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Interest in Shared-Use Mobility Services in Tribal Communities

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Disclaimer

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ABSTRACT

Technology-enabled, emerging, shared-use mobility services have significantly transformed the transportation ecosystem in urban communities and are beginning to enter more and more rural communities. Shared-use mobility services such as rideshare, carshare, bikeshare, microtransit, etc., are being proven useful to rural communities, but there is much less literature on the usefulness and applicability of these emerging mobility services to U.S. tribal communities. This study addresses the need to better understand the scope for shared-use mobility services in tribal areas, and identify opportunities and challenges in those areas using a three-pronged approach – an exploratory literature scan, a case study with tribes in eastern Oklahoma, and interviews with tribal community stakeholders from across the nation. Based on findings and observations from these three approaches, microtransit (also referred to as rideshare services) and carshare services seemed to be more favored and more relevant shared-use mobility services available to meet the unique transportation needs of tribal communities.

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EXECUTIVE SUMMARY

Shared-use mobility services are being proven to be useful to rural communities, but there is much less literature on the usefulness and applicability of these emerging shared-use mobility practices to U.S. tribal communities. This study addresses the need to better understand the scope for shared-use mobility services in tribal areas, and to identify opportunities and challenges. Below are brief definitions of the shared-use mobility services discussed in this study.

Definitions:

Rideshare services: Rideshare services are prearranged and on-demand transportation services for compensation in which drivers and passengers connect via digital applications. Digital applications are typically used for booking, electronic payment, and ratings. Examples include Uber, Lyft, etc.

Bikeshare services: Bikeshare services provide users with on-demand access to bicycles at a variety of pick-up and drop-off locations for one-way (point-to-point) or roundtrip travel. Examples include B-Cycle, Zagster, etc. Bikeshare service include docked bikeshare systems, where bikes are locked till rented at docks located in bikeshare stations, and dockless bikeshare systems, where bikes can be located anywhere within a geofenced area and could be tracked through GPS enabled bikes and mobile apps.

Carshare services: Carshare is a model of car rental where people can rent cars for short periods of time, often by the hour. Examples include Car2go, Zipcar, etc.

Microtransit services: Microtransit is defined as a privately or publicly operated, technology-enabled transit service that typically uses multi-passenger/pooled shuttles or vans to provide on-demand or fixed-schedule services with either dynamic or fixed routing. When compared to regular public transit services, a ride on Microtransit service has a quicker response time and a ride can be requested 15 or 20 minutes before a trip is needed. Microtransit services can be thought of as on-demand transit services that operate similar to rideshare services such as Uber and Lyft, but the trips are provided in larger vehicles, and passengers traveling in the same direction are matched. Via Transportation is an example.

Shared-use mobility services such as rideshare, carshare, bikeshare, microtransit, etc. are explored in this study using a three-pronged approach. An exploratory literature scan of past, present, and forthcoming tribal shared-use mobility service implementations is conducted. In addition, a case study is conducted with residents from nine tribes within the Cherokee Nation and the Northeast Oklahoma Tribal Transit Consortium to learn about the potential interest among tribal residents to use rideshare, carshare, and bikeshare services. Finally, interviews are conducted with tribal community stakeholders from across the nation to gather insights on interest, opportunities, and challenges in implementing shared-use mobility services in tribal communities.

Literature Review of Tribal Shared-Use Mobility Service Implementations

Bikeshare:

In the summer of 2018, LimeBike launched a dockless bikeshare program in Nevada's Reno-Sparks Indian Colony. Within a year of operation, the program had to be discontinued. An informal donations model of bicycling activity in Pine Ridge Reservation in South Dakota was explored in the literature, but it does not fall under a traditional bikesharing arrangement. Having bike services in tribal communities is challenging because, typically, there is no available infrastructure for safe bicycling and the travel distances in tribal areas are long. However, bikeshare programs can be helpful to tribal communities in locations where bicycle infrastructure is present.

Carsharing:
Two tribal carsharing initiatives, which are in the planning stage were identified. As part of California's Clean Mobility Options Voucher Pilot Program, two tribal communities received funding to develop a carshare program with electric vehicles. 1) A grant of $1 million was awarded to the Cahuilla Tribe to fund a zero-emissions carsharing program with six plug-in electric vehicles to provide affordable, on-demand, and clean transportation options for residents. 2) A grant of $993,300 was awarded to the Twenty-Nine Palms Band of Mission Indians to fund a carshare program with eight electric vehicles to enhance the health, welfare and sustainability of tribal community members. These programs are still in their initial stages, and therefore little information is available on them. While there is little literature related to carshare programs in tribal communities, more information relating to the carshare operations, opportunities, and challenges could be available in the next 2 to 3 years based on implementation efforts that are underway.

Microtransit:
Microtransit services have been more prevalent and successful than other forms of shared-use mobility options in rural communities and they seem to be more popular among tribal communities as well. Two current microtransit service implementations in tribal communities are explored. 1) Blackfeet Transit agency in Montana partnered with Via to provide door-to-door dynamically-routed microtransit service for riders travelling within the Blackfeet Reservation, Browning, and nearby towns. When a rider requests a ride, passengers going in the same direction are pooled in a single vehicle in real time using Via's advanced algorithms. To book or pre-schedule a ride, riders can use the Blackfeet Transit mobile app (Figure 2.5); riders without access to a smartphone can call a dedicated phone line. 2) The Grand Gateway Economic Development Association partnered with Uber to develop an on-demand microtransit service named PICK transportation to fill the transportation gap in after-work-hours transportation services in rural and tribal areas of eastern Oklahoma. The PICK transportation service, involving four rural transit agencies and ten tribal nations, offers on-demand public transportation to 21 rural communities. The service is operated through a fleet of 41 vehicles and is also an ADA-compliant service. The PICK transportation service is thoughtfully designed to accommodate individuals with diverse characteristics. It ensures accessibility for those with and without smartphones or bank accounts.

Tribal Case Study with Cherokee Nation and the Northeast Oklahoma Tribal Transit Consortiums

A case study is conducted with residents from nine tribes within the Cherokee Nation and the Northeast Oklahoma Tribal Transit Consortiums. The research team collaborated with Pelivan Transit, public transit provider for the nine tribes mentioned, to distribute paper surveys on their vehicles as well as at various community avenues. Pelivan Transit operates a fleet of 67 vehicles, which includes both ADA-equipped minivans and ADA-compliant shuttle buses. Its transit service is available Monday to Friday, from 8 a.m. to 4 p.m. Based on the survey responses, most (87.5%) respondents agreed or strongly agreed that it is important for public transit services to be available to their community's residents.

A total of 400 paper surveys were distributed among the nine tribes. Only 24 paper survey responses were received. Although the number of responses is low, the research team considers the information gathered from these 24 surveys to be valuable in understanding the opinions and preferences of tribal residents regarding shared-use mobility services.

Shared-use mobility service is also a type of public transportation service, and most respondents agreed or strongly agreed that it is important for rideshare, bikeshare, or carshare services to be available to their community's residents. There is a lack of transportation services to connect the widely dispersed tribal communities, and therefore tribal respondents felt that it is important to have inexpensive travel options.

It was found that most community residents have access to a smartphone which is necessary for booking a trip on shared-use mobility platforms such as ridesharing, carsharing, bikesharing, microtransit services, etc. In addition to from having access to smartphones, users should also have credit or debit cards and should be comfortable using them as payment methods in smartphone apps. Operational statistics of Uber microtransit service in the region showed that a majority of the rides booked their trip by calling the regional mobility management center (RMMC) through a dedicated phone line. Based on the findings, it can be concluded that the tribal residents are not ready to fully use smartphone apps for requesting rides. Therefore, outreach and education efforts by community stakeholders in this regard could help them better use the functionalities of shared-use mobility services.

According to the survey findings (Figure E.1), rideshare services were the most utilized or familiar shared-use mobility service compared to bikeshare and carshare services. This could be attributed to the popularity of rideshare services like Uber and Lyft in the United States, which respondents may have used during travel to larger cities. Respondents may also be familiar with the Uber microtransit service available in their area.

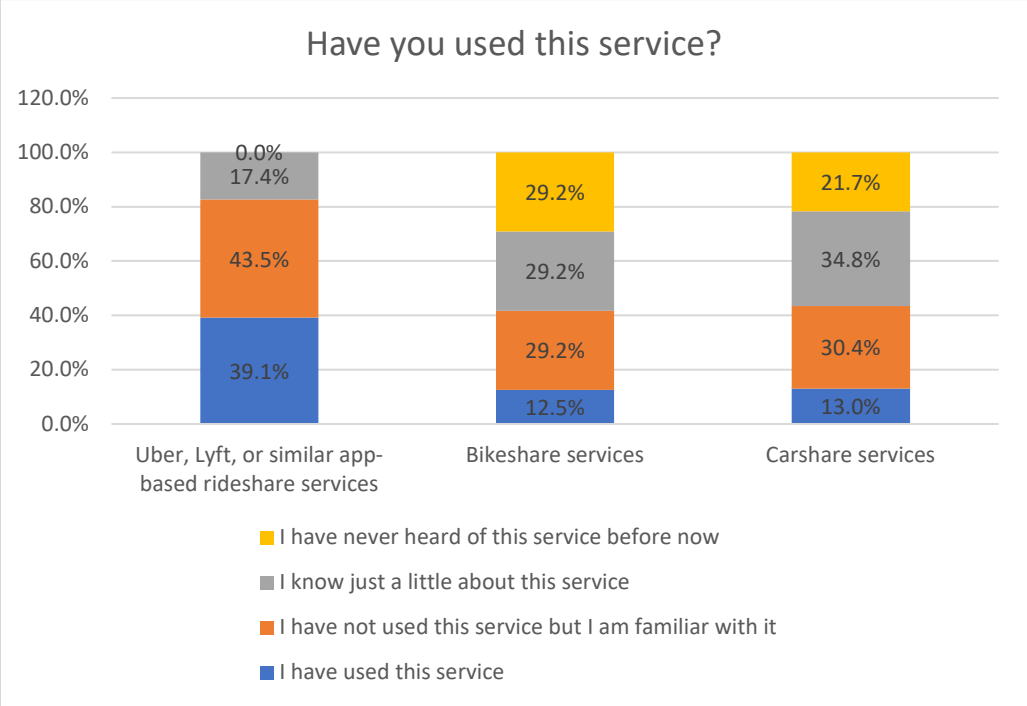

Figure E.0.1 Summary of findings for rideshare, bikeshare, and carshare usage, N=24

Regarding interest in using shared-use mobility services if available in their community, rideshare services were the most popular choice among respondents, with slightly more than half (52.2%) expressing willingness to use the service (Figure E.2). Bikeshare and carshare services also generated interest, but among a smaller proportion of respondents (21.7% for bikeshare and 22.75% for carshare).

Having bikesharing services in tribal communities is challenging because, typically, there is no infrastructure (such as bike paths, signage, etc.) on the roads to facilitate safe bicycling, and there are substantial travel distances between people goods and services in tribal areas. Further, survey respondents also mentioned that the quality of bikeability as not good, but at an acceptable level.

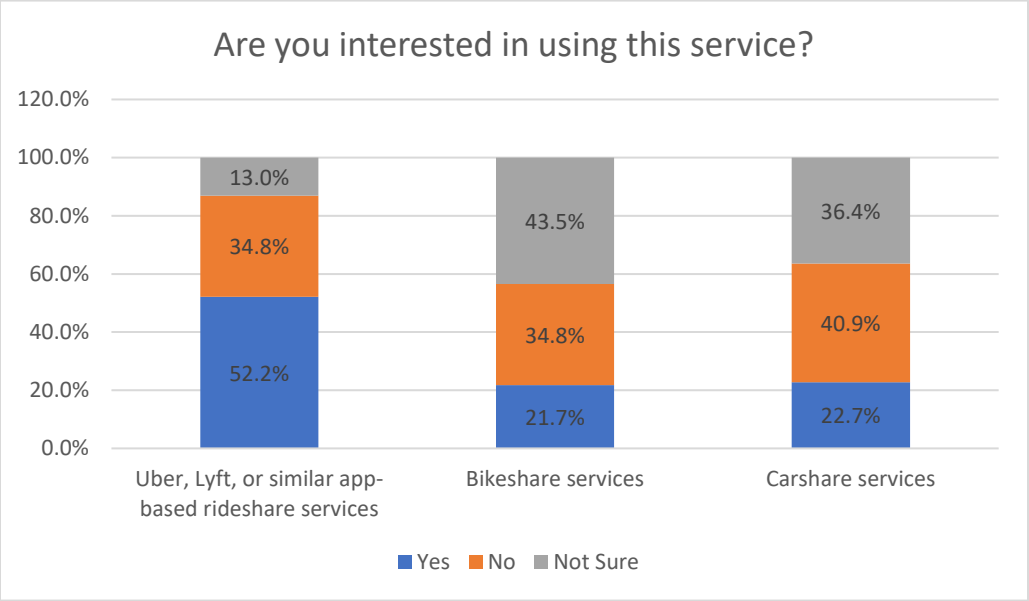

Figure E.0.2 Interest in using the service if available in your community, N=24

Tribal Stakeholder Interviews

A total of 10 tribal stakeholder interviews were conducted with tribal community contacts in Alaska, California, Montana, North Dakota, Oklahoma, Oregon, and Washington to gather insights on interest, opportunities, and challenges in implementing shared-use mobility services in tribal communities. The interviews indicated that, while there are a wide variety of public transit services available in the tribal communities represented by the interviewees, the majority of the communities still have people in the tribal area that do not have access to transportation. This observation indicates that the currently available public transit services are not sufficient and that there are existing transportation gaps. Most of the interviewees thought that some form of rideshare, carshare, bikeshare, or microtransit service could be beneficial to their tribal community. Rideshare, carshare, and microtransit services seemed to be the services that interviewees thought could benefit their communities the most.

Many tribal communities share certain characteristics that make them possible candidates for implementation of shared-use mobility services such as rideshare, carshare, bikeshare, or microtransit services. Those community characteristics include a need for providing efficient transportation services in spread-out communities to connect people travelling to and from employment and entertainment centers, the potential for cost/fuel savings to meet personal mobility needs, a need for transportation services to tribes with high levels of poverty, demand for bikeshare programs at tribal colleges, for a desire for increased mobility options in the communities, etc.

1. INTRODUCTION

Emerging technology-enabled shared-use mobility services have significantly transformed the transportation ecosystem in urban communities. Shared-use mobility services have also penetrated rural communities in the United States thanks to their numerous advantages, ease of providing service through private contractors, and availability of funding sources, such as Federal Transit Administration (FTA) formula grants, FTA mobility-on-demand funds, state department of transportation (DOT) funds, etc. Some tribal communities are embracing microtransit services and bikeshare programs to provide much-needed transportation options and to help residents better connect to various facilities within their communities. While there are numerous categories of shared-use mobility practices (such as rideshare, carshare, bikeshare, microtransit, etc.,) that are being proven to be useful to rural communities, there is much less literature on the usefulness and applicability of emerging shared-use mobility practices to tribal communities in the United States. Similarly, there is little information about funding sources for potential implementation and about the interest of tribal residents towards emerging mobility options. While there are some initial shared-use mobility service implementations in tribal areas, they are either in the planning or initial stages of their operations. Therefore, there is a need to conduct a comprehensive effort to study and evaluate these initial implementations to better understand the scope for shared-use mobility services in tribal areas, lessons learned, and keys to success for other tribal communities. This study will conduct various research activities to answer these questions.

The study objectives to address the identified research needs include:

1) Conduct an exploratory scan of literature review of current and forthcoming tribal shared-use mobility service implementation efforts in the United States, and summarize the impacts of these services on tribal community transportation.
2) Analyze the interest and adoption patterns for shared-use mobility services in a selected case study tribal community by conducting surveys of residents.
3) Conduct interviews with tribal community stakeholders across the nation to learn about the interest, opportunities, and challenges for shared-use mobility services in reservations.

Shared-use mobility services such as rideshare, carshare, bikeshare, microtransit, etc. are explored in this study. Below are brief definitions of shared-use mobility services that are discussed in this study.

Definitions:

Rideshare services: Rideshare services are prearranged and on-demand transportation services for compensation in which drivers and passengers connect via digital applications. Digital applications are typically used for booking, electronic payment, and ratings. Examples: Uber, Lyft, etc.,

Bikeshare services: Bikeshare services provide users with on-demand access to bicycles at a variety of pick-up and drop-off locations for one-way (point-to-point) or roundtrip travel. Examples include B-Cycle, Zagster, etc., Within the bikeshare service, there are docked bikeshare systems, where bikes are locked until rented at docks located at designated stations, and dockless bikeshare systems, where bikes can be located anywhere within a geofenced area for a city/community and could be tracked through GPS enabled bikes and mobile applications.

Carshare services: Carshare is a model of car rental where people can rent cars for short periods of time, often by the hour. Examples include Car2go, Zipcar, etc.,

Microtransit services: Microtransit is defined as a privately or publicly operated, technology-enabled transit service that typically uses multi-passenger/pooled shuttles or vans to provide on-demand or fixed-schedule services with either dynamic or fixed routing. When compared to regular public transit services, a ride on Microtransit service has a quicker response time and a ride can be requested 15 or 20 minutes before a trip is needed. Microtransit services can be thought of as on-demand transit services that operate similar to rideshare services such as Uber and Lyft, but the trips are provided in larger vehicles, and passengers traveling in the same direction are matched. An example is Via Transportation.

In the next section, we review the tribal shared-use mobility service implementations in the United States. Section three provides an understanding of the interest in shared-use mobility services in tribal communities through a case study of a group of tribal communities in eastern Oklahoma that are served by the Pelivan Transit. In section four, we discuss the interviews of the tribal stakeholders and their thoughts on shared-use mobility services and their applicability for tribal communities in the United States. Finally, in section five we provide a summary, conclusions, and a need for further study.

2. REVIEW OF TRIBAL SHARED-USE MOBILITY SERVICE IMPLEMENTATIONS

There are approximately 570 federally recognized tribes in the United States, and the existence of shared-use mobility services in tribal communities is negligible. That being said, there are some examples of some shared-use mobility implementations in a few tribal communities in the United States. The following sections summarize some of the tribal shared-use mobility service implementations categorized based on the type of service: bikeshare, carshare, and microtransit.

Bikeshare Programs

In the summer of 2018, LimeBike launched a dockless bikeshare program in Nevada's Reno-Sparks Indian Colony (Figure 2.1) (Reno-Sparks Indian Colony, 2023). The launch of the dockless bikeshare program is part of a larger northern Nevada regional partnership to pilot and test the dockless bikeshare program in the City of Reno, City of Sparks, Reno-Sparks Indian Colony, University of Nevada, and Reno and Washoe County (Reno-Sparks Indian Colony, 2023) (Anzilotti, 2018). The motivation for bringing bikeshare program to the communities was to reduce automobile traffic and improve mobility options for citizens and visitors (Anzilotti, 2018). Characteristics of the service include 3G-enabled GPS bikes, and affordable 30-minute bike rentals with discounted rates for students and seniors.

Figure 2.1 LimeBike dockless bikes at Colony Gym in Reno-Sparks Indian Colony
Source: (Reno-Sparks Indian Colony, 2023)

However, LimeBike service in the region was discontinued in March 2019, and the program was not extended beyond the pilot phase. According to multiple news articles, the failure to continue the service seemed to be due to the lack of transparency in the plan for dockless bikeshare operations; also, Lime launched electric scooter operations in the service region without properly informing the city officials involved (2News, 2022) (Rothberg, 2018). When the bikeshare program ended, most of the bikes ended up in the scrapyard (Figure 2.2) and the rest were recycled (Gross, 2019).

Figure 2.2 LimeBike program bikes ended up in Reno scrapyard after the dockless bikeshare program ended
Source: (Gross, 2019)

Pine Ridge Reservation in South Dakota, which is considered the poorest county in the United States, has enhanced its bicycling activity in the tribal community, thanks to Pennsylvania teacher Glen Sanders, who has donated 128 refurbished bikes to the reservation to provide valuable transportation options to its residents (Figure 2.3) (Lindeman, 2018). While this effort does not fall under a traditional bikesharing arrangement, enhancing bicycling activities in rural areas by working with donated bikes was found to be a common bikesharing practice in a recent comprehensive shared-use mobility study conducted in rural areas (Godavarthy, Hough, Libberton, & Koff, 2019).

Figure 2.3 Children and adults at Pine Ridge Reservation receiving refurbished bikes
Source: (Petro, 2017)

Carshare Programs

To combat air pollution and reduce the health effects of high traffic and air pollution exposures, 21 communities in California were awarded a total of $20 million as a part of the "Clean Mobility Options Voucher Pilot Program" to develop and launch zero-emission mobility projects (California Air Resources Board, 2021). Of the 20 communities that received funding, two tribal communities received funding to develop carshare program with electric vehicles.

A total of $1 million was awarded to the Cahuilla Tribe to fund a zero-emissions carsharing program with six plug-in electric vehicles. This program is designed to provide affordable, on-demand, and clean transportation options for community residents to use to access essential facilities such as medical services, educational institutions, and religious and cultural gatherings (California Air Resources Board, 2021) (California Air Resources Board - Cahuilla Clean Mobility Project, 2023). Similarly, a total of $993,300 was awarded to the Twenty-Nine Palms Band of Mission Indians to fund a carshare program with eight electric vehicles to help with the health, welfare and sustainability of tribal community members (California Air Resources Board - On-Demand Electric Vehicle Service for the Twenty-Nine Palms Band of Mission Indians' Reservation, 2023). Note that certain carsharing programs in tribal regions, which are still in the planning stages, will require additional time to assess their suitability for tribal communities, potential advantages, and any associated challenges.

Microtransit Services

Microtransit services have been more prevalent and successful in rural communities and rural and tribal communities are starting to experiment with those services. Two current microtransit service implementations in tribal communities are presented in this section: On-demand public transit service by Blackfeet Transit in Montana, and regional mobility-on-demand microtransit service in rural Oklahoma. These two microtransit implementations are described in detail below.

On-demand public transit service by Blackfeet Transit in Montana

In August, 2021, Blackfeet Transit agency in Montana, which already offers tribal demand-response transit services, launched a new door-to-door dynamically-routed public transit service (also referred to as microtransit service) by partnering with Via, a transportation technology company (Figure 2.4) (Via, 2021). When a rider requests a ride, passengers going in the same direct are pooled in a single vehicle in real time using Via's advanced algorithms.

Figure 2.4 Dynamically routed on-demand public transit service provided on Blackfeet Transit vehicles Source: (Glacier Reporter, 2021)

To book or pre-schedule a ride, riders can use the Blackfeet Transit mobile app (Figure 2.5); riders without access to a smartphone can call a dedicated phone line. This new service was launched to expand access to affordable, efficient, and convenient transportation options for riders travelling within the Blackfeet Reservation, Browning and nearby towns (Via, 2021). The service is available from 8 a.m. to 4:30 p.m., Monday through Friday and provides trips to and from neighboring areas such as Kalispell, Great Falls, Shelby, and Cutbank (Via, 2021). The service also included wheelchair-accessible vehicles (Glacier Reporter, 2021).

Most of Blackfeet Transit's riders are elderly and people with disabilities. The new microtransit service is believed to empower current riders as well as reach more people with Via's technology. The service is free for seniors, people with disabilities, and children under the age of 17 (SUMC, 2021). For rest of the public, the fare is $1, which should be paid in cash to the driver of the microtransit vehicle. The actual cost per trip is $24; the Blackfeet Transit Agency covers $23 of the cost through a Federal Transit Administration (FTA) grant that was received (Glacier Reporter, 2022). Within one year of operation, the number of passengers for Balckfeet Transit has doubled to 1,150 people per month (Sherfinski, 2022). Because of this increase in operations, Blackfeet Transit facility was planned for an expansion of the facility to accommodate the increased number of operating vehicles and demand (Glacier Reporter, 2022).

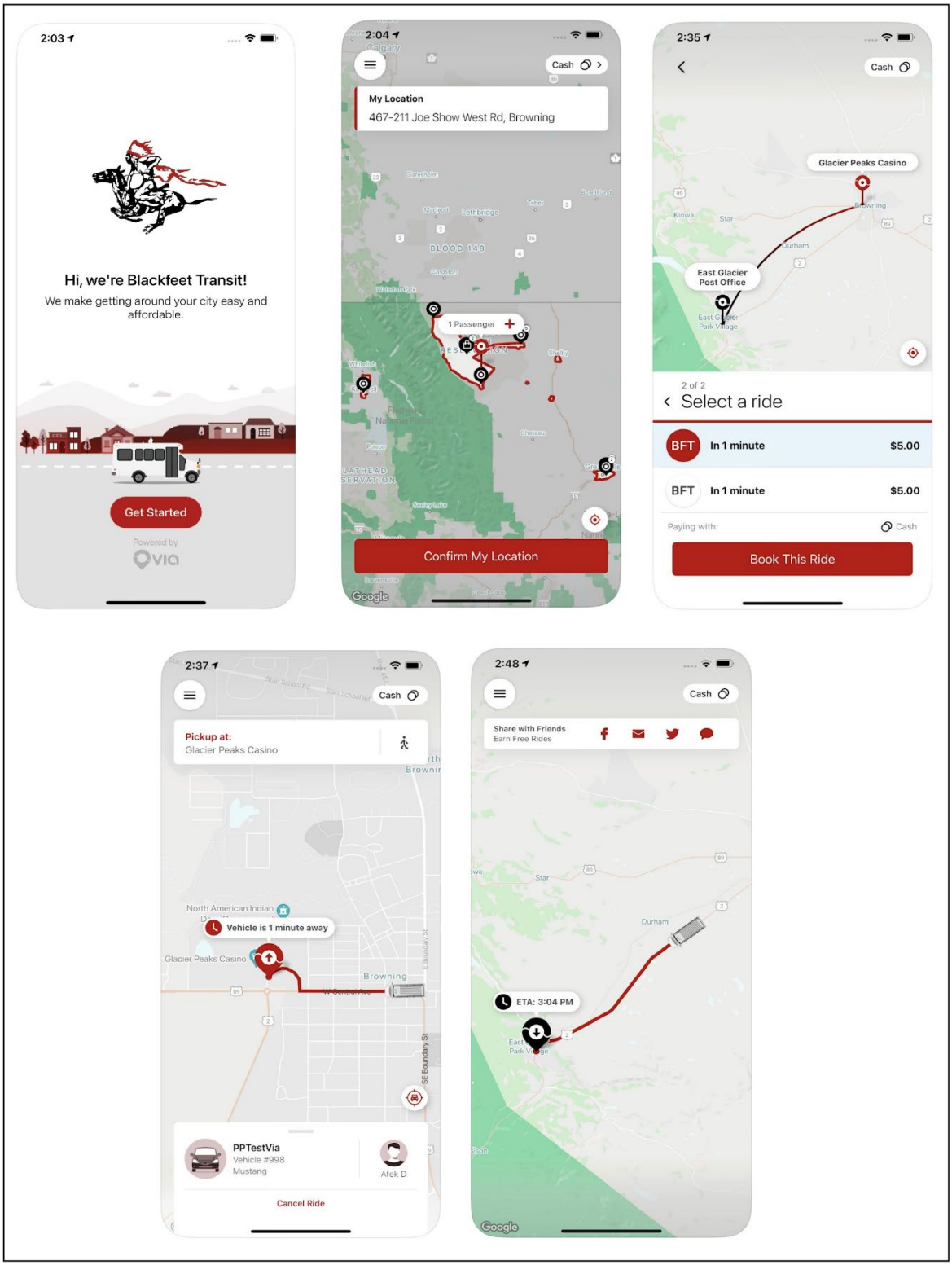

Figure 2.5 Blackfeet Transit app powered by Via – image showing step-by-step user interface for making a reservation and taking a ride
Source: Blackfeet Transit app on Apple App Store

Regional Mobility-on-Demand Microtransit Service in Rural Oklahoma

The Grand Gateway Economic Development Association secured FTA's Integrated Mobility Innovation (IMI) grant of $1.5 million to develop an on-demand microtransit service named PICK Transportation (Figure 2.6) (SUMC, 2023). Pelivan Transit is the lead agency for the grant which also provides transit services for the general public and two tribal consortiums, including the Cherokee Nation and the Northeast Oklahoma Tribal Transit Consortium. PICK Transportation is not operated by one single transit agency, but brings together four rural transit providers – Pelivan Transit, JAMM Transit, Cimarron Public Transit System, and KI BOIS Area Transit System. These rural transit agencies already provide public transit services to their service regions during daytime and end their service around 4:00 or 4:30 p.m., which creates transportation gaps for those looking for evening service (SUMC, 2023).

Figure 2.6 Image showing vehicle used for PICK Transportation Service along with vehicle branding
Source: (SUMC, 2023)

PICK transportation was launched in June 2021 to fill the transportation gap in after-work hour transportation services in rural and tribal areas of eastern Oklahoma (See Figure 2.7), allowing individuals to book spontaneous trips and providing a standard fare structure of $3 per trip one way (SUMC, 2023). The program, involving four rural transit agencies and ten tribal nations, offers on-demand public transportation to 21 rural communities. The service partners with Uber to provide the software components of microtransit service which enables dispatching, booking, payment, and trip planning. Hours of the service are Monday through Friday, from 5 p.m. to 10 p.m. and Saturday from 10 a.m. to 2 p.m. The service is operated through a fleet of 41 vehicles and is ADA-compliant. The PICK transportation service is thoughtfully designed to accommodate individuals with diverse characteristics. It ensures accessibility for those with and without smartphones or bank accounts. Users who possess a smartphone can conveniently book their rides through the Uber mobile app (refer to Figure 2.8) and complete their payments using credit or debit cards within the app (SUMC, 2023). PICK transportation discontinued its association with Uber due to challenges in getting data from Uber to understand the rider statistics. The new mobility partner for PICK Transportation service is Via.

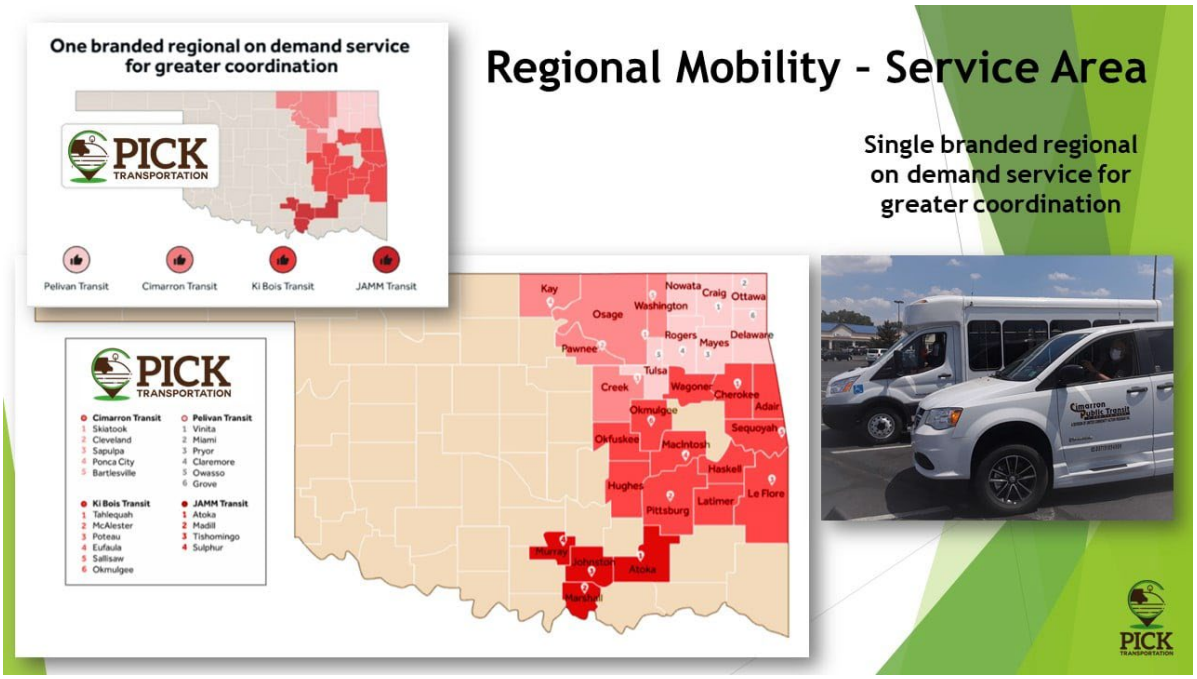

Figure 2.7 Image hows PICK Transportation branding and service area in Oklahoma
Source: (SUMC, 2023)

Individuals who lack smartphone access or a bank account can still access the service by calling the regional mobility management center (RMMC) through a dedicated phone line. Through this alternative booking method, they can arrange rides and pay the vehicle driver directly with cash. This comprehensive approach guarantees that the PICK transportation service is inclusive and caters to the needs of a wide range of users (SUMC, 2023).

PICK transportation launched its operations in Oklahoma during the peak of the COVID-19 pandemic and managed to overcome challenges such as low public transit usage during the pandemic, a national driver shortage, and a lack of technology literacy to move towards app-based booking system (SUMC, 2023). The service however increased its ridership through the project's lifetime towards serving more than 2,000 trips per month (Vilches, 2023). Figure 2.9 demonstrates the progression of ridership from when the service was launched in June 2021. The majority of the trips made on the service were for grocery stores and employment sites (Vilches, 2023).

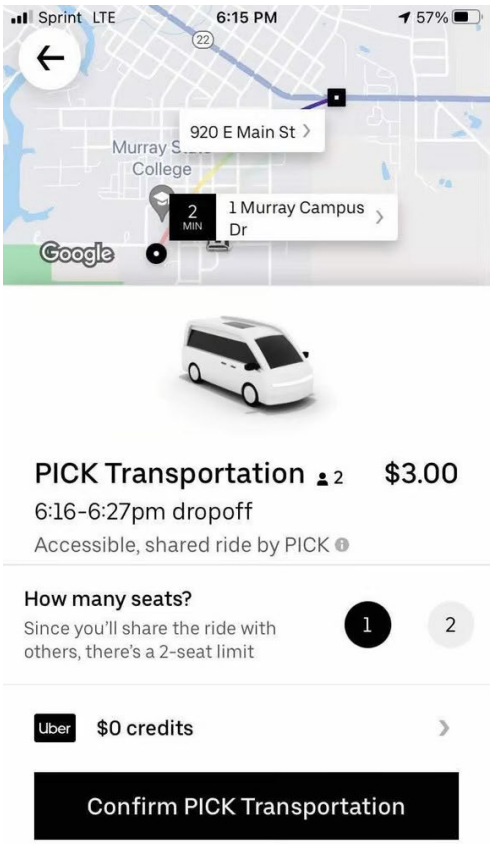

Figure 2.8 User interface for PICK Transportation Uber App
Source: (SUMC, 2023)

Figure 2.9 PICK Transportation ridership per month from the launch
Source: (Vilches, 2023)

While riders have the option to book a ride on the Uber smartphone app, as of July 2022, only 28% of the total riders booked their rides through the Uber app, and majority of the riders (72%) booked their rides through RMMC housed at Pelivan Transit (Vilches, 2023). Reasons for this are low smartphone ownership among riders and difficulty among older adults in adopting new technology (Vilches, 2023).

Guidance Available for Tribal Communities to Introduce Shared-Use Mobility Services

Recently, grant funding, including Federal Transit Administration's (FTA) formula funding, other FTA funding opportunities, state department of transportation funding, and other sources, available for using shared-use mobility services to enhance mobility options in rural and tribal areas has increased. While tribal communities can collaborate with private mobility providers to operate rideshare, carshare, bikeshare, or microtransit services, it is important for these programs to be properly planned and coordinated so that they are able to sustain operations rather than failing to succeed after initial one or two years. LimeBike's bikeshare operation in Nevada's Reno-Sparks Indian Colony seemed like a victim of an improperly operated service that eventually resulted in discontinued operations.

Therefore, it is important to have a guidance document illustrating steps to follow for implementing shared-use mobility services in tribal areas, and best practices to follow for their successful operation. A recently completed NCHRP task 76 research effort produced a five-step rural shared-use mobility toolkit (Figure 2.10) designed to inform state DOTs, regional transportation agencies, rural transit agencies, local governments, human service agencies, and other state and local agencies about the various steps and tasks involved in strategically planning for, piloting, and implementing emerging shared-use mobility services in rural communities (Godavarthy, Hough, Libberton, & Koff, 2019). This toolkit is for various categories of rural shared-use mobility services, such as ride-sharing, car-sharing, bike-sharing, microtransit, as well as mobility-as-a-service (MaaS) platforms (Godavarthy, Hough, Libberton, & Koff, 2019). While this toolkit is prepared for rural communities in the United States, it could also be used by tribal communities as most of the tribal communities are rural in nature and have mobility challenges that that are similar to those in rural communities. Visit the study for an in-depth description of the five-step rural shared-use mobility toolkit:
https://onlinepubs.trb.org/onlinepubs/nchrp/2065/Task76Report.pdf

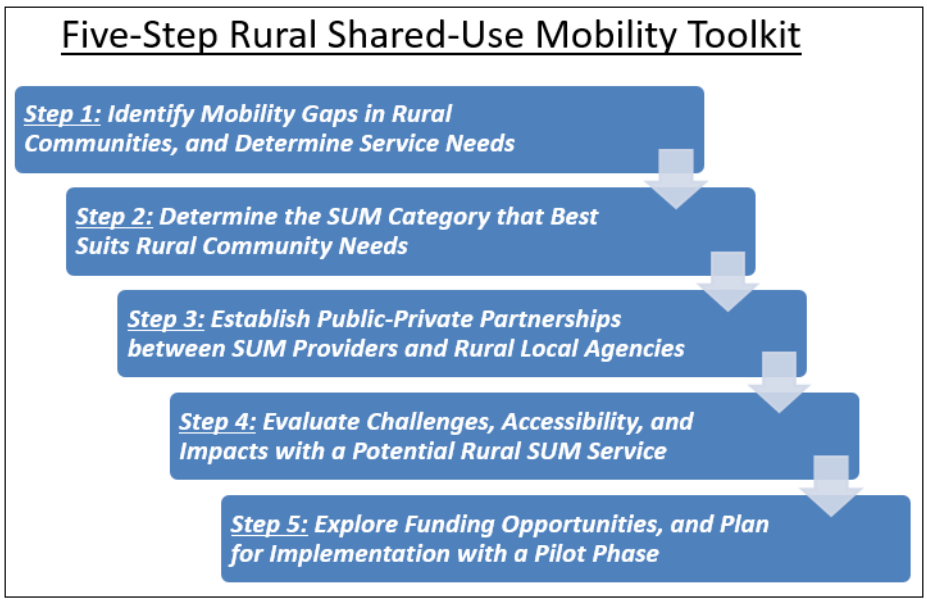

Figure 2.10 Summary of the Five-Step Rural Shared-Use Mobility Toolkit

In summary, within tribal communities, endeavors are underway to introduce diverse shared-use mobility services including bikeshare, carshare, rideshare, and microtransit options. Although these services are currently limited in their nationwide deployment, they are in their nascent phase of development, aiming to comprehensively outline the advantages, obstacles, and feasible applications. Initial assessments of tribal microtransit trials have yielded encouraging results. Nevertheless, the integration of multiple shared-use mobility initiatives within tribal contexts holds the promise of equipping tribal stakeholders with insights into opportunities, challenges, and the overall potential for broader implementation.

3. UNDERSTANDING INTEREST OF SHARED-USE MOBILITY SERVICES IN TRIBAL COMMUNITIES THROUGH A CASE STUDY

The second objective of the research effort is to analyze the interest and adoption patterns for shared-use mobility services in a selected tribal community as a case study. As a part of this objective, the study explored multiple tribal communities for potential participation in this research effort. The study primarily focused for securing interested tribal communities in the Midwest region because of existing working relationships between members of the research team with Midwest tribal stakeholders. The research team reached out to tribal community contacts in North Dakota, South Dakota, Oklahoma, and Minnesota.

Case Study Community Selection

The research team decided that a group of tribal communities in eastern Oklahoma that are served by the Pelivan transit would serve as the case study tribal community. The reason for this selection was because: 1) Pelivan transit had expressed interest in participating in the study when contacted by the research team, and 2) Pelivan transit is actively working on a microtransit service implementation (PICK transportation, as introduced in Chapter 2), and tribal residents in the service area could have better exposure and understanding of technology-enabled on-demand shared-use mobility transportation services compared to a typical tribal community in the United States.

Pelivan Transit

Pelivan transit offers transportation services to two tribal consortiums in eastern Oklahoma: the Cherokee Nation and the Northeast Oklahoma Tribal Transit Consortium (NTTC). The NTTC comprises nine tribal nations, namely the Eastern Shawnee, Miami, Modoc, Ottawa, Peoria, Quapaw, Seneca-Cayuga, Shawnee, and Wyandotte tribes. Across these two tribal consortiums, Pelivan Transit operates curb-to-curb demand response services and multiple fixed employment routes to a total of ten tribes. To facilitate these services, Pelivan Transit maintains a fleet of 67 vehicles, including ADA-compliant mini-vans (Figure 3.1) and ADA-compliant shuttle buses. Service hours are generally from 8 a.m. to 4 p.m. Monday through Friday. The cost of Pelivan Transit's services varies depending on the passenger category. For regular public passengers, the fare for a one-way trip is $3. Elderly individuals benefit from a reduced fare of $2 for a one-way trip. Individuals holding Native American Certificate of Degree of Indian Blood (CDIB) or tribal citizen cardholders are charged only 50 cents for a one-way trip.

In addition to Pelivan Transit, the service area also has an active microtransit service named PICK transportation to fill the transportation gap in after-work hour transportation services. The Grand Gateway Economic Development Association partnered with Uber to develop this on-demand microtransit service. Detailed information about this service was provided in Chapter 2.

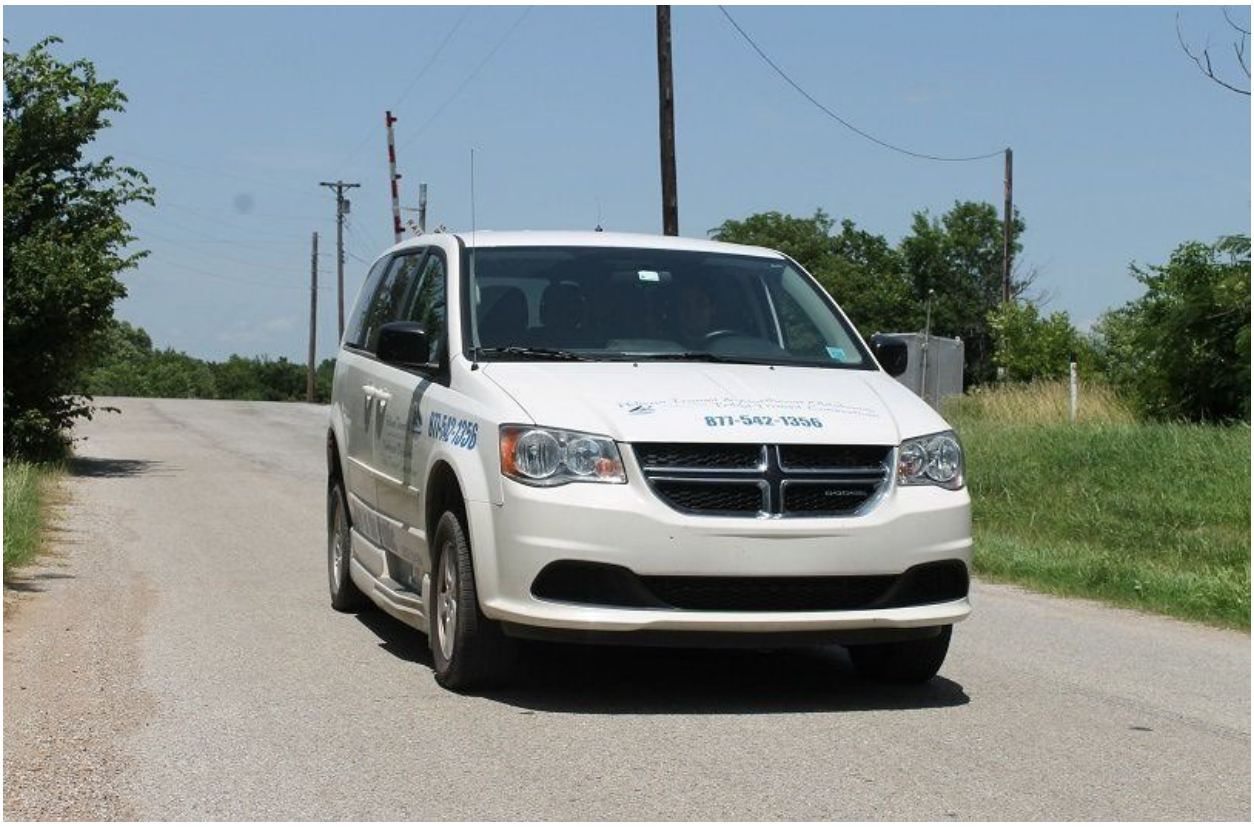

Figure 3.1 ADA accessible mini-van used by Pelivan Transit Agency to provide demand-response service in tribal communities of eastern Oklahoma
Source: pelivantransit.org

Case Study Implementation Efforts

The research team prepared a one-page questionnaire (front and back) to be distributed to tribal residents in the Cherokee Nation and the Northeast Oklahoma Tribal Transit Consortiums to understand the state of current transportation services, knowledge of shared-use mobility services, and potential interest in using shared-use mobility services, if available. Before the survey questionnaire was finalized, it was sent to tribal transportation experts across the United States to gather feedback and make improvements to ensure that the survey gathers the needed information to fulfill the study objectives. The final draft of the survey cover letter and survey questionnaire that were distributed can be found in Appendix A. North Dakota State University's (NDSU) Institutional Review Board (IRB) approval of the survey protocol was secured in December 2022 so that the survey could be distributed to residents in the two tribal consortiums. A copy of approval is available in Appendix B. Required approvals from the two tribal consortiums served by Pelivan Transit were also secured. The Pelivan Transit Director communicated with relevant parties for these approvals and secured them for the research team. Appendix C has the approval document.

A total of 400 paper surveys were distributed in January and February of 2023. The research team worked with the director of Pelivan Transit to distribute the surveys in the two tribal consortiums. Pelivan Transit's director played a key role in devising a strategy for survey distribution across the two tribal consortiums, and coordinated with various entities including their transit drivers to physically distribute the surveys to the tribal residents. The paper surveys were distributed in all Pelivan Transit

vehicles, medical (general and tribal) facilities, and at food distribution centers. The online survey was distributed via Pelivan Transit social media outlets such as Facebook, Twitter, Instagram, and its website. Each paper survey packet included: 1) cover letter, 2) one-page survey, front and back, 3) form to gather contact details of respondents to enter into a raffle to win one of the two $50 gift cards, and 4) a postage-paid return envelope. Figure 3.2 shows materials included in each survey envelope distributed.

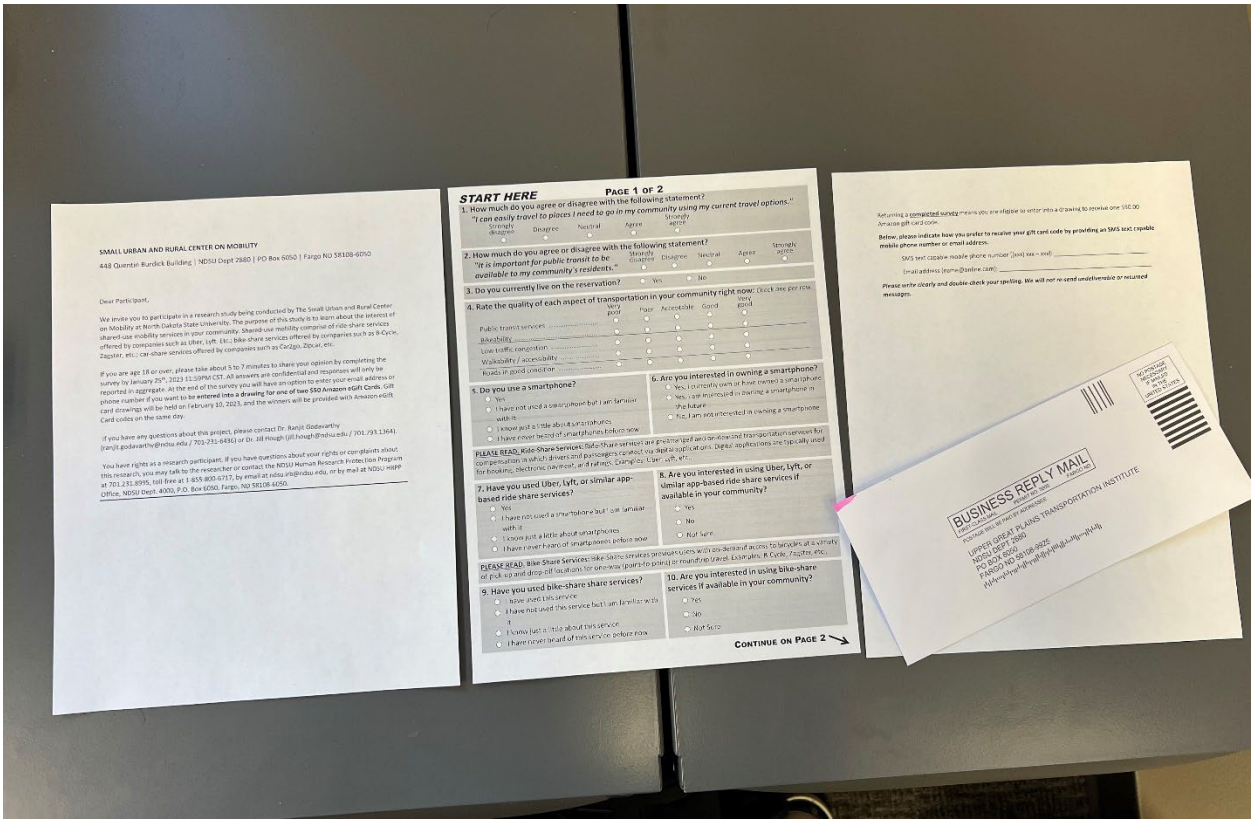

Figure 3.2 Materials included in each survey envelope

The survey questionnaire was designed to collect information on multiple aspects, including the ease of travel within the community using current transportation options, the significance of public transit for community residents, the quality of different transportation options in the community, smartphone use, utilization of various shared-use mobility services, the importance of these services, and demographic details of the respondents.

A total of 24 paper survey responses were received based on the paper survey distribution efforts at various avenues. No responses were received from the online survey distribution. Despite multiple reminder efforts to secure the completed surveys, the survey response rate was still low. While the total number of returned responses, 24, is low, the research team believes that the information gathered through these 24 survey responses is provides insight into the sentiment and interest of tribal residents toward shared-use mobility services.

Demographic characteristics:

The majority of the survey respondents were female (64% female vs. 36% male), were in the 45 to 64 years age group, and has a household income in the range of $45,000 to $99,999. Figure 3.3 presents the detailed demographic characteristics of the survey respondents. Note from this figure that there is the representation of all demographic groups within the survey respondents. Most (78.3%) of the survey respondents mentioned that they are employed for wages. Among the total survey respondents, 41% of the respondents currently live on the reservation, and the rest, 59%, do not currently live on the reservation.

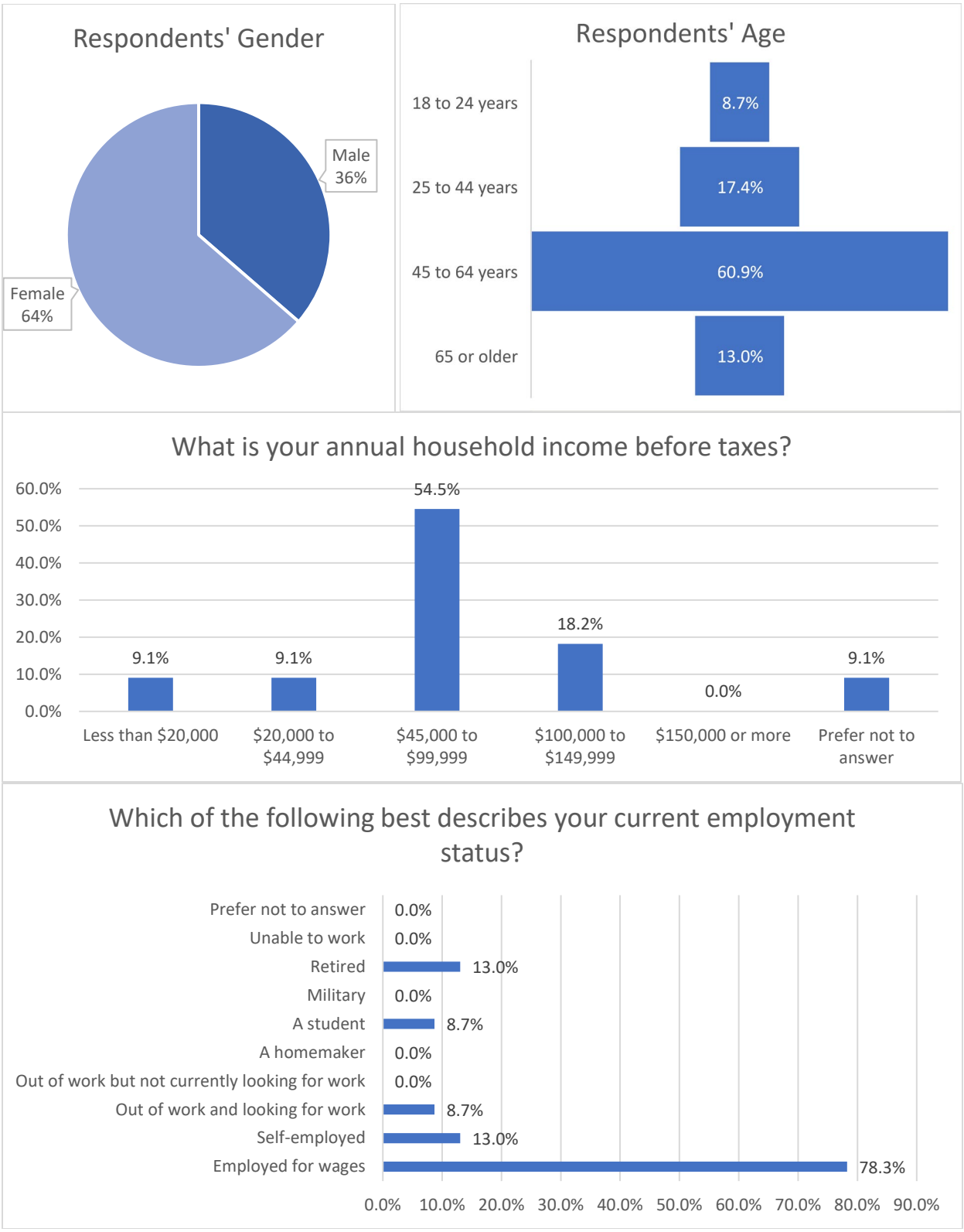

Figure 3.3 Survey respondents' demographic characteristics, N=24

Importance of transportation and current quality of transportation infrastructure and services

Several questions were included in the survey to assess the current transportation infrastructure and services for the tribes. Respondents were initially asked how much they agree with the statement: "I can easily travel to places I need to go in my community using my current travel options." A summary of findings is presented in Figure 3.4. While the majority of the respondents agreed with this statement, some respondents disagreed or strongly disagreed, indicating that there is some proportion of the tribal population that has transportation gaps. A follow-up question asked the respondents their level of agreement with the statement: "It is important for public transit to be available to my community's residents." Most (87.5%) of the respondents agreed or strongly agreed with this statement, indicating that Pelivan Transit and other relevant public transit services are critical and useful to the people in the tribes being studied.

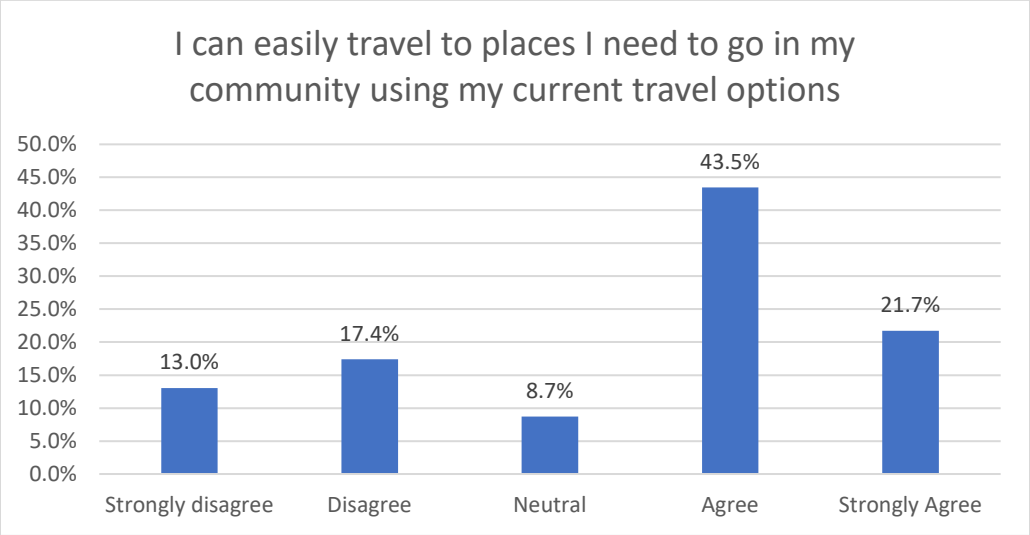

Figure 3.4 Ease of travel using current travel options, N=24

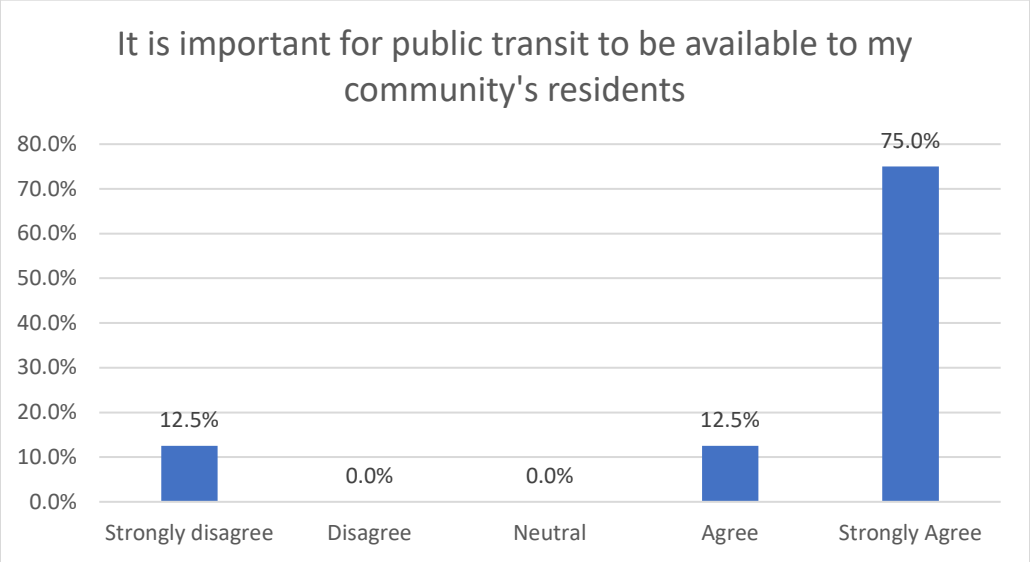

Figure 3.5 Importance of public transit in the tribes studied, N=24

To better understand the quality of various aspects of transportation on the reservation, residents were asked a follow-up question in which they were to rate the quality of each aspect of transportation in the community where they currently live. The various aspects of transportation the respondents were asked to rate, included public transit services, bikeability, low traffic congestion, walkability/accessibility, and roads in good condition. Respondents had to rate transportation the aspects as very poor = 1, poor = 2, acceptable = 3, good = 4, or very good = 5. Results are shown in Figure 3.6. This figure shows the average rating for the responses from all the respondents. Responses indicate that that public transit services operated by Pelivan Transit in the tribes studied are in good condition. Roads had an average quality rating between 2 (poor) and 3 (acceptable). All other aspects (bikeability, low traffic congestion, and walkability/accessibility) are observed to be of a quality between 3 (acceptable) and 4 (good). in reviewing the average findings for various individual transportation aspects, it can be concluded that the condition of the roads and bikeability were ranked as lowest in quality. Improving these aspects for the tribes studied could help identify solutions to provide better transportation connections as well as promote bicycling activities, and could potentially facilitate bikeshare programs for making needed transportation connections.

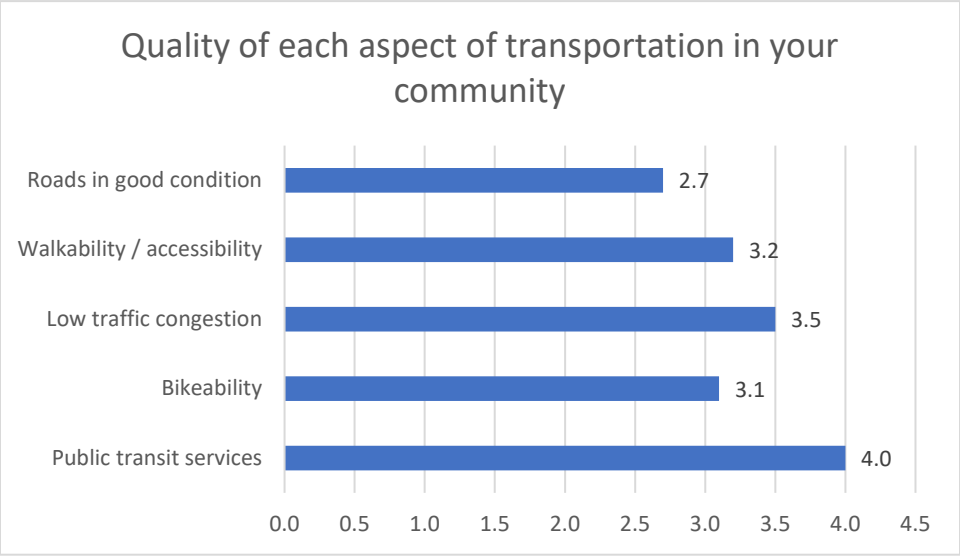

Figure 3.6 Quality of various transportation aspects. Rating scale: 1 = Very Poor, 2 = Poor, 3 = Acceptable, 4 = Good, and 5 = Very Good, N=24

Smartphone Usage

Additional questions were included in the survey to learn if the survey respondents have access to smartphones, which are key to using technology-enabled shared-use mobility services. The first question on this topic asked if the respondents use a smartphone, followed by a question asking if the respondents are interested in owning a smartphone. Figure 3.7 and 3.8 summarizes the findings for these two questions. Most (92%) of the survey respondents use a smartphone, and all of these respondents are interested in owning a smartphone. This finding shows that the tribal survey respondents have access to smartphones which are necessary for booking a trip on shared-use mobility platforms such as ridesharing, carsharing, bikesharing, microtransit services, etc.

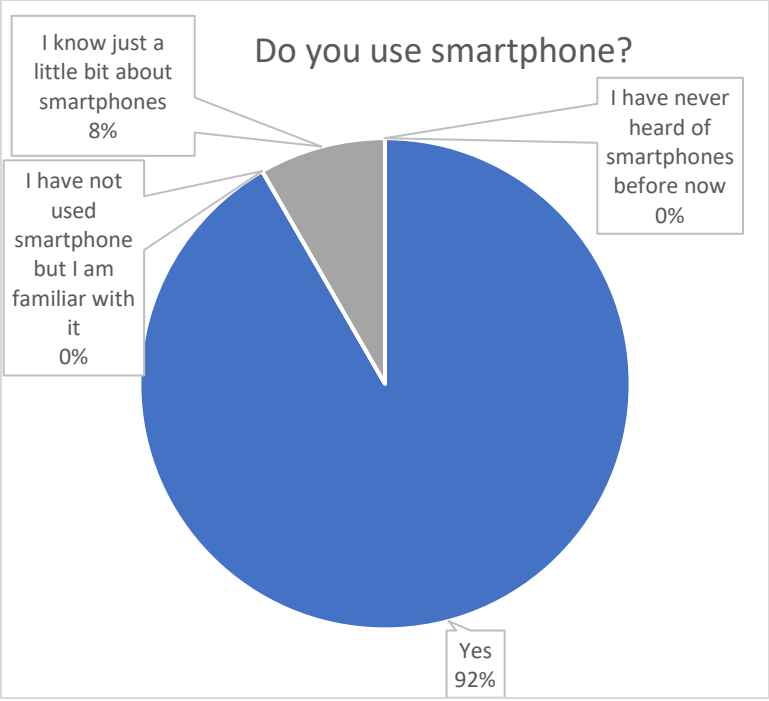

Figure 3.7 Current smartphone usage, N=24

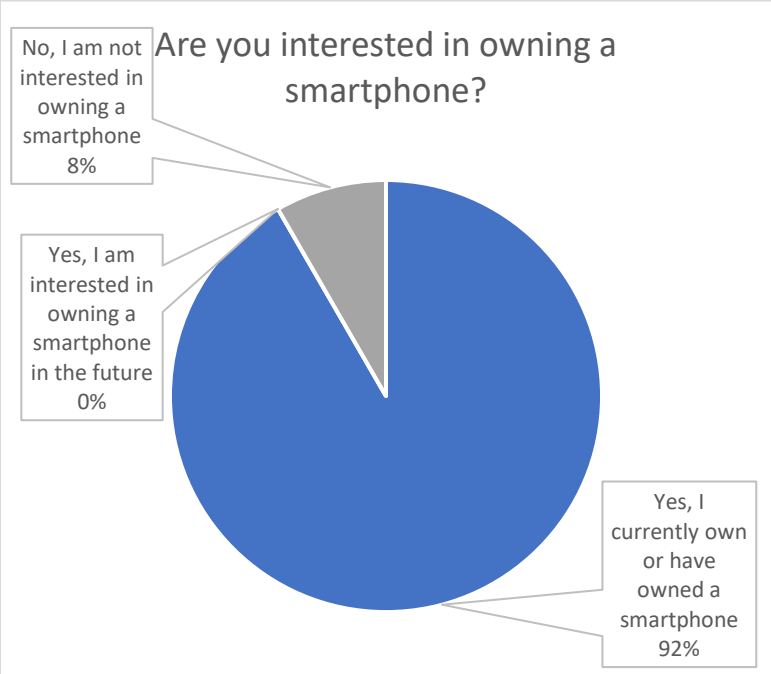

Figure 3.8 Interest in owning a smartphone, N=24

Ridesharing, Bikeshare, and Carshare Services

For each category (rideshare, bikeshare, and carshare) of shared-use mobility service, two survey questions are presented in the questionnaire – the first question is if the respondent had used the service, for example bikeshare service, and the second question is if the respondent is interested in using the service if available in their community. The actual questions and multiple-choice answer

options for each of these questions can be reviewed from the survey questionnaire available in Appendix A. Note that a question focused on microtransit was not asked because for most agencies the use of microtransit services is synonymous with rideshare services. Simply put, rideshare services provided in bigger vehicles and by pooling passengers are microtransit services. The research team did not want to confuse tribal residents by presenting two kinds of services that are similar in definition. Consequently, they limited questions to rideshare service which is more familiar to respondents. Further, the microtransit service operated in the case study community area is Uber, which is a transportation technology company that provide rideshare services.

One important measure the research team took before asking rideshare, bikeshare, and carshare related questions was to properly introducing the concept of each of these services. Figure 3.9 shows the introduction and explanation of rideshare, bikeshare, and carshare services that was in the survey questionnaire and presented to the survey respondents before asking questions relating to each kind of service. Rideshare, bikeshare, and carshare services are not typically found in tribal communities, so it is reasonable to assume that a majority of the tribal community residents may not have used them before, and in some cases may not have heard about them before. Therefore, these services are properly introduced before asking questions about each of the service type so the respondents could provide their most accurate response.

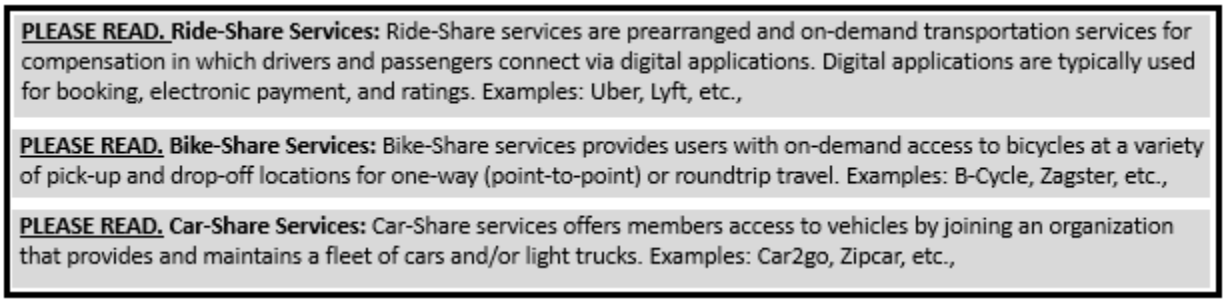

Figure 3.9 Definition for each kind of shared-use mobility service that was presented in the survey questionnaire

Among rideshare, bikeshare, and carshare services, rideshare services seemed to be the service that the survey respondents used most or are more familiar with when compared to bikeshare and carshare services. This could be due to the fact that Uber/Lyft rideshare services are more popular in the United States and respondents might have used the service when they travelled to bigger cities. It is also possible that respondents may have used the Uber microtransit service that is available in their service area. Figure 3.10 summarizes the findings of shared-use mobility service usage. A total of 39.1% of respondents used rideshare services, 12.5% used bikeshare services, and 13% used carshare services. Similarly, for those respondents who did not use the mentioned service, comparatively more respondents mentioned they are familiar with rideshare services (43.5%) relative to bikeshare (29.2%) and carshare (30.4%) services. A significant percentage of respondents also mentioned that they either know just a little or never heard about bikeshare or carshare services.

When asked if the respondent is interested in using rideshare, bikeshare, and carshare services if available in their community, rideshare service seemed to be the most popular among the respondents with little over half (52.2%) of the respondents stating they were willing to use the service if available. Bikeshare and carshare services also were found to be of interest to the respondents, but to a lesser proportion (21.7% of respondents for bikeshare, and 22.75% of respondents for carshare). Therefore, it

can be summarized that there is interest from the survey respondents in using rideshare, bikeshare, and carshare services, but to a different extent for each of the services.

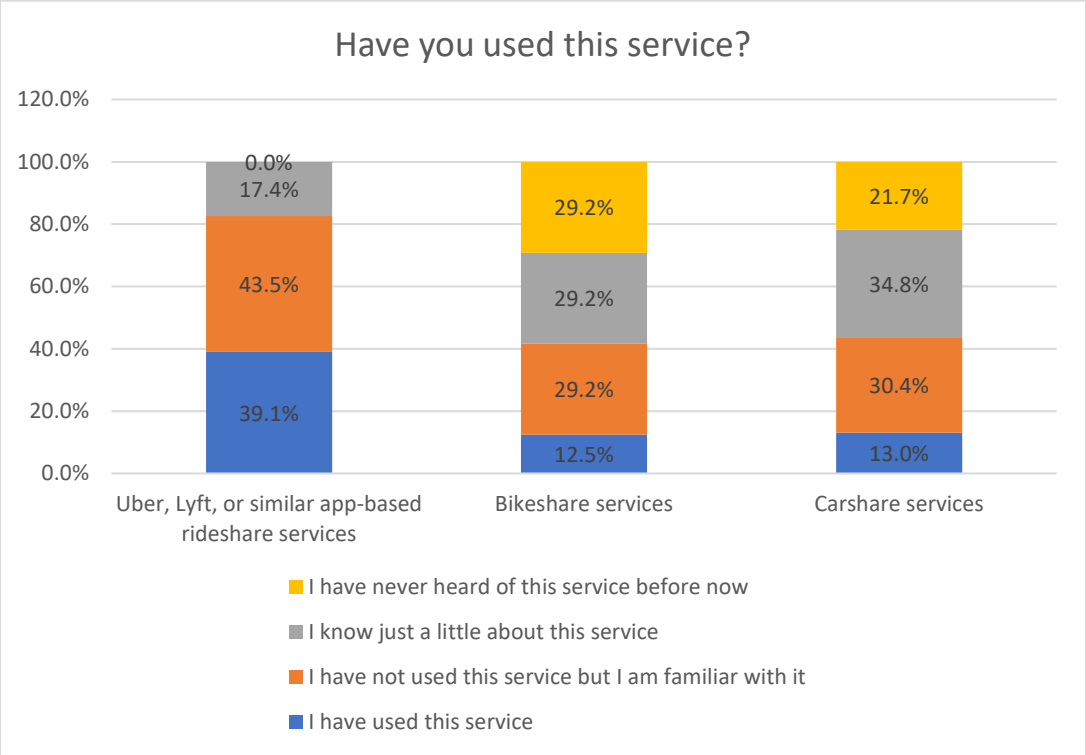

Figure 3.10 Summary of findings for rideshare, bikeshare, and carshare usage, N=24

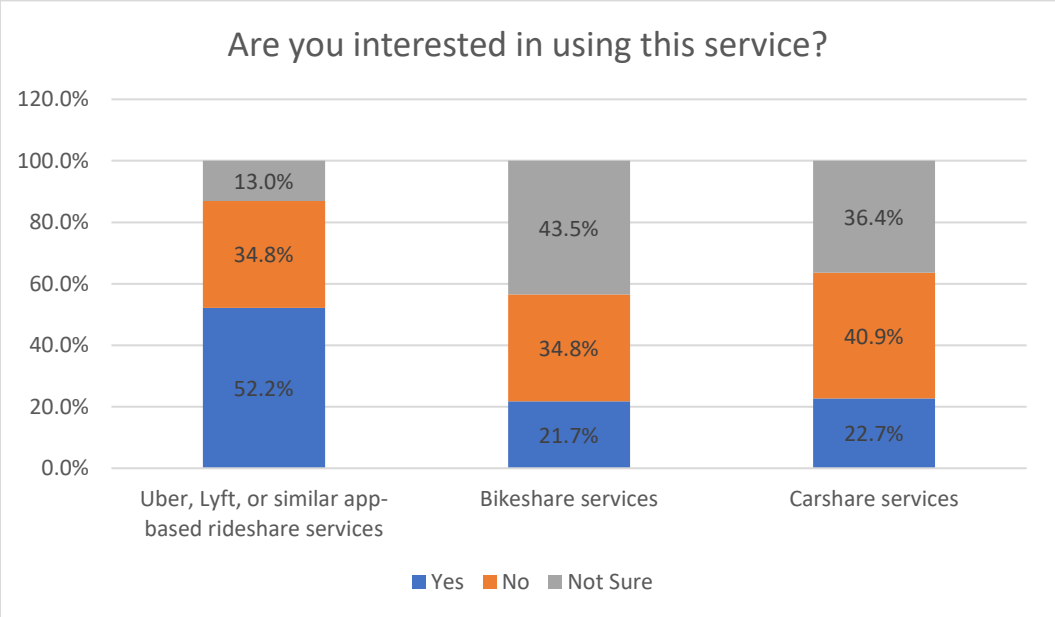

Figure 3.11 Interest in using the service if available in your community, N=24

In addition to learning if the respondent has used shared-use mobility service or was interested in using the shared-use mobility service if available, additional questions were asked to determine if the respondent agrees or disagrees with a statement that says it is important for rideshare/bikeshare/carshare services to be available to their community's residents. Findings for these questions are presented in Figure 3.12. None of the respondents disagreed with the statements presented indicating that each type of shared-use mobility service (rideshare, bikeshare, or carshare) has some level of importance to the respondents for providing transportation options and meeting mobility needs of their community. While some respondents took a neutral stand regarding the importance of rideshare, bikeshare, or carshare services being important to their community residents, most of the respondents said they agree or strongly agree those services are important (Figure 3.12).

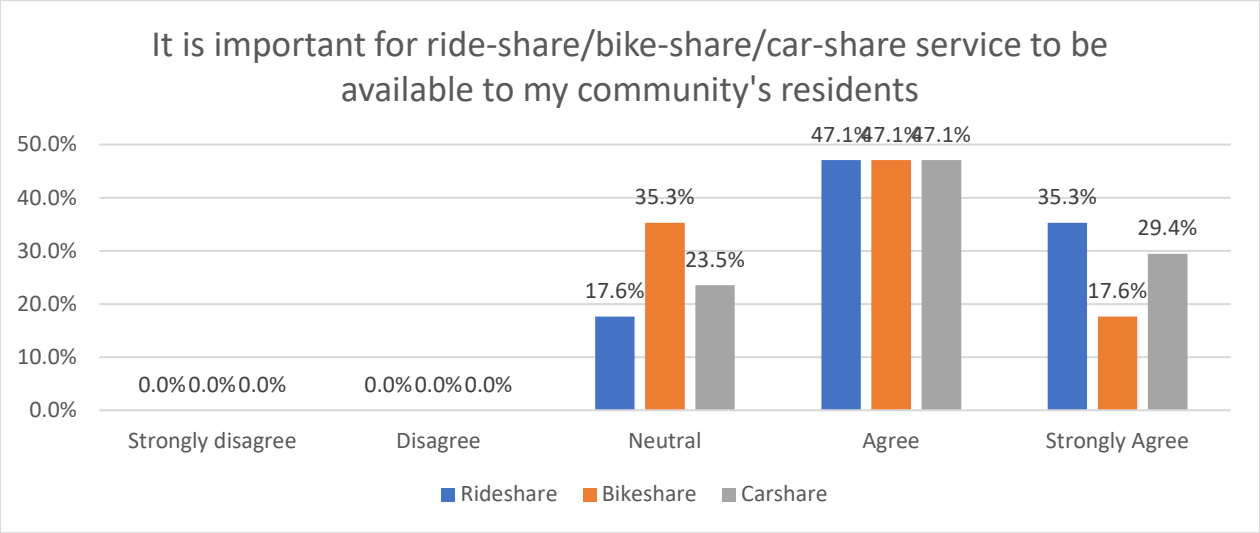

Figure 3.12 Importance of rideshare, bikeshare, and carshare services to your community residents, N=24

Some hand-written comments were also provided by the respondents which reinforced the fact that shared-use mobility services, as well as any other inexpensive transportation options would benefit their community. Below are some of the comments provided by the respondents.

"*I think (it is) very important to have inexpensive ride options for our community. There are many people who would benefit greatly.*"

"*Transportation services in (our community) are almost non-existent. We should use these (shared use mobility) services.*"

4. INTEREST OF SHARED-USE MOBILITY SERVICES FROM TRIBAL COMMUNITY STAKEHOLDERS

While the study of current shared-use mobility implementations in tribal communities and the case study have provided valuable information on the scope of interest in shared-use mobility services in some tribal communities, there is a need to gather a more comprehensive understanding on what tribal communities across the country feel about potential shared-use mobility implementations; if there are existing transportation gaps that could be addressed by rideshare, carshare, and bikeshare services; and what are the challenges that tribal communities could face towards using technology-enabled transportation services. To address this need, interviews were conducted with tribal community stakeholders across the nation.

Appendix D includes the questions used and format followed for conducting tribal community stakeholder interviews. The interviews are primarily planned to be conducted online via email and providing a survey link where tribal community contacts could provide responses and feedback. The research team has an internal list of rural and tribal transit/transportation agency contact information. This list was used to reach out to all tribal transit/transportation contacts in the United States via email in April 2023. Reminder emails were also sent to boost the response rate. This effort resulted in a total of 10 completed interviews from tribal community stakeholders. Table 4.1 and 4.2 summarizes responses from all the 10 tribal community stakeholder interviews. Figure 4.1 shows the map with the 10 responding stakeholder locations. As evident from the tables and figure, the interviews conducted are spread out across tribal communities in the United States and represent a sample of diverse tribal communities. Interviews were conducted with tribal community contacts in Alaska, California, Montana, North Dakota, Oklahoma, Oregon, and Washington.

According to the interviewee's responses, all except two tribal communities has public transit. All kinds of public transit services (traditional fixed-route, flexible-route, ADA-complementary paratransit, demand-response for general public, intercity, etc.) are available across the 10 tribal communities represented from the interviews. However, services that are most common across the tribal communities include traditional fixed-route, demand-response for general public, and ADA complementary paratransit. While there are a wide variety of public transit services available in the tribal communities represented by the interviewees, it is interesting to note from Table 4.1. and Table 4.2 that a majority of the communities still have people in the tribal area that do not have access to transportation. This observation signifies that the current available public transit services are not sufficient and that there are existing transportation gaps.

For a question asking if the interviewees are knowledgeable about shared-use mobility services such as rideshare, carshare, bikeshare, or microtransit services, only one mentioned that they do not know about them. The rest of the respondents said they know them briefly or very well. Tribal community stakeholders' knowledge about current innovative transportation services is very important for exploring creative ways to use them to address tribal transportation issues and explore opportunities for securing grants to pilot innovative tribal shared-use mobility services.

Table 4.1 Summary of Responses from Tribal Stakeholder Interviews

S. No	Interviewee's Organization	City, State	Does your community have Public Transit?	Type of Services Available	Are there people in the tribal area that do not have access to transportation?	Are you knowledgeable about shared-use mobility services such as rideshare, carshare, bikeshare, or microtransit services?	Do you think some form of rideshare, carshare, bikeshare, or microtransit service could be beneficial to your tribal community?	Which type of shared-use mobility service do you think could potentially benefit your community?
1	Standing Rock Public Transit	Fort Yates, ND	Yes	Demand-Response, Intercity	Yes	Yes, I know them briefly	Yes	Rideshare, Carshare, Bikeshare, Microtransit
2	Eastern Washington University	Spokane, WA	Yes	Traditional fixed-route, Flexible-route, ADA-complementary paratransit	Yes	Yes, I know them very well	Yes	Rideshare, Carshare, Microtransit
3	Oklahoma Department of Transportation	Oklahoma City, OK	Yes	Traditional fixed-route, ADA-complementary paratransit		Yes, I know them very well	Maybe	Rideshare, Carshare, Microtransit
4	Chemehuevi Indian Tribe	Chemehuevi, CA	No		Yes	No, I do not know them	Yes	Rideshare, Carshare, Microtransit
5	Confederated Tribes of the Umatilla Indian Reservation - Kayak Public Transit	Pendleton, OR	Yes	Traditional fixed-route, ADA-complementary paratransit	Some outlying and remote areas have limited transit access (Yes)	Yes, I know them very well	Maybe	Rideshare, Carshare, Microtransit

Table 4.2 Continuation of Table 4.1 - Summary of Responses from Tribal Stakeholder Interviews

S. No	Interviewee's Organization	City, State	Does your community have Public Transit?	Type of Services Available	Are there people in the tribal area that do not have access to transportation?	Are you knowledgeable about shared-use mobility services such as rideshare, carshare, bikeshare, or microtransit services?	Do you think some form of rideshare, carshare, bikeshare, or microtransit service could be beneficial to your tribal community?	Which type of shared-use mobility service do you think could potentially benefit your community?
6	Confederated Salish and Kootenai Tribes - Montana	Pablo, MT	Yes	Demand-Response, Inter-city	No	Yes, I know them briefly	Not sure	NA
7	Kalispel Tribe of Indians	Cusick, WA	Yes	Traditional fixed-route, Flexible-route, ADA-complementary paratransit, Demand-response for general public	No	Yes, I know them briefly	Yes	
8	Chickaloon Native Village	Chickaloon, AK	Yes	Demand-response for general public		Yes, I know them briefly	Yes	Rideshare, Microtransit
9	Bristol Bay Native Association	Dillingham, AK	No		Yes	Yes, I know them very well	Maybe	Rideshare, Microtransit
10	Squaxin Island Tribe	Shelton, WA	Yes	Traditional fixed-route, Demand-response for general public	No			

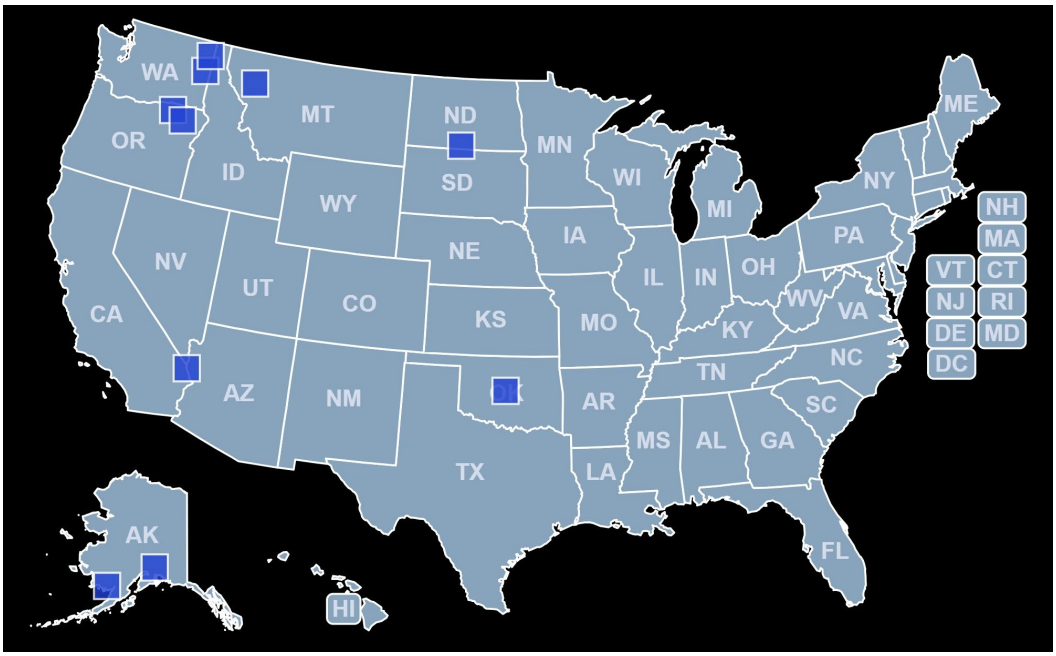

Figure 4.1 Location of tribal stakeholder respondents

About half of the interviewees (5 out of 10) though that some form of rideshare, carshare, bikeshare, or microtransit service could be beneficial to their tribal community. Rideshare, carshare, and microtransit services seemed to be the most popular services that interviewees think could benefit their communities. Based on the review of current implementations in Chapter 2, microtransit services seemed to be the single-most-successful share-use mobility service in the very few tribal communities that are implementing shared-use mobility services. Apart from the microtransit service implementations that are reviewed in Chapter 2, the research team learned that Confederated Salish and Kootenai Tribes, Pablo, MT, was preparing to run a VIA microtransit service starting in September 2023.

Many tribal communities share certain characteristics that make them possible candidates for shared-use mobility services such as rideshare, carshare, bikeshare, or microtransit services. Those community characteristics include a need to provide efficient transportation services in spread-out communities to connect people travelling to and from employment, and entertainment centers, the potential for cost/fuel savings to meet personal mobility needs, a need for transportation services for tribes with high levels of poverty, demand for bikeshare programs in tribal colleges, for increased mobility options in the communities, etc. Some other specific responses by the interviewees in this context are presented below.

"Our Tribe is on the road system and vastly spread out. Sharing trips would cut back the amount of costs on individuals using their own individual vehicles for each trip and would cost share fuels/expenses."

"Any form of public transport (public or private) that was subsidized would be beneficial to the community as a whole. Scheduled or on-call transit that increased mobility would make life better and depending on the degree of engagement, there could be other societal benefits too."

"I believe any of these modes of transportation would help our community members that are in need of some sort of transportation to go from one place to another. Funding is the main problem."

Some of the challenges tribal communities encounter when deciding to introduce shared-use mobility services include lack of funding opportunities, potential to have continued funding for sustainable operations if funding is secured to start a program, lack of broadband internet coverage, very low technology or smartphone application usage by potential riders, long travel distances, lack of population base to support a sustainable service, lack of bike infrastructure, etc. For exploring shared-use mobility services, some tribal community stakeholders preferred funding without a need for match and without a need for sovereignty waiver issues. Some other specific responses by the interviewees in this context are presented below.

"Lack of funding and lack of internet coverage. Also, riders in our area don't use technology like most. We tried using a mobile app for our transit system and people preferred calling into our dispatch number."

"Lack of any continuous use or reliable demand and lack of funding is always an issue in rural areas. Also, most our areas (villages) don't have the population base to support any sustainable service: e.g. some can't even support a local store."

"There are programs and funding available to start a program in one form or another; but keeping it going is a whole different story."

In summary, it can be concluded that there are definitely transportation gaps in the tribal communities as revealed in the stakeholder interviews and the current public transit services may not completely meet all the transportation needs of tribal residents. Tribal community stakeholders seemed knowledgeable about technology-enabled shared-use mobility services and believe shared-use mobility service could benefit their communities. Providing funding opportunities and addressing the challenges in implementation of shared-use mobility service could promote shared-use mobility services in tribal areas.

5. SUMMARY AND CONCLUSIONS

While there are 570 federally recognized tribes in the United States, only a very few shared-use mobility implementations in tribal communities have begun and only very recently. Shared-use mobility services such as rideshare, carshare, bikeshare, microtransit, etc. are explored in this study using a three-pronged approach. Initially, an exploratory literature scan was conducted of the past, present, and forthcoming tribal shared-use mobility service implementations. Next, a case study was conducted with residents from nine tribes within the Cherokee Nation and the Northeast Oklahoma Tribal Transit Consortiums to learn about the potential interest among tribal residents to use rideshare, carshare, and bikeshare services – these tribes are selected for a case study because there is an active Uber rideshare/microtransit implementation and the probability of residents knowing about technology-enabled shared-use mobility service could be higher than in a typical tribal community. Finally, interviews are conducted with tribal community stakeholders from across the nation to gather insights on interest, opportunities, and challenges in implementing shared-use mobility services in tribal communities. Based on findings and observations from these three different approaches, microtransit and carshare services seemed to be the most favored and relevant shared-use mobility services available to meet the unique transportation needs of tribal communities. One of the consistent observations from the three approaches is that tribal community residents are not tech savvy and are not in favor of using smartphone apps to request and purchase rideshare, carshare, bikeshare, and microtransit services. Therefore, it is important for tribal mobility providers to initially rely on having a call-in number to arrange for the rides/trips, accept cash payments when applicable, and to continuously focus on training efforts to educate riders to move towards using smartphone apps. Observation from the case study showed that more than 90% of the tribal residents have access to smartphone and are interesting in owning a smartphone. Because most tribal residents probably having smartphones, proper education efforts can help tribal residents explore the available smartphone apps to better access shared-use mobility services.

Most of the available existing literature on tribal shared-use mobility implementations are in the area of microtransit services. Blackfeet Transit agency in Montana partnered with Via to provide door-to-door dynamically-routed microtransit service for riders travelling within the Blackfeet Reservation, Browning and nearby towns. The Grand Gateway Economic Development Association partnered with Uber to develop an on-demand microtransit service named PICK transportation to fill the transportation gap in after-work hour transportation services in rural and tribal areas of eastern Oklahoma. The Confederated Salish and Kootenai Tribes in Montana also set to run a Via microtransit service starting September 2023. Carshare services also seemed popular among tribal communities.

Two tribal communities in California (Cahuilla Tribe, and Twenty-Nine Palms Band of Mission Indians) were awarded grant funding to start a carshare program, however, there is not much information available yet on the two tribal carshare programs.

LimeBike bikeshare program launched with a lot of publicity in 2018 only resulting in failure to continue its operations within one year. Having bike-services in tribal communities is challenging because, typically, there is no available infrastructure for safe bicycling, and there are long travel distances in tribal areas. Case study survey respondents from nine tribes within the Cherokee Nation and the Northeast Oklahoma Tribal Transit Consortiums also rated the quality of bikeability as only "acceptable." Interviews with tribal community stakeholders across the country have shown that bikeshare programs can be helpful to tribal communities at certain locations such as colleges, casinos, etc., where bicycle infrastructure is present.

A case study conducted with the Cherokee Nation and the Northeast Oklahoma Tribal Transit Consortiums helped learn about tribal residents' understanding of transportation needs, gaps in the existing service, knowledge about shared-use mobility services and their potential applicability to their tribal communities, and interest in using rideshare, bikeshare, and carshare services if available in their community. Based on the survey findings from 24 tribal survey respondents, rideshare services were the most utilized or familiar shared-use mobility service among the respondents compared to bikeshare and carshare services. This could be attributed to the popularity of rideshare services like Uber and Lyft in the United States, which respondents may have used during travel to larger cities. Respondents may also be familiar with the Uber microtransit service available in their area. Regarding interest in using shared-use mobility services if available in their community, rideshare services were the most popular choice among respondents, with slightly more than half (52.2%) expressing willingness to use the service. Bikeshare and carshare services also generated interest, but among a smaller proportion of respondents (21.7% for bikeshare and 22.75% for carshare).

The initial findings from shared-use mobility implementations within tribal communities are largely encouraging. Tribal stakeholders and residents from the case study community showed keen interest in adopting these innovative mobility services. However, this interest is contingent upon proper consultation and planning with tribal leaders during the deployment process. The authors believe that tribal community stakeholders have the potential to explore one or more of these technology-enabled mobility options utilizing existing or new funding opportunities. This could significantly enhance mobility within the communities, benefitting residents. For mobility providers interested to provide service in tribal communities, establishing trust with tribal residents, leaders and stakeholders is paramount to the success of shared-use mobility operations within those communities.

The authors believe that, given the novelty of shared-use mobility services in tribal communities, further follow-up studies are necessary to comprehensively assess current operations. As more shared-use mobility implementations are expected in the coming years, there will be an opportunity to conduct assessments across a broader range of tribal communities. This would provide valuable insights to inform various tribal communities about the potential for such operations.

The future scope of research in this area could include conducting a cost-benefit analysis to determine an economic option between rideshare or microtransit services is economical when compared to expanding the public transit services; exploring the potential for tribal owned and operated shared-use mobility services; identifying challenges with tribal shared-use mobility implementations and addressing them with policy changes; etc.

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7. APPENDIX A – COVER LETTER AND SURVEY QUESTIONNAIRE

SMALL URBAN AND RURAL CENTER ON MOBILITY

448 Quentin Burdick Building | NDSU Dept 2880 | PO Box 6050 | Fargo ND 58108-6050

Dear Participant,

We invite you to participate in a research study being conducted by The Small Urban and Rural Center on Mobility at North Dakota State University. The purpose of this study is to learn about the interest of shared-use mobility services in your community. Shared-use mobility comprise of ride-share services offered by companies such as Uber, Lyft. Etc.; bike-share services offered by companies such as B-Cycle, Zagster, etc.; car-share services offered by companies such as Car2go, Zipcar, etc.

If you are age 18 or over, please take about 5 to 7 minutes to share your opinion by completing the survey by January 25th, 2023 11:59PM CST. All answers are confidential and responses will only be reported in aggregate. At the end of the survey you will have an option to enter your email address or phone number if you want to be **entered into a drawing for one of two $50 Amazon eGift Cards**. Gift card drawings will be held on February 10, 2023, and the winners will be provided with Amazon eGift Card codes on the same day.

If you have any questions about this project, please contact Dr. Ranjit Godavarthy (ranjit.godavarthy@ndsu.edu / 701-231-6436) or Dr. Jill Hough (jill.hough@ndsu.edu / 701.793.1364).

You have rights as a research participant. If you have questions about your rights or complaints about this research, you may talk to the researcher or contact the NDSU Human Research Protection Program at 701.231.8995, toll-free at 1-855-800-6717, by email at ndsu.irb@ndsu.edu, or by mail at NDSU HRPP Office, NDSU Dept. 4000, P.O. Box 6050, Fargo, ND 58108-6050.

START HERE **PAGE 1 OF 2**

1. How much do you agree or disagree with the following statement?
"I can easily travel to places I need to go in my community using my current travel options."

Strongly disagree	Disagree	Neutral	Agree	Strongly agree
○	○	○	○	○

2. How much do you agree or disagree with the following statement?
"It is important for public transit to be available to my community's residents."

Strongly disagree	Disagree	Neutral	Agree	Strongly agree
○	○	○	○	○

3. Do you currently live on the reservation? ○ Yes ○ No

4. Rate the quality of each aspect of transportation in your community right now: *Check one per row.*

	Very poor	Poor	Acceptable	Good	Very good
Public transit services	○	○	○	○	○
Bikeability	○	○	○	○	○
Low traffic congestion	○	○	○	○	○
Walkability / accessibility	○	○	○	○	○
Roads in good condition	○	○	○	○	○

5. Do you use a smartphone?
- ○ Yes
- ○ I have not used a smartphone but I am familiar with it
- ○ I know just a little about smartphones
- ○ I have never heard of smartphones before now

6. Are you interested in owning a smartphone?
- ○ Yes, I currently own or have owned a smartphone
- ○ Yes, I am interested in owning a smartphone in the future
- ○ No, I am not interested in owning a smartphone

PLEASE READ. Ride-Share Services: Ride-Share services are prearranged and on-demand transportation services for compensation in which drivers and passengers connect via digital applications. Digital applications are typically used for booking, electronic payment, and ratings. Examples: Uber, Lyft, etc.,

7. Have you used Uber, Lyft, or similar app-based ride share services?
- ○ I have used this service
- ○ I have not used this service but I am familiar with it
- ○ I know just a little about this service
- ○ I have never heard of this service before now

8. Are you interested in using Uber, Lyft, or similar app-based ride share services if available in your community?
- ○ Yes
- ○ No
- ○ Not Sure

PLEASE READ. Bike-Share Services: Bike-Share services provides users with on-demand access to bicycles at a variety of pick-up and drop-off locations for one-way (point-to-point) or roundtrip travel. Examples: B-Cycle, Zagster, etc.,

9. Have you used bike-share share services?
- ○ I have used this service
- ○ I have not used this service but I am familiar with it
- ○ I know just a little about this service
- ○ I have never heard of this service before now

10. Are you interested in using bike-share services if available in your community?
- ○ Yes
- ○ No
- ○ Not Sure

CONTINUE ON PAGE 2 ↘

PLEASE READ. Car-Share Services: Car-Share is a model of car rental where people can rent cars for short periods of time, often by the hour. Examples: Car2go, Zipcar, etc.,

11. Have you used car-share services?

- ○ I have used this service
- ○ I have not used this service but I am familiar with it
- ○ I know just a little about this service
- ○ I have never heard of this service before now

12. Are you interested in using car-share services if available in your community?

- ○ Yes
- ○ No
- ○ Not Sure

13. How much do you agree or disagree with the following statement?

"It is important for ride-share service to be available to my community's residents."

Strongly disagree	Disagree	Neutral	Agree	Strongly agree
○	○	○	○	○

14. How much do you agree or disagree with the following statement?

"It is important for bike-share service to be available to my community's residents."

Strongly disagree	Disagree	Neutral	Agree	Strongly agree
○	○	○	○	○

15. How much do you agree or disagree with the following statement?

"It is important for car-share service to be available to my community's residents."

Strongly disagree	Disagree	Neutral	Agree	Strongly agree
○	○	○	○	○

16. What is your age?

- ○ 18 to 24 years
- ○ 25 to 44 years
- ○ 45 to 64 years
- ○ 65 or older

17. What is your gender?

- ○ Male
- ○ Female
- ○ Prefer not to answer
- ○ Other: _____

18. What is your annual household income before taxes?

- ○ Less than $20,000
- ○ $20,000 to $44,999
- ○ $45,000 to $99,999
- ○ $100,000 to $149,999
- ○ $150,000 or more
- ○ Prefer not to answer

19. Do you have driver's license?

- ○ Yes
- ○ No

20. How many working vehicles (cars, trucks, and motorcycles) are available in your household? _____

21. Which of the following best describes your current employment status? *Check all that apply.*

- ☐ Employed for wages
- ☐ Self-employed
- ☐ Out of work and looking for work
- ☐ Out of work but not currently looking for work
- ☐ A homemaker
- ☐ A student
- ☐ Military
- ☐ Retired
- ☐ Unable to work
- ☐ Prefer not to answer

22. Please share any final comments you have regarding a potential ride-share, bike-share, or car-share service for your community:

_____

_____

_____

8. APPENDIX B – NDSU IRB APPROVAL

NDSU NORTH DAKOTA STATE UNIVERSITY

12/22/2022

Dr. Ranjit Prasad Godavarthy
Upper Great Plains Transport

Re: IRB Determination of Exempt Human Subjects Research:
Protocol #IRB0004610, "Interest of Shared-Use Mobility Services in Tribal Communities"

NDSU Co-investigator(s) and research team:

- Ranjit Prasad Godavarthy
- Jill Annette Hough

Approval Date: 12/22/2022
Expiration Date: 12/21/2025
Study site(s): Cherokee Nation Tribe, Oklahoma North East Tribal Transit Consortium, Oklahoma Choctaw Nation, Oklahoma
Funding Source:

- Small Urban, Rural and Tribal Center on Mobility

The above referenced human subjects research project has been determined exempt (category 2) in accordance with federal regulations (Code of Federal Regulations, Title 45, Part 46, *Protection of Human Subjects*).

Please also note the following:

- The study must be conducted as described in the approved protocol.
- Changes to this protocol must be approved prior to initiating, unless the changes are necessary to eliminate an immediate hazard to subjects.
- Promptly report adverse events, unanticipated problems involving risks to subjects or others, or protocol deviations related to this project.

Thank you for your cooperation with NDSU IRB procedures. Best wishes for a successful study.

NDSU has an approved FederalWide Assurance with the Department of Health and Human Services: FWA00002439.

RESEARCH INTEGRITY AND COMPLIANCE
NDSU Dept 4000 | PO Box 6050 | Fargo ND 58108-6050 | ndsu.research@ndsu.edu
Shipping Address: Research 1, 1735 NDSU Research Park Drive, Fargo ND 58102
NDSU is an EO/AA university

9. APPENDIX C – CHOCTAW NATION IRB APPROVAL

Choctaw Nation of Oklahoma

Institutional Review Board

OHRP FWA Number: 00001128
OHRP IRB Number: 00004293

One Choctaw Way • Talihina, OK 74571
(918) 567-7000, Ext. 6014

Gary Batton
Chief

Jack Austin, Jr.
Assistant Chief

December 16, 2022

Ranjit Godavarthy, Ph.D.
Associate Professor, Department of Transportation, Logistics, and Finance
North Dakota State University
Dept. 2880, PO Box 6050
Fargo, ND 58108-6050

RE: Shared-Use Mobility Services in Tribal Communities
Protocol Exemption Date: December 16, 2022

Dear Dr. Godavarthy,

The Choctaw Nation of Oklahoma Institutional Review Board (CNO IRB) reviewed the above referenced research protocol. Based on the information provided, this protocol was deemed to be exempt research in accordance with criteria of the Choctaw Nation of Oklahoma Institutional Review Board Charter which follows the guidelines set forth in 45 CFR Part 46, under Exemption Category 2: Anonymous Educational Tests, Surveys, Interviews, or Observations; and the principles of the Belmont Report, for the protection of human research participants. It is the expectation of the CNO IRB that the rights and protection of the individuals in this study will be respected.

As principal investigator of this protocol, it is your responsibility to ensure this study is conducted as presented, and to submit any protocol modifications to the CNO IRB promptly to assure the research protocol is eligible to remain in an exempt status. All research study related records, including copies of signed consent forms, should continue to be retained in a manner consistent with the intent of the Health Information Portability and Accountability Act (HIPAA), if applicable, for a minimum of three (3) years following the termination of the research project.

You, as the principal investigator, along with your sponsoring institution, are accountable to ensure this research project is carried out in a legal, moral, and ethical manner. Failure to do so, will jeopardize not only your exempted research protocol, but any and all protocols supported by your sponsoring institution, and active with the CNO IRB.

Choctaw Nation of Oklahoma

Institutional Review Board

OHRP FWA Number: 00001128
OHRP IRB Number: 00004293

One Choctaw Way • Talihina, OK 74571
(918) 567-7000, Ext. 6014

Gary Batton
Chief

Jack Austin, Jr.
Assistant Chief

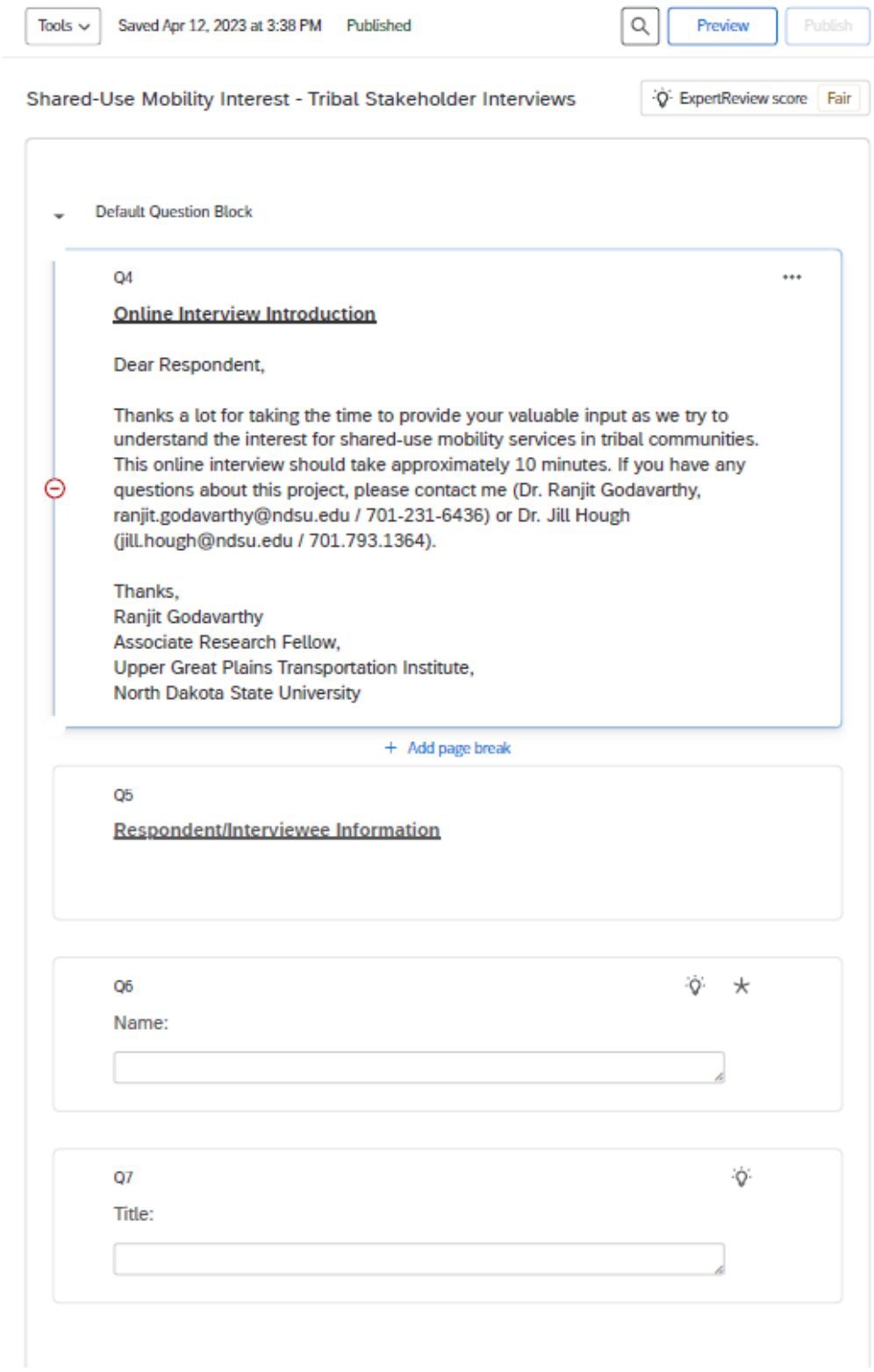
The CNO IRB reserves the right for editorial review and comment on any material to be published, or presentations given to individuals not affiliated with the Choctaw Nation of Oklahoma. The CNO IRB should be notified well in advance of any intent to publish material related to this research. It is your responsibility to allow the CNO IRB at least 20 days for this review, and approval must be obtained ***prior*** to final submission of the material for publication or presentation. If you have questions concerning these procedures or need any additional assistance from the CNO IRB, please contact Carey Fuller, CNO IRB Administrative Director at 918-567-7000 ext. 6014 or cmfuller@cnhsa.com.

Sincerely,

Carey Fuller

Carey Fuller, BA, CPH
Institutional Review Board Administrative Director
Choctaw Nation of Oklahoma Institutional Review Board

10. APPENDIX D – QUESTIONS AND FORMAT USED FOR TRIBAL STAKEHOLDER INTERVIEWS


Tools
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Published
Preview
Publish
Shared-Use Mobility Interest - Tribal Stakeholder Interviews
ExpertReview score
Fair
Default Question Block
Q4
Online Interview Introduction
Dear Respondent,
Thanks a lot for taking the time to provide your valuable input as we try to understand the interest for shared-use mobility services in tribal communities. This online interview should take approximately 10 minutes. If you have any questions about this project, please contact me (Dr. Ranjit Godavarthy, ranjit.godavarthy@ndsu.edu / 701-231-6436) or Dr. Jill Hough (jill.hough@ndsu.edu / 701.793.1364).
Thanks,
Ranjit Godavarthy
Associate Research Fellow,
Upper Great Plains Transportation Institute,
North Dakota State University
Add page break
Q5
Respondent/Interviewee Information
Q6
Name:
Q7
Title:

Q8

Organization Name:

Q9

City:

Q10

State:

Import from library | Add new question

Add Block

Block 1

Q14 *

Does your community currently have access to some sort of public transportation service for community members or visitors? If 'yes', please provide what type of service is avaialble.

- Yes
- No
- Not Sure

Q15

If you answered "yes" above, can you mention what type of transportation services are available in your community?
(Select all that apply)

- ☐ Traditional fixed-route
- ☐ Flexible route
- ☐ ADA complementary paratransit
- ☐ Demand-response for general public
- ☐ Other (please provide details)

Q16

Are there people within the reservation that do not have access to transportation?

Import from library | Add new question

Add Block

Block 2

Q17

Are you knowledgeable about shared-use mobility services such as ride-share, car-share, bike-share or microtransit services?

- ○ Yes, I know them very well
- ○ Yes, I know them briefly
- ○ No, I do not know them

Q18

Quick Overview of Shared-Use Mobility Services

Ride-share services: Ride-Share services are prearranged and on-demand transportation services for compensation in which drivers and passengers connect via digital applications. Digital applications are typically used for booking, electronic payment, and ratings. *Examples:* Uber, Lyft, etc.,

Bike-share services: Bike-Share services provide users with on-demand access to bicycles at a variety of pick-up and drop-off locations for one-way (point-to-point) or roundtrip travel. *Examples:* B-Cycle, Zagster, etc.,

Car-share services: Car-Share is a model of car rental where people can rent cars for short periods of time, often by the hour. *Examples:* Car2go, Zipcar, etc.,

Microtransit services: Microtransit is defined as a privately or publicly operated, technology-enabled transit service that typically uses multi-passenger/pooled shuttles or vans to provide on-demand or fixed-schedule services with either dynamic or fixed routing. When compared to regular public transit services, a ride on Microtransit service has a quicker response time and a ride can be requested 15 or 20 minutes before a trip is needed. Microtransit services can be thought of as on-demand transit services that operate similar to ride-share services such as Uber and Lyft, but the trips are provided in larger vehicles, and passengers traveling in the same direction are matched.
Example: Via Transportation.

Q19 ✶

Do you think some form of ride-share, car-share, bike-share, or microtransit service could be beneficial to your tribal community?

- ○ Yes
- ○ Maybe
- ○ No
- ○ Not sure

Q20

Which type of shared-use mobility service do you think could potentially benefit your community?
(Select all that apply)

- ☐ Ride-share
- ☐ Car-share
- ☐ Bike-share
- ☐ Microtransit
- ☐ Other form (please specify)
- ☐ Not applicable

Q21

What are some of your tribal community's characteristics you believe could lend themselves to benefiting from shared-use mobility services such as ride-share, car-share, bike-share, or microtransit service?

Q23

What strategies/measures from policymakers do you think would help promote ride-share, car-share, bike-share, or microtransit service implementations in tribal communities?

Q22

What potential challenges do you anticipate your tribal community could encounter if you decide to introduce shared-use mobility services such as ride-share, car-share, bike-share, or microtransit?(Examples could include lack of demand, lack of funding for attracting private mobility providers, lack of broadband internet coverage, longer travel distances, etc.,)

Q23

Do you have any final comments or feedback regarding the availability of shared-use mobility services in tribal communities?

Import from library | Add new question

Add Block

Block 3

Import from library | Add new question

Add Block

End of Survey

We thank you for your time spent taking this survey.

Your response has been recorded.