high cost of some T2P initiatives and the need to compensate for other funding priorities. Some participants also mentioned that certain funding sources can only be spent for capital improvements (such as widening a road), whereas others can only be used for operations (such as hiring bus drivers). Below are some quotes exemplifying the challenges:

> There can be a lot of competing priorities. And so, being able to squeeze in or maintain support for some of the leisure routes, often pulls very much on the priorities of the local government partner.

> I think they [funding agency] mostly fund capital improvements. I think the problem is that the transit authority is looking for ongoing costs for maintaining buses or hiring bus drivers. And that's where we're having trouble finding that kind of continuous funding.

A related issue affecting most transit agencies during the recovery period of the COVID-19 pandemic has been a shortage of labor, which in some cases has led to service cuts to T2P services. Many interviewees lamented that transit agencies have trouble hiring and retaining bus drivers, due in part to relatively low wages, especially for T2P initiatives because they are seen as less essential than other services and because such initiatives are often seasonal. One noted, "*Probably the biggest barrier is staffing trying to find available drivers to help provide this service … we do have sometimes people who can pitch in to help drive. But the regulatory framework within [the province] is becoming so complex that to hire a fully qualified driver. For a three-month position, it is just about impossible.*"

Inadequate infrastructure. A set of barriers limiting the rollout of T2P initiatives deals with infrastructure. The main infrastructural barriers that hinder the implementation of T2P initiatives involve difficulties in accessing locations in mountainous locations, and they were not generally mentioned for T2P initiatives that focus on urban parks. These barriers include, but are not limited to, 1) narrow roads and limited spaces for buses to turn around, 2) transit service conflicts with cars, 3) lack of cell phone coverage, 4) road closure due to forest fire, and 5) last-mile connections.

Some participants raised the issue of the width of roads and bridges, which in some cases prevents the implementation of T2P altogether, and in others, leads to using smaller vehicles, such as shuttles, which are more expensive to operate per rider. One noted, "*We can't really go too much farther beyond [trailhead], just because with our vehicles right now, the turnarounds are very difficult. The roads are quite narrow. And we can't really run our buses up there all the time. It's not safe.*" Several participants noted that the opportunity to implement T2P initiatives and their

success clash with high traffic congestion due to many private vehicles on roads with limited capacity. As a result, buses and shuttles often have unreliable service times, as exemplified by this quote: "*If you've used buses to get into the mountains, you know that you can put all the schedules you want for buses, but they get caught in the same traffic. Buses get caught under the same conditions as other vehicles going up and down these canyons. They cannot keep to a schedule.*"

The lack of cell phone coverage was mentioned primarily as a safety issue in case of disasters or sudden need for evacuation of mountainous areas. One interviewee noted, "*Communication is another barrier. We don't have a good wireless network in the forest. … You lose your cell phone coverage.*" Other participants mentioned infrastructure damage and service suspension caused by forest fires. One explained, "*It definitely was after another bad event, which was a forest fire that we had in 2017, which burned a large section of [the Park] and created a lot of closures.*" Finally, unsafe or unclear last-mile connections make it difficult for recreationists to reach their destination from transit stops. One interviewee noted, "*[Street] is the main road that goes through our neighborhood that also accesses the [open space]. And it has no sidewalks, it has no lighting, it has no curbs, it's pretty dangerous.*"

Siloed agencies. Numerous participants have pointed out that T2P initiatives could be inherently difficult to implement because they often require collaborations between government agencies that traditionally operate in different silos. Those siloed agencies include park agencies and transit agencies, but also transit agencies operating in nearby jurisdictions.

Participants noted that funding for parks and funding for transit tends to be siloed and often not available at the same time. Also, public land agencies generally do not control the design of the roads that give access to certain trailheads. Local departments or state departments of transportation design and manage those roads. In addition, the lack of collaboration between governmental agencies can also manifest between various transit agencies serving nearby areas. Below are some quotes exemplifying the challenges:

> But it gets complicated because a lot of this work requires a lot of funding. And when funding streams are so siloed and limited for one agency or one program, they might only be able to cover a certain thing, but they're they can pay for roads, but they can't pay for the operation. So then they're trying to find somebody that can pay operations and it's a headache. It's a lot, and you're asking agencies to do a lot of work to do that collaboration.

> All of the roads had access to these public lands, and the recreation sites, they're all from other sources. They're either state DOT, the Department of Transportation, or county highways. And so we rely on them because it's their right of way, and sometimes our parking encroaches into their right of way.

> So the problem is that we end up really only having good public transit within local transit districts. And those transit districts are all very siloed. … that makes it difficult to get for people to get around the state [to recreational sites].

Politics. Several issues related to politics also create barriers to TP2 initiatives. One issue involved the lack of agreement about basic facts and solutions due to fractured political environments. In this context, advocacy about T2P initiatives clashed against beliefs that such initiatives might not have certain environmental and economic benefits, as explained by an interviewee,

> The challenge is to get the players to operate from the same information. Because … everyone thinks they are a transportation expert … So I think our biggest challenge right now is to try to get a nucleus of people who are decision-makers to accept the same transportation information.

Another political issue was that some wealthy hillside and mountain communities vehemently opposed T2P initiatives. Specifically, some

respondents shared instances of wealthy neighborhoods raising "Not in my back yard" (NIMBY) concerns about T2P initiatives with routes in front of their homes. NIMBYism typically manifests as resistance to new developments or services that are perceived to negatively impact the local community, despite broader societal benefits (Chung et al., 2016). One participant explicitly used this term when describing opposition to T2P services: "the most vocal people were the ones, it's the NIMBY people, not in my backyard." In some cases, these vocal oppositions have led to the discontinuation of T2P services. In one of the T2P initiatives we identified in the search (Pasadena, CA, U.S.), residents opposing the initiative lamented that a lack of community engagement before the implementation of the transit service was one of the reasons for their opposition (Munguia, 2018). A participant noted,

> There was a lot of pushback from some community members, where the routes went through there. … They just didn't want people coming through their communities.

5. Discussion

5.1. Summary of findings

In this paper, we presented the first comprehensive investigation of the motivations, facilitators, and challenges of T2P initiatives around the U.S. and Canada. We undertook this research due to the emerging interest globally in sustainable access to large public-owned natural spaces (Park et al., 2021; Han et al., 2023; Rigolon et al., 2018). We conducted interviews using a thematically focused expert interview protocol on 28 professionals involved in the operation of T2P initiatives (Wroblewski and Leitner, 2009; Trinczek, 2009). To better understand the context of such initiatives, before carrying out the interviews, we conducted a web search and categorized the existing initiatives in the U. S. and Canada into six distinctive types.

For the first research question (motivations), we found four factors motivating the implementation of T2P initiatives, including parking and traffic congestion, environmental impacts, equity in access to parks, and economic development via tourism. Some similar initiatives occur within many national parks but without connection to the nearby towns and cities, also share the common objectives of reducing congestion within parks (Hassan et al., 2020; National Park Service, 1999). The environmental motivation of many TP2 initiatives can be seen within the context of efforts by the outdoor recreation industry to reduce its impacts, especially as the effects of climate change worsen (Spector et al., 2012; Winter et al., 2019).

Although many initiatives started with the goal of relieving traffic and parking stress, some have multiple goals, including protecting ecosystems and providing equitable access to nature, especially for disadvantaged groups. Specifically, equity-oriented T2P initiatives can be considered as part of broader efforts to advance green space equity in the U.S. and beyond (Yañez et al., 2021; Rigolon, 2019; Xiao et al., 2017; Mears et al., 2019; Oscilowicz et al., 2021). A few initiatives also aimed to advance the local economy via increased tourism. This has made the initiatives' objectives often align with governmental mandates, gaining initial support from the government, local and regional non-profits, and residents.

The findings for the second research question (facilitators) identified three major facilitators and strategies that contribute to the implementation of such initiatives, which are policy advocacy, partnerships to implement initiatives, and community engagement. Specifically, policy advocacy efforts are often needed to jumpstart T2P initiatives. These efforts have included tailored narratives, coalition-building, data dissemination, and pilot program leverage. Some of these strategies were also used in green space equity policy advocacy (Rigolon et al., 2022, 2024), highlighting cross-sectoral collaborations and learning between transit and green space equity advocates.

After developing support for T2P initiatives via policy advocacy,

partnerships were often used to implement them. We identified *horizontal, vertical, and public-private partnerships* as different types of partnerships for T2P initiatives, and such partnerships provided combined funding, technical assistance, and spaces for collaboration. Prior research on transit implementation reinforces the notion that partnerships, particularly those involving public sectors, are crucial for advancing transit adoption (Bond and Steiner, 2006; Li and Love, 2020; Schwieterman et al., 2018). In addition, in-depth community engagement emerged as a cornerstone of effective T2P initiatives. Engaging residents helps design initiatives that take into account various needs, including those of groups experiencing disadvantage, and inform the public about initiatives and boost ridership. Many green space equity policies were crafted through community engagement (Rigolon, 2019; Nesbitt et al., 2019; Khazaei et al., 2019), suggesting that community engagement for T2P initiatives might be particularly important to create equity-oriented initiatives.

For the third research question (challenges), we uncovered four interconnected challenges faced by T2P operators: limited funding and labor, inadequate infrastructure, siloed agencies, and politics. Limited funding and labor scarcity, exacerbated by the post-COVID-19 recovery phase, is a challenge faced by transit agencies for any service (Ziedan et al., 2023), and the lower priority given to transit services to recreational destinations, as we found in our study, makes this challenge worse for T2P initiatives. Many transit agencies in the U.S. and Canada still have not reached their pre-COVID-19 ridership levels (Ziedan et al., 2023; Kapatsila et al., 2022), and the reduced revenues due to lower ridership might worsen funding issues.

Challenges specific to T2P initiatives, such as infrastructure inadequacies and navigating inter-agency dynamics, underscore the unique hurdles in implementing transit solutions to parks. Previous studies on transit operations within large parks have similarly identified recurring challenges, including issues with low and unstable ridership, inadequacies in transit infrastructure that lacks accessibility and sightseeing focus, and conflicts among transit users and visitors using other modes of transportation (Taff et al., 2013; Nelson et al., 2008). Infrastructure challenges in mountain or hillside areas, such as narrow roads, are particularly hard to address if transit agencies have limited funding, but might be overcome via partnerships with public land agencies, which often own those roads, especially if such agencies are motivated to reduce the environmental impacts of transportation. These connections underscore a complex interplay between motivations, facilitators, and challenges for T2P initiatives in the U.S. and Canada. Our findings underscore the importance of holistic, community-centered approaches, leveraging partnerships and advocacy to overcome obstacles to promote transit connections to large parks and open spaces.

5.2. Policy implications

The findings of our research carry significant practical implications for the implementation of T2P initiatives in the U.S. and Canada. These recommendations aim to enhance the effectiveness and sustainability of T2P programs, providing valuable insights for both North American and global T2P initiatives.

Our study underscores the pivotal role of community engagement in shaping successful T2P initiatives. Agencies initiating such programs should prioritize community involvement from the outset, gaining insights into local transportation and recreational needs. This ongoing engagement strategy ensures that T2P initiatives are tailored to specific community contexts. For instance, Parkbus, a successful non-profit T2P initiative, initially funded by the Ontario provincial government, expanded its services across provinces in Canada via collaborations with local municipalities (Parkbus, n.d.). By engaging closely communities, Parkbus adeptly tailored its services to diverse local contexts, fostering trust and gaining private and public support. Partnering with local community-based organizations, especially in disadvantaged communities, is crucial for fostering trust and meaningful engagement.

Establishing continuous community engagement practices, including post-implementation awareness efforts, contributes to the long-term success of T2P initiatives.

Robust partnerships among various entities emerge as key facilitators for successful T2P initiatives. Effective collaboration between public agencies, nonprofits, and transit organizations can address challenges and ensure the sustainability of initiatives. Establishing partnerships at the outset, outlining shared expectations and policies through memoranda of understanding, provides a solid foundation. Seeking diverse federal and state/provincial funding sources and recognizing the essential role of partnerships are crucial for financial sustainability, especially for private-sector-led T2P initiatives.

Implementing pilot projects emerges as a strategic approach for testing and evaluating the viability of T2P initiatives. These projects serve as a valuable testing ground, providing data for advocacy and further development. Initiating T2P initiatives with pilot projects, such as seasonal shuttles, allows agencies to assess their impact and feasibility. Evaluation of pilots should extend beyond ridership data, including surveys to understand rider experiences, motivations, barriers, and demographics.

Crafting compelling narratives for advocacy is identified as a crucial element for garnering support for T2P initiatives, as also shown in other research (Rigolon et al., 2022). Focused on key motivations, these narratives should leverage data and storytelling to drive public understanding and engagement. Storytelling based on the lived experiences of low-income residents can be particularly effective, according to the interviewees (for an example, see The Wilderness Society, 2021). Narratives highlighting the main motivations behind T2P initiatives, such as congestion relief, environmental sustainability, equity, and economic development, enhance the effectiveness of advocacy efforts. Embedding data and storytelling from affected communities within T2P narratives creates a more impactful advocacy strategy.

Addressing barriers through effective partnerships and robust community engagement is pivotal for the success of T2P initiatives. Leveraging effective partnerships to overcome barriers related to limited funding, infrastructure, and coordination among siloed agencies is essential. Robust community engagement emerges as a key strategy for navigating political and bureaucratic challenges, particularly addressing NIMBY opposition to T2P initiatives (Chung et al., 2016).

5.3. Limitations and suggestions for future research

Our study has several limitations. First, T2P initiatives vary widely in scale, from localized programs to expansive nationwide endeavors. The list of T2P initiatives derived from our web search is not exhaustive, reflecting only a portion of such initiatives in the U.S. and Canada. This may result in overlooking professionals engaged in other distinct initiative types who did not have the opportunity to participate in our interviews. Second, our study did not differentiate findings for initiatives in the U.S. and Canada or among different geographic regions. Rather, we treated all initiatives collectively to extract common findings. However, differences between the two countries or different regions may exist due to variations in governmental structures, geography, climate, and cultural features. A cross-cultural comparative analysis would enrich our understanding of how cultural nuances influence the

success or challenges of T2P initiatives. Third, we did not quantify the urgency of motivations, the relative importance of facilitators, and the severity of challenges. Understanding the magnitude of these factors can be useful for prioritizing recommendations in practical applications. Future research can aim to quantify and rank the motivations, challenges, and facilitators to provide more actionable insights for T2P practitioners. Also, delving into the policy landscape surrounding these initiatives in depth would offer insights into the regulatory frameworks and funding structures that either support or hinder their implementation.

6. Conclusions

Our research contribute to the emerging field of transit connections to large parks and open spaces. Our study represents an original effort to comprehensively investigate T2P initiatives in the U.S. and Canada. By addressing gaps in existing literature, we provide insights into the motivations, facilitators, and challenges associated with the implementation of sustainable transportation initiatives to access large open spaces.

Our findings offer actionable recommendations for transit agencies, public land managers, and sustainability advocates. T2P initiatives must be grounded in nuanced understandings of community engagement, partnership development, pilot project implementation, narrative creation, and barrier mitigation. While our study is focused on the U.S. and Canada, it has relevance beyond North America due to the growing global interest in transit connections to parks, aligning with the goals of sustainability, transit advocacy, and equity in park access (Park et al., 2021; Swanteson-Franz et al., 2020; Liang and Zhang, 2017). The insights and recommendations provided can serve as a reference for countries facing similar environmental, social, and economic challenges in their valuable natural areas.

CRediT authorship contribution statement

Yiyang Wang: Writing – review & editing, Writing – original draft, Visualization, Validation, Methodology, Investigation, Formal analysis, Data curation. **Alessandro Rigolon:** Writing – review & editing, Writing – original draft, Visualization, Validation, Supervision, Resources, Project administration, Methodology, Investigation, Funding acquisition, Formal analysis, Conceptualization. **Keunhyun Park:** Writing – review & editing, Writing – original draft, Visualization, Supervision, Resources, Project administration, Methodology, Investigation, Funding acquisition, Formal analysis, Data curation, Conceptualization.

Data availability

The data that has been used is confidential.

Acknowledgement

Appendix I. Interview protocol

T2P Practitioner Interview Questions

Introduction

Thank you for participating in our Transit-to-parks initiatives research study, and for signing the survey consent letter form in advance. Please note that the interview process will be recorded, and any data collected through this interview will be anonymized. Do you have any questions about the

study you would like me to answer at this time? If not, we will start by introducing ourselves and the research we have done so far.

- Self intro (research team)
- 2 min introduction of our research progress so far
  o So far, information of 105 initiatives around US and Canada have been compiled and created into a web map.
  o Next step, we are seeking to interview staff members of transportation agencies, nonprofits, planning departments, and parks and recreation agencies that have been involved in transit-to-parks initiatives

About the organization and the practitioner

- Can you briefly introduce **your agency** and the **work you do in your organization**?

Part I: About the initiative

- Can you tell us more about Roam Transit as well as the type of services offered?

Timeline

- Probe: When was the first day of service?
- Probe: Was the service ever suspended or put on hold? Why?

Motivations

- Probe: What were the **main motivations** for starting this transit system?
- Probe: Was traffic **congestion, equity, or other environmental issues** one of the primary motivations for this initiative?
- Probe: Did your planning team **consult any relevant regional planning goals, research, or empirical data** prior to implementing this service?
- Probe: Who are the **main targeted demographics or users** of this initiative? (i.e. tourists, local residents)

Partnership

- Probe: Did you **partner with any other organizations** during the planning and implementation process of this service?
- Probe: Specifically, **what kind of assistance** have they provided as partners?
- Probe: How did this partnership facilitate the success of this service's implementation?
- Probe: What are some takeaways from this collaboration? Are you **planning to reach for more partnerships** in the future?
- Probe: What **advocacy strategies** have been used to push for the implementation of this transit-to-parks initiative? (e.g., narratives, partnerships, data, pilot programs)

Funding

- Probe: How is this transit-to-parks service funded?
- Probe: Is it funded differently compared to other seasonal services/permanent routes?

Community engagement

- Probe: How did you initially engage the community in the planning of the initiative?
- Probe: What strategies do you use to maintain community engagement throughout the operation of the initiative?
- Probe: Can you share a success story where community engagement significantly benefited the initiative?
- Probe: Any future plans for community engagement (in the planning/implementation process)?

Part II: Challenges and opportunities

- What **challenge** did you encounter when planning and operating this service?

  (could be the aspects mentioned in Section I or others).

- Probe: What about any resistance from **local residents**?
- Probe: What about the challenges of **working with other agencies**?
- Probe: What about resistance **to funding and seeking partnership**?
- Probe: In light of the **ongoing COVID-19 pandemic**, did you have to cope with any additional barriers?
- What are some of the **opportunities**, or things you can improve? (could be the aspects mentioned in Section I or others)
- Probe: Are there any **potential opportunities** coming with the ongoing **COVID-19 pandemic**?
- Probe: What about **creating partnerships with other agencies** (e.g., transportation, transit, park, urban planning)?
- Probe: What about **getting funding from public or private donors**?
- Probe: In the future, do you plan to **consult more empirical research/data** to **improve** the current system?

Lessons learned and next steps

- What are the **biggest two or three lessons** you have learned from the T2P initiative(s) you have been involved in?
- What are **some next steps** of the transit-to-parks initiative(s) you have been involved in?
- Do you know any other Transit-to-parks initiatives? (Please connect us to them if possible; could be the one in your agency or others)
- Based on takeaways and learning from operating Roam Transit **do you have any recommendations or suggestions other T2P service providers** that would set them up for success?

Member checking for interviews

Before we wrap up, I would like you to hear my main takeaways from your interview.
Specifically, I seem to have learned that **[insert main takeaways based on notes taken.]** Does that sound accurate to you?
Wrap up for interviews - Thank you again for participating in our research study!

Appendix II. Codebook

Code	Definition
motive	Content about motivations to create and/or implement transit-to-parks initiatives
motive_equity	Motivation for transit-to-parks initiatives: improving access to parks and trails for those who lack it
motive_environment	Motivation for transit-to-parks initiatives: environmental reasons, such as reducing emissions
motive_traffic	Content on traffic-related motivations
motive_economy	Content on motivations related to economic development
facil	Content about facilitators to create and/or implement transit-to-parks initiatives
facil_advocate	Content about advocacy strategies to create and/or implement transit-to-parks initiatives
facil_advocate_narratives	Content about narratives and messaging in policy advocacy for transit-to-parks/trails
facil_advocate_coalition	Content on coalitions in policy advocacy for transit-to-parks and trails
facil_advocate_data	Content on data and research used in advocacy for transit-to-parks and trails
facil_advocate_pilot	Content about pilot transit-to-trails/parks programs
facil_partner	Content about partnerships
facil_partner_funding	Content about partnerships in funding
facil_partner_tech	Content about technical assistance as part of partnerships
facil_partner_conversation	Content about partnerships used to convene conversations among various agencies
facil_partner_build	Content about partnerships used to build infrastructure
facil_partner_service	Coentent about partnerships to coordinate transportation services
facil_community	Content on community engagement activities carried out before/during/after
challenge	Content about challenges to transit-to-parks initiatives
challenge_infra	Content on infrastructural challenges to implementing transit-to-parks initiatives
challenge_cost	Content on funding and labor challenges to implementing transit-to-parks initiatives
challenge_silo	Content on siloing-related challenges to implementing transit-to-parks initiatives
challenge_politics	Content on political challenges to implanting transit-to-parks initiatives

References

Anderson, W.P., Kanaroglou, P.S., Miller, E.J., 1996. Urban form, energy and the environment: a review of issues, evidence and policy. Urban Stud. 33 (1), 7–35.

Arakaki, E., Craig, K., Stevenson, M., 2019. Connecting people to parks in King County: a transit-to-parks GIS analysis. The Wilderness Society.

Bond, A., Steiner, R., 2006. Sustainable campus transportation through transit partnership and transportation demand management: a case study from the University of Florida. Berk. Plann. J. 19 (1).

Brown, G., Schebella, M.F., Weber, D., 2014. Using participatory GIS to measure physical activity and urban park benefits. Landsc. Urban Plann. 121, 34–44.

Buehler, R., 2010. Transport policies, automobile use, and sustainable transport: a comparison of Germany and the United States. J. Plann. Educ. Res. 30 (1), 76–93. https://doi.org/10.1177/0739456x10366302.

Chung, W., Choi, J., Woo, C.W., Lee, S., Saindon, C.E., 2016. Community relations dealing with a not in my back yard (nimby) context. Int. J. Conflict Manag. 27 (3), 424–452. https://doi.org/10.1108/ijcma-09-2014-0069.

Donaldson, R., Ferreira, S., Didier, S., Rodary, E., Swanepoel, J., 2016. Access to the urban national park in Cape Town: where urban and natural environment meet. Habitat Int. 57, 132–142. https://doi.org/10.1016/j.habitatint.2016.04.010.

Douglas, O., Lennon, M., Scott, M., 2017. Green space benefits for health and well-being: a life-course approach for urban planning, design and management. Cities 66, 53–62. https://doi.org/10.1016/j.cities.2017.03.011. Scopus.

Furman, A., 2013. Mobility and the role of the automobile as the central device in modern north american residential spatial. The Sustainable City VIII : Urban Regeneration and Sustainability 179. https://doi.org/10.2495/SC130021.

Gramann, J.H., 1982. Toward a behavioral theory of crowding in outdoor recreation: an evaluation and synthesis of research. Leisure Sci. 5 (2), 109–126.

Gosens, Tom, Jan, Rouwendal, 2018. Nature-based outdoor recreation trips: duration, travel mode and location. Transport. Res. Pol. Pract. 116, 513–530.

Gühnemann, A., Kurzweil, A., Mailer, M., 2021. Tourism mobility and climate change - a review of the situation in Austria. Journal of Outdoor Recreation and Tourism 34, 100382. https://doi.org/10.1016/j.jort.2021.100382.

Heckathorn, D.D., 2011. Comment: snowball versus respondent-driven sampling. Socio. Methodol. 41 (1), 355–366. https://doi.org/10.1111/j.1467-9531.2011.01244.x.

Halecki, W., Stachura, T., Fudała, W., Stec, A., Kuboń, S., 2023. Assessment and planning of green spaces in urban parks: a review. Sustain. Cities Soc. 88, 104280 https://doi.org/10.1016/j.scs.2022.104280.

Han, Y., He, J., Liu, D., Zhao, H., Huang, J., 2023. Inequality in urban green provision: a comparative study of large cities throughout the world. Sustain. Cities Soc. 89, 104229.

Hassan, M.S., Radzi, S.F.M., Wahid, F., Mohd, S., Muhammad, Z., Saputra, J., 2020. Study of supply chain strategy for achieving sustainable transport near national park, Jerantut, Pahang, Malaysia. Int. J. Supply Chain Manag. 9 (4), 276–290.

Herford, I., 1989. The use of mass visitor transport systems to manage peak usage days. Aust. Parks Recreat. 25 (4), 7–11.

Holding, D.M., Kreutner, M., 1998. Achieving a balance between "carrots" and "sticks" for traffic in National Parks: the Bayerischer Wald project. Transport Pol. 5 (3), 175–183. https://doi.org/10.1016/S0967-070X(98)00014-6.

Høyem, J., 2020. Outdoor recreation and environmentally responsible behavior. Journal of Outdoor Recreation and Tourism 31, 100317. https://doi.org/10.1016/j.jort.2020.100317.

Hugill, P., McShane, C., 1995. Down the asphalt path: the automobile and the American city. Technol. Cult. 36, 420. https://doi.org/10.2307/3106392.

Jakle, J.A., Sculle, K.A., 2004. Lots of Parking: Land Use in a Car Culture. University of Virginia Press. https://doi.org/10.5860/choice.42-2829.

Jansen, F.M., Ettema, D.F., Kamphuis, C.B.M., Pierik, F.H., Dijst, M.J., 2017. How do type and size of natural environments relate to physical activity behavior? Health Place 46, 73–81. https://doi.org/10.1016/j.healthplace.2017.05.005.

Kapatsila, B., Grisé, E., van Lierop, D., Bahamonde-Birke, F.J., 2022. From riding to driving: the effects of the COVID-19 pandemic on public transit in Metro vancouver. Findings.

Kassily, F.N., 2008. Towards promotion of local tourism: a case study of the Kenya Wildlife Service outreach program. Tourism 56 (2), 199–203.

Kenworthy, J.R., Laube, F.B., 1999. Patterns of automobile dependence in cities: an international overview of key physical and economic dimensions with some implications for urban policy. Transport. Res. Pol. Pract. 33 (7–8), 691–723.

Khazaei, A., Joppe, M., Elliot, S., 2019. Mapping a diverse community's engagement in parks planning. Leisure Sci. 41 (4), 294–312.

Korstjens, I., Moser, A., 2018. Series: practical guidance to qualitative research. Part 4: trustworthiness and publishing. Eur. J. Gen. Pract. 24 (1), 120–124. https://doi.org/10.1080/13814788.2017.1375092.

Leech, N.L., Onwuegbuzie, A.J., 2008. Qualitative data analysis: a compendium of techniques and a framework for selection for school psychology research and beyond. Sch. Psychol. Q. 23 (4), 587–604. https://doi.org/10.1037/1045-3830.23.4.587.

Li, X., Love, P.E., 2020. State-of-the-art review of urban rail transit public–private partnerships. J. Infrastruct. Syst. 26 (3), 03120002.

Liang, H., Zhang, Q., 2017. Assessing the public transport service to urban parks on the basis of spatial accessibility for citizens in the compact megacity of Shanghai, China. Urban Stud. 55 (9), 1983–1999. https://doi.org/10.1177/0042098017705846.

Lumsdon, L.M., Downward, P., Rhoden, S., 2006. Transport for tourism: can public transport encourage a modal shift in the day visitor market? J. Sustain. Tourism 14 (2), 139–156. https://doi.org/10.1080/09669580608669049.

Manning, R., Lawson, S., Newman, J., Hallo, J., Monz, C., 2014. Sustainable Transportation and the National Parks: from Acadia to Zion. University Press of New England. https://doi.org/10.1016/j.jort.2015.04.005.

Markevych, I., Schoierer, J., Hartig, T., Chudnovsky, A., Hystad, P., Dzhambov, A.M., de Vries, S., Triguero-Mas, M., Brauer, M., Nieuwenhuijsen, M.J., Lupp, G., Richardson, E.A., Astell-Burt, T., Dimitrova, D., Feng, X., Sadeh, M., Standl, M., Heinrich, J., Fuertes, E., 2017. Exploring pathways linking greenspace to health: theoretical and methodological guidance. Environ. Res. 158, 301–317. https://doi.org/10.1016/j.envres.2017.06.028.

Metro Vancouver Regional Parks, 2020. Alternative Transportation Study Part I: Access Inventory.

Mears, M., Brindley, P., Maheswaran, R., Jorgensen, A., 2019. Understanding the socioeconomic equity of publicly accessible greenspace distribution: the example of Sheffield, UK. Geoforum 103, 126–137.

Monz, C., D'Antonio, A., Lawson, S., Barber, J., Newman, P., 2016. The ecological implications of visitor transportation in parks and protected areas: examples from research in US National Parks. J. Transport Geogr. 51, 27–35. https://doi.org/10.1016/j.jtrangeo.2015.11.003.

Munguia, H., 2018, June. 25). Why Altadenans don't want Pasadena's transit-to-trails pilot program made permanent as-is. Pasadena Star-News 1–6. https://www.pasadenastarnews.com/2018/09/04/county-eliminating-part-of-pasadenas-transit-to-trails-bus-route/.

National Park Service, 1999. Transportation planning guidebook. Park Facility Management Division.

Nelson, B., Taylor, V., Nabti, J., 2008. Shifting modes of travel to national parks: pilot study at muir woods national monument, California. Transport. Res. Rec. 2077 (1), 166–174.

Nesbitt, L., Meitner, M.J., Girling, C., Sheppard, S.R., 2019. Urban green equity on the ground: practice-based models of urban green equity in three multicultural cities. Urban For. Urban Green. 44, 126433.

Newton, J.N., Newman, P., Taff, B.D., Shr, Y.H., Monz, C., D'Antonio, A., 2020. If I can find a parking spot: a stated choice approach to Grand Teton National Park visitors' transportation preferences. Journal of Outdoor Recreation and Tourism 32, 100172. https://doi.org/10.1016/j.jort.2018.04.001.

Nutsford, D., Pearson, A.L., Kingham, S., 2013. An ecological study investigating the association between access to urban green space and mental health. Publ. Health 127 (11), 1005–1011.

Oscilowicz, E., Lewartowska, E., Levitch, A., Luger, J., Hajtmarova, S., O'Neill, E., Planas Carbonell, A., Cole, H.V.S., Rivera Blanco, C., Monroe, E., 2021. Policy and Planning Tools for Urban Green Justice: Fighting Displacement and Gentrification and Improving Accessibility and Inclusiveness to Green Amenities. Barcelona Laboratory for Urban Environmental Justice and Sustainability. http://www.bcnuej.org/wp-content/uploads/2021/04/Toolkit-Urban-Green-Justice.pdf.

Palinkas, L.A., Horwitz, S.M., Green, C.A., Wisdom, J.P., Duan, N., Hoagwood, K., 2013. Purposeful sampling for qualitative data collection and analysis in mixed method implementation research. Adm. Pol. Ment. Health 42 (5), 533–544. https://doi.org/10.1007/s10488-013-0528-y.

Park, K., Rigolon, A., Choi, D., Lyons, T., Brewer, S., 2021. Transit to parks: an environmental justice study of transit access to large parks in the U.S. West. Urban For. Urban Green. 60, 127055 https://doi.org/10.1016/j.ufug.2021.127055.

Parkbus. (n.d.). Home. https://www.parkbus.ca/oref.

Pettebone, D., Newman, P., Lawson, S.R., Hunt, L., Monz, C., Zwiefka, J., 2011. Estimating visitors' travel mode choices along the bear lake road in rocky mountain national park. J. Transport Geogr. 19 (6), 1210–1221. https://doi.org/10.1016/j.jtrangeo.2011.05.002.

Rampin, et al., 2021. Taguette: open-source qualitative data analysis. J. Open Source Softw. 6 (68), 3522. https://doi.org/10.21105/joss.03522.

Rigolon, A., Aboelata, M.J., Yañez, E., Bennett, R., 2022. "A park is not just a park": toward counter-narratives to advance equitable green space policy in the United States. Cities 128, 103972. https://doi.org/10.1016/j.cities.2022.103792.

Rigolon, A., Browning, M.H., Lee, K., Shin, S., 2018. Access to urban green space in cities of the Global South: a systematic literature review. Urban Science 2 (3), 67.

Rigolon, A., 2019. Nonprofits and park equity in Los Angeles: A promising way forward for environmental justice. Urban Geogr. 40 (7), 984–1009.

Rigolon, A., Osei Owusu, R., Becerra, M., Cheng, Y., Daniel, Christensen, J., Connolly, J. J.T., Corbin, C.N.E., Douglas, J.A., Fernandez, M., Jennings, V., Ito, J., Mullenbach, L.E., Nesbitt, L, Osborne Jelks, N., Walker, R., Viera, S., Romero, F., Espiricueta, A., 2024. Advancing green space equity via policy change: a scoping review and research agenda. Environ. Sci. Pol. 157, 103765 https://doi.org/10.1016/j.envsci.2024.103765.

Rundle, A., Quinn, J., Lovasi, G., Bader, M.D., Yousefzadeh, P., Weiss, C., Neckerman, K., 2013. Associations between body mass index and park proximity, size, cleanliness, and recreational facilities. Am. J. Health Promot. 27 (4), 262–269.

Scauzillo, S., 2018. First modern transit-to-trails from pasadena to san gabriel mountains starts in april. San Gabriel Valley Tribune. https://www.sgvtribune.com/2018/03/12/first-modern-transit-to-trails-from-pasadena-to-san-gabriel-mountains-starts-in-april/.

Schwieterman, J.P., Livingston, M., Van Der Slot, S., 2018. Partners in Transit: A Review of Partnerships between Transportation Network Companies and Public Agencies in the united states.

Scruggs, G., 2021. The cities trailblazing transit service into the wilderness. Next City. https://nextcity.org/urbanist-news/the-cities-trailblazing-transit-service-into-the-wilderness.

Sierra Club, 2021. Closing the nature equity gap with public transit. https://www.youtube.com/watch?v=LFgjnBX7kWM.

Song, Y., Newman, G., Huang, X., Ye, X., 2022. Factors influencing long-term city park visitations for mid-sized US cities: a big data study using smartphone user mobility. Sustain. Cities Soc. 80, 103815 https://doi.org/10.1016/j.scs.2022.103815.

Spector, S., Chard, C., Mallen, C., Hyatt, C., 2012. Socially constructed environmental issues and sport: a content analysis of ski resort environmental communications. Sport Manag. Rev. 15 (4), 416–433.

Swanteson-Franz, R., Arakaki, E., Bounkeua, K., Lopez-Ledesma, Y., 2020. Next stop: equitable access. A transit to parks analysis. The Wilderness Society.

Taff, D., Newman, P., Pettebone, D., White, D.D., Lawson, S.R., Monz, C., Vagias, W.M., 2013. Dimensions of alternative transportation experience in yosemite and rocky mountain national parks. J. Transport Geogr. 30, 37–46.

The Wilderness Society, 2021. Eya Goes to the Park [Video]. YouTube. https://www.youtube.com/watch?v=HQvLVFGAmDY.

Thórhallsdóttir, G., Ólafsson, R., Jóhannesson, G.T., 2021. A methodology of estimating visitor numbers at an Icelandic destination using a vehicle counter and a radar. Journal of Outdoor Recreation and Tourism 35, 100378. https://doi.org/10.1016/j.jort.2021.100378.

Tian, M., Yuan, L., Guo, R., Wu, Y., Liu, X., 2021. Sustainable development: investigating the correlations between park equality and mortality by multilevel model in Shenzhen, China. Sustain. Cities Soc. 75, 103385 https://doi.org/10.1016/j.scs.2021.103385.

Trinczek, R., 2009. How to interview managers? Methodical and methodological aspects of expert interviews as a qualitative method in empirical social research. In: Interviewing Experts. Palgrave Macmillan UK, London, pp. 203–216.

Wells, C.W., 2013. Car Country: an Environmental History. University of Washington Press.

Wen, M., Zhang, X., Harris, C.D., Holt, J.B., Croft, J.B., 2013. Spatial disparities in the distribution of parks and green spaces in the USA. Ann. Behav. Med. 45 (S1), 18–27. https://doi.org/10.1007/s12160-012-9426-x.

Winter, P.L., Selin, S., Cerveny, L., Bricker, K., 2019. Outdoor recreation, nature-based tourism, and sustainability. Sustainability 12 (1), 81.

Wroblewski, A., Leitner, A., 2009. Between scientific standards and claims to efficiency: expert interviews in programme evaluation. In: Bogner, A., Littig, B., Menz, W. (Eds.), Interviewing Experts. Palgrave Macmillan UK, pp. 235–251. https://doi.org/10.1057/9780230244276_12.

Xiao, Y., Wang, Z., Li, Z., Tang, Z., 2017. An assessment of urban park access in Shanghai–Implications for the social equity in urban China. Landsc. Urban Plann. 157, 383–393.

Yañez, E., Aboelata, M.J., Rigolon, A., Bennett, R., 2021. Changing the Landscape: People, Parks, and Power. Prevention Institute. https://preventioninstitute.org/publications/changing-landscape-people-parks-and-power.

Ziedan, A., Brakewood, C., Watkins, K., 2023. Will transit recover? A retrospective study of nationwide ridership in the United States during the COVID-19 pandemic. Journal of Public Transportation 25, 100046.