Wisconsin Non-Driver Transportation Behavior Study

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16. Abstract

This study explores the transportation challenges faced by non-drivers in Wisconsin, a population comprising aging adults, individuals with disabilities, low-income residents, and those without access to vehicles. Non-drivers account for approximately 31% of the state's population, with rural areas experiencing the greatest mobility barriers due to limited transportation options. The research aimed to understand the transportation needs, behaviors, and challenges of non-drivers and their support networks, termed "non-driver-adjacent" individuals, who often provide rides or other transportation assistance. A statewide survey of 1,268 respondents, including 505 non-drivers and 763 non-driver-adjacent individuals, collected insights into the reasons for not driving, transportation options used, service satisfaction, and unmet needs. Key barriers identified included the cost of vehicle ownership, lack of a driver's license, disabilities, and inadequate public transit coverage. While family-provided rides were highly rated, public and paratransit services received lower satisfaction due to limited availability and long travel times. The study offers actionable recommendations, such as expanding public transit, enhancing pedestrian infrastructure, introducing affordable ride-sharing programs, and leveraging technology for real-time transit tracking. These strategies aim to improve mobility, reduce social isolation, and ensure equitable access to services for non-drivers. The findings provide a foundation for WisDOT as well as other policymakers across the state to develop inclusive, sustainable transportation systems in Wisconsin, as well as other policymakers across the state.

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EXECUTIVE SUMMARY

A comprehensive research initiative was undertaken to explore the transportation challenges faced by non-drivers in Wisconsin. This study, commissioned by the Wisconsin Department of Transportation (WisDOT), involved a statewide survey targeting both non-drivers and their support networks to identify key barriers, assess existing transportation options, and evaluate service quality. The survey collected responses from 1,268 participants, including 505 non-drivers and 763 non-driver-adjacent individuals, providing robust insights into the needs and experiences of these populations.

Key Findings:

1. Reasons for Not Driving:
    - **Driver's License**: A significant proportion (33%) of non-drivers lack a driver's license, often due to financial barriers such as the cost of driver education or licensing fees. This issue disproportionately affects young adults and low-income groups, with individuals earning less than $25,000 annually being the most impacted.
    - **Vehicle Costs**: Approximately 28% of respondents cited vehicle-related expenses, including purchase, maintenance, and insurance costs, as a primary barrier to driving. This challenge is particularly acute for middle-income groups balancing rising living expenses.
    - **Disabilities**: Disabilities — physical, mental, and age-related — were a significant factor, affecting 23% of respondents. Older adults and unemployed individuals were particularly impacted, emphasizing the need for accessible transportation options.

2. Transportation Options:
    - **Public Transit**: Limited availability in rural areas and indirect routes in urban areas significantly increase travel times. For instance, rural respondents often face lengthy waits and multiple transfers to access essential services.
    - **Family and Friends**: While 72% of non-drivers reported being highly satisfied with rides provided by family or friends, scheduling conflicts and dependency concerns limit this option's reliability.

- **Active Transportation**: Weather conditions and inadequate infrastructure deter walking and cycling. Respondents noted safety concerns such as poorly maintained sidewalks and a lack of dedicated cycling lanes.
- **Ride-Hailing Services**: High costs were a recurring concern, with most respondents stating that ride-hailing services are not affordable for daily use.

3. Quality of Transportation Services:
    - **Cost**: High transportation costs, including public transit fares and ride-hailing fees, limit accessibility, particularly for low-income individuals.
    - **Travel Time**: Long waits and circuitous routes were reported as major issues, with respondents citing delays in reaching appointments or work.
    - **Availability**: Transportation service gaps were most pronounced in rural areas, where public transit and ride-hailing options are minimal or nonexistent.

Recommendations:

In collaboration with the Project Oversight Committee (POC), the research team identified actionable strategies to enhance transportation accessibility for non-drivers and their support networks, with the following prioritized ones:

- **Expand Public Transit**: Increase coverage and frequency in rural and underserved urban areas. This includes extending operating hours and reducing the number of transfers needed for common routes.
- **Enhance Infrastructure**: Invest in better sidewalks, crosswalks, and cycling lanes to support safe and accessible active transportation options.
- **Develop Ride-Sharing Programs**: Introduce community-based, affordable ride-sharing services tailored to the needs of non-drivers, particularly in areas with limited public transit.
- **Provide Financial Subsidies**: Implement targeted financial assistance programs to reduce costs for low-income individuals, such as discounted transit fares or vehicle ownership support.
- **Leverage Technology**: Deploy real-time transit tracking systems, improve paratransit scheduling, and promote smartphone applications that streamline ride-hailing and transportation coordination.

Conclusion:

By implementing these recommendations, policymakers, transportation providers, and community organizations can collaboratively create a more inclusive and efficient transportation system in Wisconsin. Such a system will address the unique challenges faced by non-drivers, improve mobility options, and enhance overall quality of life. Continued research is encouraged to refine strategies and deepen understanding of transportation needs, especially for vulnerable populations.

1. INTRODUCTION

1.1. Background

Non-driving populations consist of diverse groups, such as aging adults, students, children, low-income individuals, and those with disabilities, as well as individuals who choose not to drive, lack access to a vehicle, or have limited transportation options. All these populations may encounter substantial mobility challenges leading to limited access to economic opportunities, medical and other essential services, healthy food, reduced participation in community activities and resulting in isolation, particularly in the state's rural areas.

The Wisconsin Department of Transportation (WisDOT) estimates that 31% of the state's population are non-drivers. Notably, a significant component comprises individuals aged 65 and above, who face significant challenges in driving due to age, disabilities, or financial constraints. This segment of the population is expected to grow substantially, with a 72% projected increase between 2015 and 2040, as reported by the Wisconsin Department of Health Services. This aging trend is particularly noticeable in rural areas, especially in the northern half of the state.

These regions also exhibit moderate to high poverty rates and increasing health concerns according to County Health Rankings. Transportation barriers pose an elevated risk of social isolation and a decrease in quality of life for the non-driving population. Low-income individuals across all age groups frequently encounter considerable mobility obstacles. The National Household Travel Survey (NHTS) data confirms the connection between income levels and transportation barriers, as older adults with household incomes below $15,000 are less likely to own a vehicle compared to their younger counterparts or those with higher earnings. Furthermore, transportation experiences and potential interventions differ significantly between urban and rural settings. The Rural Transit Fact Book highlights such rural/urban distinctions in the types of trips, average trip distance, and mode choice. Previous research has also documented transportation challenges faced by individuals with disabilities encompassing issues related to transportation modality, structural concerns, and technology usage. As such, it is crucial to enhance the transition process for non-drivers and ensure the availability of suitable and equitable mobility options throughout Wisconsin.

1.2. Objectives and Approach

The research objectives are to: (1) understand the transportation needs, behaviors, challenges and opportunities for Wisconsin's non-drivers; (2) examine relevant data that influence the available transportation options on non-drivers' daily activities; and (3) identify non-driver preferences for a range of possible transportation services, technologies, and policies that could improve their mobility.

The approach to the research is to develop and conduct a statewide survey, then collect a representative sample of Wisconsin's population using statistically valid methods, with the consideration of major demographic breakdowns in Wisconsin. Based on the survey results, recommendations and implementation plans will be developed to support informed decision-making to create an efficient multimodal transportation system that meets the specific needs of different non-driving groups.

1.3. Report Structure

The report is organized into six chapters, each addressing specific aspects of the project. Chapter 1 serves as the introduction, providing an overview of the project's background, objective and approach, and report structure. Chapter 2 provides a literature review exploring the unique factors, challenges, and motivations that influence non-drivers' transportation choices, with a focus on prioritizing the specific needs and experiences of non-drivers. Chapter 3 introduces the survey activities of the Wisconsin statewide non-drivers survey, which discusses survey design, pilot testing, data collection, and data retention. Chapter 4 presents the result of the statewide non-driver survey of Wisconsin, covering the socio-economic characteristics of respondents, reasons for not driving, modes of transportation, travel purpose and frequency, importance and satisfaction of transportation options, assessment of service, transportation impact, concerns, suggestions, and latent class analysis. Chapter 5 provides implementation plans to combat challenges non-drivers faced, compiled from the survey results. Finally, Chapter 6 concludes the report by summarizing key findings, discussing challenges non-drivers face, and offering strategic plans for the future.

2. LITERATURE REVIEW

This chapter explores the critical importance of maintaining mobility for non-drivers, an often-overlooked group in transportation planning. It delves into the various challenges faced by non-drivers, highlighting how socio-demographic characteristics such as age, income, and disability status, alongside technological advancements, impact their mobility options. Drawing on insights from previous studies and research, the chapter also provides a range of recommendations aimed at improving accessibility and transportation options for non-drivers. For a more comprehensive review of the literature on this topic, please refer to Appendix A.

2.1. Importance of Maintaining Mobility

Ensuring mobility for non-driving seniors is crucial for maintaining independence, social engagement, and access to essential services. A comprehensive approach involving various stakeholders, as outlined in Dickerson et al.'s analysis [1], is necessary. This includes implementing programs like the Assessment of Readiness for Mobility Transition (ARMT) and expanding transportation options through initiatives like those of the Federal Transit Administration. In terms of measuring transportation system performance, Litman [2] suggests considering traffic, mobility, and accessibility perspectives. Accessibility, particularly relevant for older adults and non-drivers, emphasizes transportation planning that considers their needs and safety, promoting inclusive mobility solutions. Beck et al. [3] delve into the complex relationship between aging and driving behaviors, emphasizing the need to preserve mobility while addressing challenges faced by older drivers. Their study, utilizing latent class analysis (LCA), identifies patterns of driving behaviors influenced by psychological, demographic, and health-related factors. Proposed solutions include specialized education programs and psychosocial support interventions targeting alternative transportation options and coping mechanisms. For a comprehensive overview of the findings from the mentioned research on mobility solutions for seniors and non-drivers, Table 1 is provided.

Table 1: Key Research Findings on Mobility Aspect for Seniors and Non-Drivers

Study	Main Points	Approach	Key Findings/Recommendations
[1]	Multifaceted approach involving stakeholders regarding the importance of mobility	Comprehensive analysis of non-driving seniors	• Implementing educational and assessment programs. • Expansion of transportation options • Strategies for creating coalitions
[2]	Considering traffic, mobility, and accessibility viewpoints, with a particular emphasis on the critical importance of accessibility	Review of transportation system performance measurement methods	• Importance of inclusive mobility solutions, providing alternative transportation options and reducing their dependency on driving • Enhancing pedestrian infrastructure, expanding public transit, implementing traffic calming, and promoting mixed land use for improved community accessibility.
[3]	Investigating complex relationship between aging and driving behaviors	Study on driving avoidance behaviors	• Investigating the impact of psychological, demographic, and health factors on driving behaviors, while supporting interventions for age identity and stress coping. • Creating education programs for alternative transportation, with a focus on ride-hailing, to decrease driving avoidance. • Promoting ride-sharing services through targeted initiatives and highlighting health and medication management to tackle driving-related concerns.

2.2. Challenges Faced by Non-Drivers

Various challenges faced by non-drivers, particularly seniors and individuals with disabilities, were highlighted through survey findings and research. These challenges extend beyond difficulties with walking and accessing transportation services to encompass concerns about safety, affordability, and social isolation. Non-drivers often encounter barriers in navigating their communities, leading to limited access to essential services and activities. Proposed solutions aim to address these multifaceted challenges by not only enhancing public transportation and improving infrastructure but also by fostering community engagement and inclusivity. Additionally, initiatives to provide alternative transportation options tailored to the specific needs of seniors and individuals with disabilities are essential for promoting independence and well-being. Table 2 provides an overview of common transportation challenges experienced by disability groups, while Table 3 outlines related challenges encountered by senior groups, drawing insights from various studies.

Table 2: Common Transportation Challenges for Disability Groups

Study	Main Points	Approach	Key Findings/Recommendations
[4]	• Perceiving public transportation (excluding paratransit) as unhelpful due to inaccessible stops and limited schedules. • Favoring paratransit services but facing challenges like advance planning and service inaccuracies. • Considering rideshare services as an alternative yet confronting limitations in physical access and information availability.	Examining non-driving mobility challenges for individuals with diverse disabilities	• Addressing accessibility, scheduling, and driver assistance in public transportation and paratransit services for people with disabilities. • Improving physical infrastructure for individuals with physical disabilities. • Considering the specific needs of different disability groups in transportation system design.
[5]	• Highlighting barriers such as limited access to affordable transportation and unfamiliarity with options. • Addressing emotional and practical impacts of stopping driving, including dependence and isolation feelings. • Emphasizing caregiver support in facilitating transportation	Analyzing transportation challenges for elderly and young adults with disabilities	• Developing initiatives to address psychological well-being during driving transitions. • Improving access to affordable transportation, particularly in rural areas. • Providing caregiver support for arranging transportation. • Subsidizing ridesharing or establishing community-based transportation networks.
[6]	• Federal transportation policies addressing availability, accessibility, and safety concerns.	Investigating the use of transportation services by Persons Aging with Mobility Disabilities (PAwMD)	• Collaborate with end-users and stakeholders to tailor transportation policies and programs. • Address top barriers to coordination of transportation services for PAwMD • Implement tailored solutions across public and private transportation modes to address lived experiences of PAwMD
[7]	• Struggling to find safe, affordable transportation options.	Surveying transportation access for individuals with disabilities	• Enhancing access to information regarding transportation options. • Improving communication between service providers and clients, fostering collaboration among government bodies, transportation services, and professionals.
[8], [9]	• Improving transit: tackling destination access, seating, and information challenges with a focus on safety, delivery services, and diverse transportation options.	Surveying older adults and individuals with disabilities	• Enhancing transit access, pedestrian safety, and overcoming barriers including service gaps and inconvenient hours.

Table 3: Common Transportation Challenges for Senior Groups

Study	Main Points	Approach	Key Findings/Recommendation
[10]	• Challenges for seniors include perceived distance and safety concerns when walking. • Challenges in accessing taxi and senior van services include availability, wait times, safety, driver behavior, cost, vehicle maintenance, and communication.	Conducting a survey among seniors aged 75 and above.	• Enhancing public transportation services and ensuring accessibility • Improving safety of walking paths and educating communities about senior mobility issues • Developing user-friendly information systems for taxi and senior van services
[11]	• Challenges including physical limitations, accessibility issues, safety concerns, environmental obstacles, and financial strain	Interviewing sixty Respondents aged 60 to 79 with a mobility disability for over a decade	• Targeting interventions in health management to support physical function and independence. • Underscoring engagement in daily activities to enhance aging in place and quality of life.
[12]	• High demand for increased transportation services beyond public transportation offerings. • Difficulty securing transportation for social/recreational activities, work-related purposes, personal errands, and shopping.	Surveying social service providers in Oregon to understand transportation needs of low-income and elderly people	• Expanding transportation services and operating hours for diverse needs like social activities, work, errands, and shopping • Improving connectivity with other services and enhancing access to transportation information.

2.3. Socioeconomic and Demographic Factors

Addressing disparities in access to essential services and opportunities for non-drivers, particularly influenced by income levels, is crucial for societal equity. Various studies highlight the need for targeted interventions to improve transit access, considering factors like healthcare, food, job opportunities, educational institutions, and recreational facilities. These interventions include investments in public transit infrastructure, expansion of transit services, and innovative mobility solutions. Therefore, it is important to design and implement effective strategies tailored to each community's specific needs, ultimately fostering more inclusive and resilient transportation systems. Table 4 and Table 5 subsequently summarize research studies that investigate the influence of demographic factors and income situation on transportation behavior, presenting key insights and findings.

Table 4: Influence of Demographic Factors on Transportation Behavior

Study	Main Points	Approach	Findings/Recommendations
[13]	• Determining the various demographic groups constituting non-drivers in Washington State. • Identifying the demographics and mobility needs of surveyed non-drivers through a market research survey.	Analyzing the availability of transportation options and their impact on non-drivers' access to daily life activities.	• Emphasizing the need to enhance transportation infrastructure and expand transit services for timely access to diverse facilities. • Implementing shuttle services, ridesharing programs, and micro-transit to enhance mobility and address transit access gaps. • Collaboration among transportation agencies, local governments, community organizations, and stakeholders plays a key role in developing and implementing effective solutions.
[14]	• Examining factors influencing mobility including age, household size, housing density, and community context.	Analyzing travel behavior of non-driving seniors aged 75 and older	• Noting mobility decline with age and reduced trip-making in larger households, countered by increased trip-making in apartment living, higher housing density, and affluence among elderly non-drivers. • Addressing mobility limitations due to safety concerns, with policy implications for improving transportation access.
[15]	• Examining transportation challenges and emphasizing the crucial role of local governments in enhancing mobility.	Reviewing policies and services in six cities for low-income, rural, and elderly populations	• Examining inner-city Los Angeles minority elderly favoring walking and public transport for short trips, with lower car ownership than suburban counterparts, exploring evolving mobility patterns. • Improving bus schedule accessibility, incentivizing ride-hailing for low-income elderly, expanding taxi vouchers, fostering ride-hailing partnerships, advocating for telehealth stations, and improving internet access in low-income elderly communities.
[16]	• Emphasizing cultural differences, proposed solutions include diverse transportation options, community advocacy, and culturally sensitive interventions	Focusing on immigrant and refugee populations among diverse older adults	• Collaborating among community members, transportation experts, and policymakers is crucial for implementing a comprehensive approach.
[17]	• Persisting in gender differences in driving, older men are more likely to drive, but this gap narrows, especially among those 85+.	Analyzing travel behavior and mobility patterns across demographics, utilizing NHTS data to examine shifts from 2001 to 2009.	• Expressing a strong desire for increased mobility, individuals with medical conditions or disabilities make fewer trips. • Facing heightened concerns, people with disabilities encounter challenges regarding accidents, congestion, and travel costs.
[18]	• Identifying significant associations among the elderly, household income, urban residence, household region, vehicle ownership, gender, worker status, education level, and group membership.	Using NHTS and HPTS data for analyzing elderly activity-travel behavior.	• Encountering increased risks of social isolation, elderly individuals living alone have limited mobility options, necessitating special attention. • Implementing community outreach programs, tailored transportation services, and initiatives to foster social connections can mitigate social isolation among older adults.

Table 5: Influence of Income on Transportation Behavior

Study	Main Points	Approach	Findings/Recommendations
[19]	• Elderly individuals (aged 65 and older) encounter public transportation challenges due to physical disabilities, affordability issues, and limited healthcare access. • Young adults (16-24) express concerns about job security and missed opportunities. • Those aged 25-44 face challenges with gas prices and vehicle acquisition.	Conducting a comprehensive community transportation needs survey within Douglas and Sarpy County by ENCAP.	• Common challenges encompass unaffordable ride-sharing, high gas prices, and dissatisfaction with public transit's limited-service hours and inconvenient transfers. • Specific issues with MOBY/Paratransit services included late arrivals, cancellations, high costs, and challenges for visually impaired individuals with curb-to-curb service.
[20]	• Contrasting urban areas with a preference for alternative transportation and low car ownership against suburban and rural areas with higher car ownership and limited public transit access.	Analyzing 2009 NHTS data to examine factors influencing transportation choices among various socioeconomic groups.	• Examining disparities in car ownership influenced by cultural preferences, household size, and residential location. • Implementing subsidized transport initiatives and financial aid for vehicle ownership to address transportation disparities and promote social inclusivity.
[21]	• Examining transportation challenges limiting economic opportunities and job accessibility.	Reviewing policies and services for non-drivers and individuals with low incomes in six cities.	• Emphasizing the role of vehicle access in enhancing job prospects for low-income individuals. • Assessing the impact of housing vouchers on economic well-being. • Demonstrating the relationship between housing policy, residential outcomes, and economic well-being, including welfare-to-work voucher program evaluations and commuting inequality examinations in various areas.
[22]	• Contrasting higher-income respondents with broader transportation choices, less concerned about the financial impact of stopping driving, with lower-income individuals facing more obstacles and emphasizing the need for income-sensitive transit solutions.	Examining income adequacy and perceptions of driving cessation through interview-based analysis.	• Emphasizing planning and support services in transition periods. • Addressing challenges for rural residents post-driving cessation from limited public transport access, leading to isolation and dependency.
[23]	• Correlating high income inequality regions with lower health and well-being for those with the lowest incomes.	Examining income inequality effects on health outcomes.	• Understanding and addressing the impact of income inequality on health outcomes requires new research and policy approaches.

2.4. Technological Impacts

Developing supportive technologies is crucial for addressing challenging or obstructed sections of routes, especially concerning a wide range of disabilities. For example, mobile apps could offer up-to-date details on accessible routes or alternative transportation options for those with mobility limitations. Based on revision of previous research, those suggested to develop assistive technologies for individuals facing transportation challenges, such as providing real-time information on accessible routes via mobile applications like Google

Maps and Be My Eyes. Additionally, resources like Plan for the Road Ahead are needed to address concerns about pre-booking transportation and uncertainty about available services. Research on ridesharing adoption scenarios evaluates their impact on urban congestion using mobile phone records and surveys, offering insights for policymakers. Ridesharing services are valued for their convenience but raise equity concerns, particularly for non-drivers and low-income individuals. Strategies to enhance ridesharing accessibility include inclusive business models, geographic expansion, and multilingual support. Smartphone usage influences transportation preferences, with a slight decline in auto usage noted in urban areas, emphasizing the importance of improving public transportation and bridging the digital divide. Initiatives like the Portland Smart Cities UB Mobile PDX focus on developing smart mobility solutions for underserved communities, addressing barriers such as limited access to essential items and concerns about online security. According to the comprehensive summary of transportation research studies presented in Table 6, various research has been conducted to investigate the impact of technologies on transportation behavior of non-driver groups.

Table 6: Studies on the Impact of Technology on Non-Drivers

Study	Key/Main Points	Findings/Recommendations
[4], [15], [22]	• Implementing assistive technologies to expand transportation options for older adults with ride-sharing apps and electric vehicle car-sharing. • Utilizing navigation apps like Google Maps and Be My Eyes for orientation.	• Highlighting the importance of resources such as the Plan for the Road Ahead platform to address pre-booking transportation and service uncertainty in communities. • Optimizing apps to include disability-friendly features like alerts for unsuitable sidewalks is significant.
[24]	• Evaluating changes in key metrics such as vehicle miles traveled and congested travel time under different adoption scenarios. • Conducting a survey of ridesharing adoption rates among drivers and non-drivers.	• Analyzing real-world travel patterns and behaviors using data from mobile phone records. • Understanding the potential effects of ridesharing on urban congestion. • Providing insights for policymakers and transportation planners to adapt ridesharing strategies.
[25]	• Thoroughly exploring equity considerations related to ridesharing usage, particularly for low-income individuals and those with limited English proficiency. • Identifying access challenges faced by specific demographic groups.	• Implementing strategies like inclusive business models and affordable pricing to tackle economic disparities. • Highlighting geographic expansion and technology optimization for better accessibility in rural areas. • Incorporating multilingual support and collaborating with disability advocacy groups for diverse user needs. • Utilizing data-driven decision-making and feedback loops to prioritize equity and enhance user experiences.
[26]	• Investigating the impact of transportation choices, smartphone internet usage frequency, income, location, and age on transportation preferences. • Noting variations in smartphone internet usage across age groups and regions, with higher rates among younger demographics and urban areas.	• Underscoring the importance of bridging the digital divide in rural and low-income communities with initiatives like subsidized smartphone plans. • Advocating for tailored interventions for vulnerable groups such as low-income communities and the elderly, including fare subsidies and community-based transportation services.

Study	Key/Main Points	Findings/Recommendations
[27]	• Leveraging smart mobility technologies to enhance transportation in disadvantaged communities by lowering costs and improving public transit, ridesharing, and active transportation services. • Security concerns and limited internet access hinder the adoption of smart mobility technologies, especially among older adults and financially vulnerable households.	• Enhancing public transit information on smartphone apps and improving access to public data. • Implementing policies to reduce barriers to electric vehicle adoption. • Providing translations for smart mobility applications in multiple languages.

2.5. Potential Solutions and Strategies

Various challenges and potential solutions regarding transportation accessibility for non-drivers, particularly older adults, and individuals with disabilities, have been addressed in recent research (Table 7). Suggestions include the development of assistive technologies to overcome transportation barriers and the promotion of community-based initiatives and Volunteer Driver Programs (VDPs). Additionally, recommendations for policymakers emphasize the importance of enhancing public transit information, implementing universal design principles, and leveraging partnerships with ride-hailing companies to improve transportation access for vulnerable populations. Furthermore, efforts to address disparities in transportation access include the introduction of specialized transportation services and the implementation of innovative on-demand transportation solutions. However, funding shortages and declining volunteer numbers remain significant challenges, highlighting the ongoing need for sustained investment and support in ensuring equitable access to transportation for all individuals.

Table 8, Table 9, and Table 10 depict challenges and solutions for non-driving populations, emphasizing seniors, disabilities, and low-income groups.

Table 11 outlines policy strategies to improve transportation equity and accessibility comprehensively. Leveraging these insights and targeted solutions, policymakers can aim to develop more inclusive, efficient, and sustainable transportation systems that meet diverse community needs.

Table 7: Overview of Mobility Solutions Regarding Non-Drivers' Issues

Study	Key/Main Points	Findings/Recommendations
[28]	• Decreasing alternative transportation usage among older adults implies a reliance on personal vehicles or dependence on rides from family and friends. • Maintaining mobility for health and social engagement necessitates accessible alternative transportation modes. • Implementing alternative transportation methods enhances cognitive well-being, promotes active lifestyles, and fosters community engagement.	• Implementing community-based participatory research (CBPR) yielded four new senior transportation initiatives: Senior Circulator, Lyfting Villages, Travel Training, and Safe Routes to Age in Place. • Developing inclusive, community-driven transportation alternatives should prioritize the unique needs and contributions of older adults to enhance fairness and participation in transportation planning and usage.
[29]	• Improving rideshare services and automated vehicles for older adults' transportation needs.	• Implementing community-based initiatives such as volunteer driver programs (VDPs) to meet transportation needs and reduce isolation, especially in rural areas. • Incorporating universal design principles into transportation planning to create inclusive environments that promote active aging.
[30], [31], [32], [33], [34]	• Offering door-to-door assistance (Wisconsin's network of VDPs) • Filling transportation gaps in areas with limited bus access, VDPs enable long-distance travel and rides outside typical business hours. • Exploring demographic metrics related to VDP use and delivery, assessing community capacity and service needs.	• Discovering solutions that include specialized services by Curative Connections and on-demand options like Green Bay Metro. • Considering challenges from funding shortages and declining volunteer numbers in ensuring equitable transportation access for all. • Conducting additional research to evaluate community capacity and demand for volunteer transportation programs is essential.
[35]	• Seniors face significant accessibility challenges in seeking healthcare, which limits transportation options for medical appointments. • Relying on others for transportation indicates an accessibility gap, even among physically capable patients. • There is a lack of familiarity with ride-sharing apps.	• Identifying physical and financial constraints as barriers to accessing transportation for medical visits. • Patients, including those living far from their doctors, hesitated to cover transportation costs. • Introducing a prepaid card program to provide transportation aid for Medicare beneficiaries, offering flexibility in choosing suitable transportation modes for medical appointments.
[36]	• Proposing a performance measurement technique to assess accessibility enhancements for non-drivers, especially in public transportation-dependent American municipalities.	• Identifying factors influencing better-walking non-drivers leaving home, including nearby Activity Location Units (ALUs) and bus stops. • Highlighting regional accessibility disparities, emphasizing the importance of extensive bus networks and strategically located activity locations.

Table 8: Challenges and Solutions Related to “Senior Groups”

Challenge	Solution
Dependency on others	• Promote and expand volunteer driving programs and peer-to-peer ride-sharing initiatives. • Develop community-based transportation services that cater to seniors' needs, providing door-to-door assistance for essential trips.
Inconveniences in using public transit	• Improve public transit systems by adjusting schedules, enhancing accessibility to stops, and optimizing overall travel time. • Design and implement exclusive real-time information programs to inform seniors of bus arrival times and service updates, reducing wait times and uncertainty.
Participating in social and recreational activities	• Create specialized transportation services and community programs to facilitate seniors' access to social and recreational activities. • Establish senior centers and community hubs equipped with transportation services to connect seniors with local events and gatherings.
Access to healthcare	• Implement dedicated healthcare transportation services for seniors, ensuring timely access to medical appointments and treatment facilities. • Collaborate with healthcare providers and organizations to coordinate transportation for seniors requiring specialized medical care.
Safety concerns	• Improve sidewalks, install more crosswalks, and increase the visibility of safety signs to enhance pedestrian safety for seniors.
Difficulties with getting onto and exiting buses	• Implement low-floor buses with ramps and deploy adequate training for drivers to assist seniors in boarding and disembarking safely. • Provide priority seating and designated areas for seniors on buses, making it easier for them to access and navigate public transit vehicles.
Frequency and wait times for buses	• Increase the frequency of bus services, especially during peak hours for seniors, and decrease wait times. • Implement demand-responsive transit services that allow seniors to request rides on-demand, reducing the reliance on fixed bus schedules.
Reducing mobility for older adults	• Offer a range of transportation alternatives tailored to senior needs, including on-demand ride services, wheelchair-accessible vehicles, and specialized transportation options. • Provide subsidies for transportation services and fare discounts for seniors, making transportation more affordable and accessible for older adults with limited mobility.
Transitioning to non-driving mobility	• Develop and promote programs that support seniors in transitioning from driving to alternative modes of transportation, offering education, training, and assistance as needed. • Facilitate access to mobility aids (e.g., on-demand transportation options) and assistive devices (e.g., mobility walkers and wheelchairs) to empower seniors with non-driving mobility options.

Table 9: Challenges and Solutions Related to "Disability Groups"

Challenge	Solution
Struggle with physically demanding routes (steep, slippery).	• Upgrade infrastructure to ensure accessibility, including the maintenance of sidewalks, ramps, and pedestrian crossings.
The lack of alternative transportation options	• Develop more transportation alternatives tailored to the needs of individuals with disabilities, such as community shuttles, paratransit services, and accessible rideshare programs. • Subsidize transportation costs for individuals with disabilities to make alternative options more affordable and accessible.
Despite the existence of discounted rides or vouchers, many individuals do not use them.	• Increase awareness of available discounts and voucher programs through targeted outreach campaigns and community partnerships. • Simplify the application process for discounted rides and vouchers to reduce barriers to participation and ensure that eligible individuals can access these benefits easily.
Dependence on family and friends for transportation	• Enhance community and volunteer-driven transportation programs that provide door-to-door assistance for individuals with disabilities, reducing reliance on family and friends. • Collaborate with local organizations and non-profits to expand transportation support networks and provide more options for individuals who need assistance with mobility.
Paratransit service issues like restricted scheduling and cost	• Optimize paratransit operations through the implementation of better scheduling technology, allowing for more flexible and efficient service delivery. • Increase the capacity of paratransit services to meet growing demand by investing in additional vehicles, hiring more drivers, and expanding service coverage areas.
Technology use	• Invest in smart technology solutions such as mobile apps and real-time tracking systems to improve accessibility and convenience for individuals with disabilities. • Provide training and support to ensure that individuals with disabilities can effectively use and benefit from assistive technologies and transportation apps.
Significant scheduling challenges (Access to healthcare and pharmacy)	• Introduce more on-demand transportation services to address scheduling challenges, particularly for accessing essential healthcare services and pharmacies. • Collaborate with healthcare providers and pharmacies to coordinate transportation services and offer extended hours or late-night transportation options for individuals with disabilities.

Table 10: Challenges and Solutions Related to "Low-Income Groups"

Challenge	Solution
Reliance on inconvenient or unsafe public transit & walking options	• Enhance public transit systems by increasing the frequency of services, expanding coverage areas. • Invest in pedestrian infrastructure enhancements, including the construction of sidewalks, crosswalks, and pedestrian bridges, to create safer and more accessible walking routes for all pedestrians.
Limited access to drivers' licenses	• Implement programs that provide financial assistance or subsidies to cover the costs associated with obtaining a driver's license, including application fees, driver education courses, and license testing fees. • Offer support services that guide individuals through the process of obtaining a driver's license, including assistance with paperwork, transportation to testing centers, and access to educational resources on driving regulations and safety.
Social isolation	• Develop community transportation services such as shuttle services to community centers, recreational facilities, or social events, providing low-income individuals with opportunities for social interaction and engagement.
Struggle to access educational institutions and related activities	• Introduce or expand school bus services and public transit routes to ensure that low-income students have reliable transportation options to access educational institutions and participate in extracurricular activities. • Provide subsidies or financial assistance programs for transportation costs related to education, including school bus passes, public transit tickets, or vouchers for ride-sharing services, to alleviate the financial burden on low-income families.
High cost of alternative transportation	• Offer financial assistance programs, such as vouchers or discounts, for ride-sharing services, taxis, or other alternative transportation modes, to make them more affordable and accessible for low-income individuals.
Dependency on others	• Increase the availability and awareness of affordable, reliable transportation options such as VDPs, which provide door-to-door assistance for low-income individuals who may otherwise rely on family or friends for transportation.
Transportation challenges can limit job opportunities	• Create targeted job access programs that provide transportation support, including subsidized transit passes, shuttle services to job centers, or partnerships with employers to offer transportation benefits to low-income employees.
Limited access to transportation in rural or underserved areas	• Expand transportation services to rural and underserved areas through the introduction of on-demand transit solutions, community shuttles, or partnerships with local transportation providers to ensure equitable access to transportation for low-income residents. • Advocate for increased investment in rural transportation infrastructure, including road maintenance, public transit services, and ride-sharing programs, to address transportation disparities and improve mobility options for individuals living in rural or underserved communities.
Inflexible transportation schedules	• Adjust and increase the frequency of transportation services during early morning, late evening, and weekends to accommodate the diverse schedules and needs of low-income individuals, including those working non-traditional hours or accessing essential services outside of typical operating times. • Implement flexible routing or on-demand transit services that allow users to request transportation on short notice, providing greater flexibility and convenience for low-income individuals with varying transportation needs and schedules.

Table 11: Integrated Policy Approaches to Enhance Transportation Equity and Accessibility

Category	Description	Hurdles/Barriers
Infrastructure	Public transportation; pedestrian pathways and cycling infrastructure; paratransit for individuals with disabilities, rideshare programs	Funding and prioritization; Coordination among multiple agencies
Information	Offering details on routes, schedules, fares, and accessibility features; public transportation information	Access to technology; Timeliness and accuracy; Availability of physical materials
Technology	Using apps for real-time public transit updates, online ride-sharing platforms, services for booking paratransit, and navigation aids for pedestrians	Economic factors; Cultural and language barriers; Accessibility for disability groups
Policy	Improved public transportation services, infrastructure development for safer walking and cycling, funding for paratransit services, and incentives for community car-sharing programs.	Funding; Monitoring and evaluation; Coordination among agencies
Program	Community transportation services, paratransit, travel training, and other supportive services (transit options for seniors, individuals with disabilities, and low-income commuters)	Coordination; Awareness; Funding
Funding	Funding for public transit, paratransit, walking and biking infrastructure, and other mobility services.	Obtaining long-term commitment for funding

3. WISCONSIN SURVEY

3.1. Overview

The purpose of our survey is designed to gather both quantitative and qualitative data, enabling a comprehensive understanding of the non-driving population travel behavior in Wisconsin.

The research team conducted a statewide questionnaire survey for:

- Non-driver group which encompasses reasons for not driving, demographic factors such as age, gender, income levels, rural or urban residence, and race/ethnicity. Driver licensing status, vehicle ownership, lifestyle, and disability status were also addressed, along with the available transportation options and their impact on access to essential services, economic opportunities, recreational activities, education, and other vital aspects of community life. Non-drivers' travel needs, frequency, available and preferred modes of transportation for accessing daily life activities, including multijurisdictional travel, to identify opportunities for improvement in Wisconsin were also explored. The effectiveness or ineffectiveness of various transportation options, mobility means, along with the reasons behind preferences as well as providing insights on the infrastructure, services, and technologies to integrate into mobility options were also addressed.
- Non-driver adjacent group which encompasses reasons for giving rides, types of non-driver household members, disability status of non-driver household members, and frequency of providing rides. Arranging transportation for non-driver household members and the impact and challenges of providing ride were also addressed. The improvement of infrastructure, transportation option, services, and technology to communicate and arrange rides were also explored.

The following sections in this chapter are organized as: 1) introducing the survey planning, involving five activities: survey question design; pilot testing; sample design; data collection; and data retention, 2) presenting the statewide survey results for the non-drivers group and the non-driver adjacent group, and 3) briefly discussing and summarizing the statewide survey result of both the non-drivers group and the non-driver adjacent group. Detailed surveys of both the non-drivers and non-driver adjacent group can be found in Appendix B.

3.2. Survey Planning

3.2.1. Decision Basis for Survey Design

For this study, a list of key topics for feedback and for keeping the proper focus of the survey included:

- **Driving Barriers:** What are the reasons for choosing not to drive? Socio-economic, medical, or accessibility?
- **Transportation Options:** What are the available transportation options for the users?
- **Transportation Service Quality:** In the opinion of users, how can the quality of service be improved? In the opinion of users, what are the most important features of transportation services?

3.2.2. Survey Activities

This survey plan involved three activities: survey question design, pilot testing, and data collection.

3.2.2.1. Survey Design

The survey investigated various aspects of non-drivers' transportation experiences, including reasons for not driving and demographic factors like age, gender, income, and residence type. It also explored driver licensing, vehicle ownership, lifestyle, employment and disability status, along with the impact of transportation options on access to essential services and activities. Additionally, the survey assessed non-drivers' travel needs, frequency, preferred transportation modes, and the effectiveness of current transportation options, while gathering insights on infrastructure, services, and technologies they wanted integrated into their mobility options.

The survey was developed based on a review of the literature, findings from previous surveys, and the identification of key issues related to transportation for diverse groups of non-driver populations. Some of the critical areas identified for the survey included current mobility, experiences and challenges with various transportation modes.

The survey includes four sections, with the full survey provided in Appendix B. The first section asks screening questions to determine whether respondents are part of the non-driver or non-driver adjacent populations. The second section asks demographic questions. The third section, the main survey for non-driver populations, includes questions about the reasons for being a non-driver, travel frequency and mode, usability of transportation options, access to daily life activities, and the impact of transportation. It also includes questions related to the

importance and performance (satisfaction) of transportation modes. For non-driver adjacent groups, the main survey includes questions related to the types of other non-driving household members they provide rides to, the reasons for giving rides, and the frequency and ease of accessing different activities while providing rides to non-driving household members. The fourth section consists of open-ended questions that allow respondents to provide additional comments on any concerns regarding travel or participation in activities, suggestions for improving transportation options, and ideas about using apps and smartphones to meet their transportation needs. For non-driver adjacent groups, additional questions are included, such as describing concerns about how transportation affects their non-driving household members' ability to participate in activities, how giving rides to non-driving household members affects their own life, and suggestions for improving transportation options for non-driving household members, including the use of accessible apps or smartphones. Both groups—non-drivers and non-driver adjacent—are asked the same demographic questions; however, the main survey and open-ended questions differ between these groups. The key criteria for participation in the survey are that respondents must be over 18 years old and reside in the state of Wisconsin.

Screening Questions are used to filter out drivers, focusing on non-drivers and non-driver adjacent groups. The following screening questions are asked:

- Is a vehicle available for your use within your household?
- As the primary driver, how do you typically use this vehicle?
- Do you ever use the vehicle to help meet the transportation needs of other non-driving household members?

Additionally, the market research survey featured questions focused on access to transportation options, daily life activities, and demographic information. Neutral language was carefully used in both the questions and response options to prevent influencing respondents’ answers. This ensured that respondents were not swayed in any particular direction. The survey also provided options such as "other" with a write-in choice and "prefer not to say" for those who wished to skip a particular question but still complete the survey. Open-ended questions were included at the end to give respondents the opportunity to share additional experiences that may not have been captured by the closed-ended questions. Furthermore, questions were designed for an Importance-Performance Analysis (IPA) to

evaluate key factors affecting non-drivers and assess how well those factors are performing in the current context, with the goal of identifying actionable plans for improving services for the non-driver population, in addition to conducting other analyses.

The survey questions were developed in cooperation with the University of Tennessee-Knoxville. An early draft of the survey was submitted to WisDOT, and a few revisions were made based on their feedback. To ensure quality and alignment with the survey's objectives, all questions were reviewed and approved by WisDOT to ensure consistency with their goals. To encourage broad participation, the survey was made available in two formats: an online version and a paper form, both of which included a QR code for easy access.

3.2.2.2. Pilot Testing

Drafts of the questionnaire survey were pilot tested using a cognitive interviewing process. With this process, pretest respondents (i.e., members from both the research team and project oversight committee, as well as the identified subject matter experts) first completed the survey and proposed their comments and suggestions as they proceeded through each question. The investigator then followed up by on-line meetings for their comments/suggestions. This process offered the project team a chance to assess how questions were perceived and understood, appropriateness of language and wording, and overall impressions of the survey.

3.2.2.3. Data Collection

Questionnaire web surveys were conducted from July 15, 2024, through August 15, 2024. The paper surveys and QR code were conducted from August 19, 2024, through September 6, 2024. The web surveys were distributed statewide by UT CARE, with strong support from IPIT. The paper survey and QR code were distributed by WisDOT, in collaboration with the Wisconsin Public Transportation Association (WIPTA).

3.2.2.4. Data retention

Responses were aggregated and no individual data will be reported. Data from the survey will be held for three months after completion of the project.

4. DATA ANALYSIS

This section presents survey findings, which are organized into two parts, which is the non-drivers and the non-drivers adjacent. Both sections will provide the respondents with socio-demographics in relation to their own sections as well as responses to challenges and concerns based on the open-ended questions asked. The non-driver group will answer questions in regard to reasons for not driving, travel purposes and frequency, mode of transportation, and experience of using such transportation options. As for the non-driver adjacent group, it will present answers to reasons for providing ride, travel purposes and frequency, and responsibility for arrangements of different transportation options.

4.1. Survey Result

4.1.1. Overview of Returned Responses

Based on the complete survey responses, out of 1,268 respondents, 505 belong to the non-driver population (Table 12), and 763 belong to non-driver adjacent groups (Table 13). For the 505 categorized non-driver respondents, only 498 respondents provided their ZIP codes. For the 763 categorized non-driver adjacent respondents, only 760 respondents provided their ZIP codes.

Table 12: Total Non-Drivers Respondent of Survey

County	Total population	Estimated non-driving population	Population aged 15 and over (+15)	Estimated non-driving population (+15)	Survey Response
Milwaukee	949,180	40% or more	757,619	30% - 40%	178
Dane	542,459	30 – 40%	45,0277	10% - 20%	27
Sheboygan	115,152	20 – 30%	94,300	10% - 20%	26
Rock	162,532	20 – 30%	131,576	10% - 20%	25
Waukesha	402,637	20 – 30%	333,014	10% - 20%	20
Kenosha	168,998	30 – 40%	13,7594	10% - 20%	18
Winnebago	170,924	30 – 40%	141,916	10% - 20%	17
Brown	262,559	30 – 40%	210,743	10% - 20%	15
Outagamie	186,829	20 – 30%	150,548	0% - 10%	15
Manitowoc	78,977	20 – 30%	65,726	10% - 20%	13
Eau Claire	104,132	30 – 40%	86,537	20% - 30%	9
Portage	70,822	30 – 40%	59,602	10% - 20%	9
La Crosse	118,168	30 – 40%	98,826	10% - 20%	9
Fond du Lac	102,654	20 – 30%	84,624	10% - 20%	8
Dodge	87,569	20 – 30%	73,472	10% - 20%	7

County	Total population	Estimated non-driving population	Population aged 15 and over (+15)	Estimated non-driving population (+15)	Survey Response
Racine	195,859	30 – 40%	158,563	10% - 20%	7
Marathon	135,485	20 – 30%	109,890	10% - 20%	6
Sauk	64,152	20 – 30%	52,066	10% - 20%	6
Wood	72,892	20 – 30%	59,811	0% - 10%	6
Lafayette	16,682	30 – 40%	13,391	10% - 20%	5
(blank)[1]	-	-	-	-	72
Total Respondents	-				505

Table 13: Total Non-Drivers Adjacent Respondent

County	Total population	Estimated non-driving population	Population aged 15 and over (+15)	Estimated non-driving population (+15)	Survey Response
Milwaukee	949,180	40% or more	757,619	30% - 40%	180
Waukesha	402,637	20 – 30%	333,014	10% - 20%	55
Dane	542,459	30 – 40%	45,0277	10% - 20%	52
Brown	262,559	30 – 40%	210,743	10% - 20%	39
Racine	195,859	30 – 40%	158,563	10% - 20%	28
Kenosha	168,998	30 – 40%	13,7594	10% - 20%	26
Rock	162,532	20 – 30%	131,576	10% - 20%	26
Outagamie	186,829	20 – 30%	150,548	0% - 10%	25
Winnebago	170,924	30 – 40%	141,916	10% - 20%	25
Marathon	135,485	20 – 30%	109,890	10% - 20%	18
Eau Claire	104,132	30 – 40%	86,537	20% - 30%	17
Walworth	103,391	20 – 30%	86,013	10% - 20%	15
La Crosse	118,168	30 – 40%	98,826	10% - 20%	14
Washington	135,529	20 – 30%	111,488	0% - 10%	14
Wood	72,892	20 – 30%	59,811	0% - 10%	14
Jefferson	84,837	20 – 30%	70,353	10% - 20%	13
Waupaca	50,997	20 – 30%	42,541	0% - 10%	11
Dodge	87,569	20 – 30%	73,472	10% - 20%	9
Sauk	64,152	20 – 30%	52,066	10% - 20%	8
Sheboygan	115,152	20 – 30%	94,300	10% - 20%	8
(blank)	-	-	-	-	163
Total Respondents	-				498

4.1.2. Socio-demographic Characteristics

As one of the important portions of the survey questionnaire, respondents were asked about

[1] This means that the respondents didn't indicate the county

their socio-demographic characteristics, including:

- Gender
- Age
- Race and Ethnicity
- Native Language
- Employment Status
- Annual Household Income
- Primary Zip code Residence
- Type of Residence
- Number of People Living With
- Hold Valid Driver License

4.1.2.1. Non-Drivers

Out of the 496 non-driver respondents of the statewide survey, females comprise a larger portion of the survey respondents (66.1%) compared to males (33.9%) in Figure 1. The survey indicates a significant representation across different age groups, with the highest percentage (30.5%) falling within the 45-64 age range, suggesting this group may be the most impacted or interested in non-driver-related transportation issues. The lowest participation comes from the 18-24 age range (14.0%) and those over 65 (12.2%) in Figure 2.

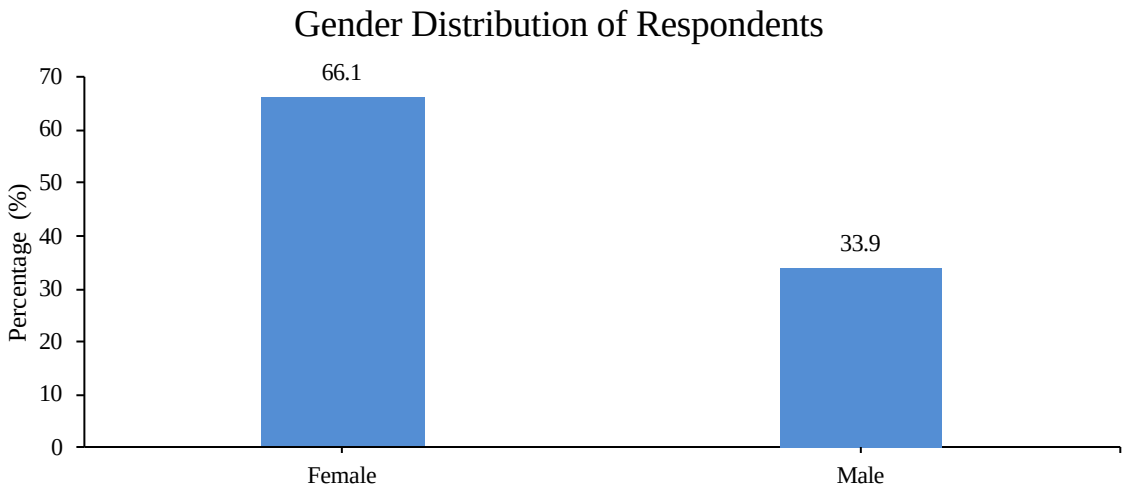


Figure 1: Gender of Non-Driver Respondents

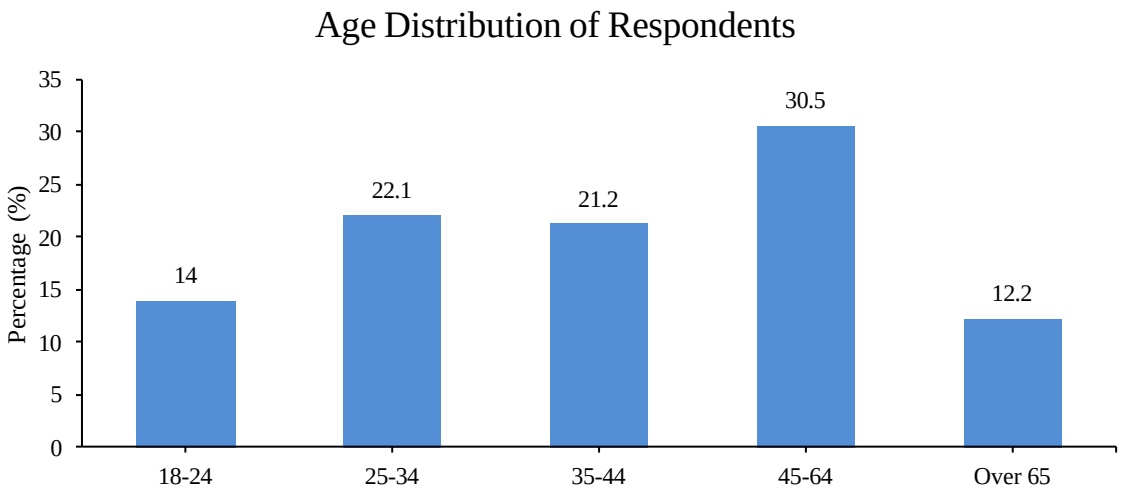


Figure 2: Non-Driver Respondents by Ages

Figure 3 shows the race and ethnicity of respondents, with the majority identifying as White (64.9%), followed by Black or African American (21.4%), Hispanic or Latino (7.3%), and smaller proportions from other groups. To address equity gaps, transportation strategies should prioritize outreach and tailored solutions for underrepresented groups, for example Black or African American and Hispanic or Latino communities.

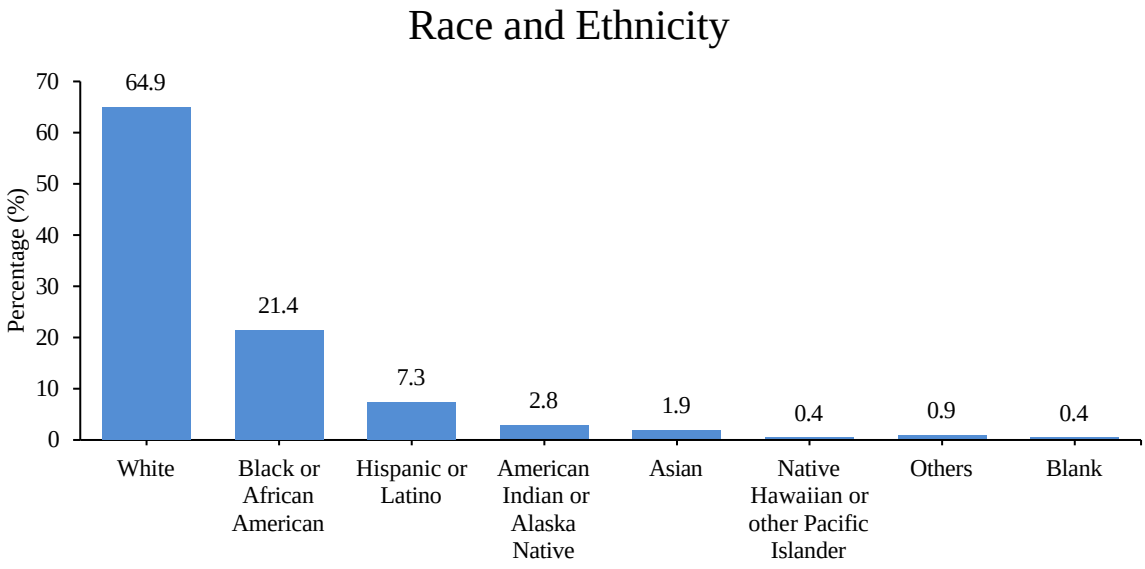


Figure 3: Non-Driver Respondents by Race and Ethnicity

In Figure 4, the largest segment of respondents is employed, making up 35% of the total. This group likely has regular commuting needs, necessitating consistent and reliable transportation services. Their transportation needs may be centered around peak commuting hours, and they could benefit significantly from services that reduce commute times and enhance

convenience.

Overall, unemployed groups form about 35% of the respondents, similar to the employment rate. Those actively looking for work may require affordable and accessible transportation options to attend job interviews and training sessions. Meanwhile, those not looking for work or unable to work, which could include people with disabilities or other conditions limiting their work capability, might rely on transportation for essential services and social engagement.

Retirees represent 14.1% of the respondents in Figure 4. This group may have more flexible transportation needs, not bound by the typical commuter schedules. However, they might require transportation for healthcare services, social activities, and other errands, which demands accessible and possibly less frequent transportation services than those required by the working population.

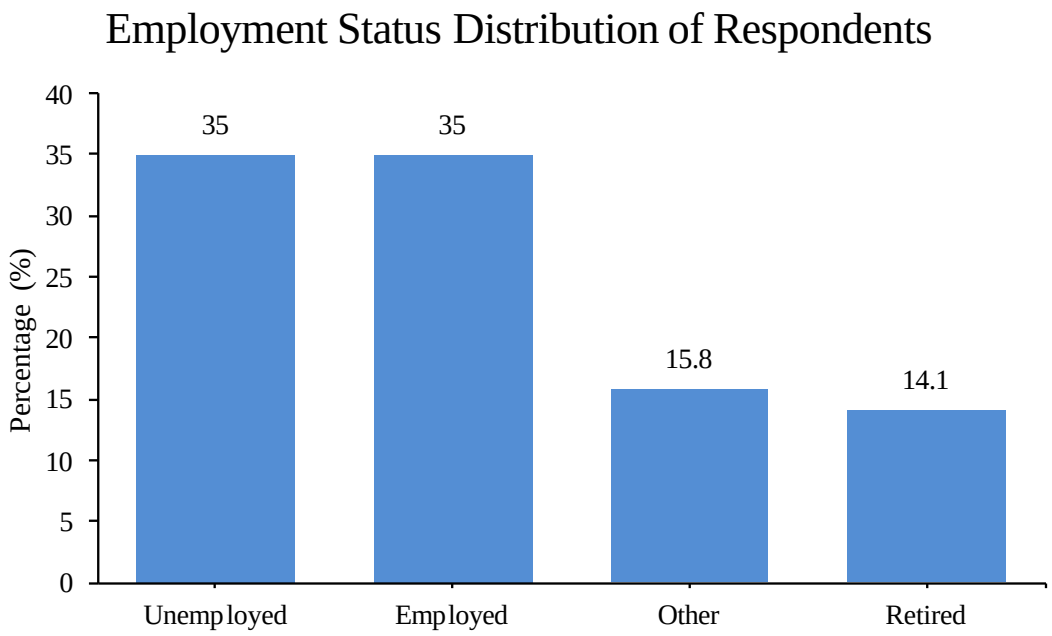


Figure 4: Employment Status of Non-Driver Respondents

The income distribution among respondents shows that the largest group earns less than $25K annually (44.7%), followed by those earning between $25K and $50K (31.0%), and over $50K (24.4%) in Figure 5.

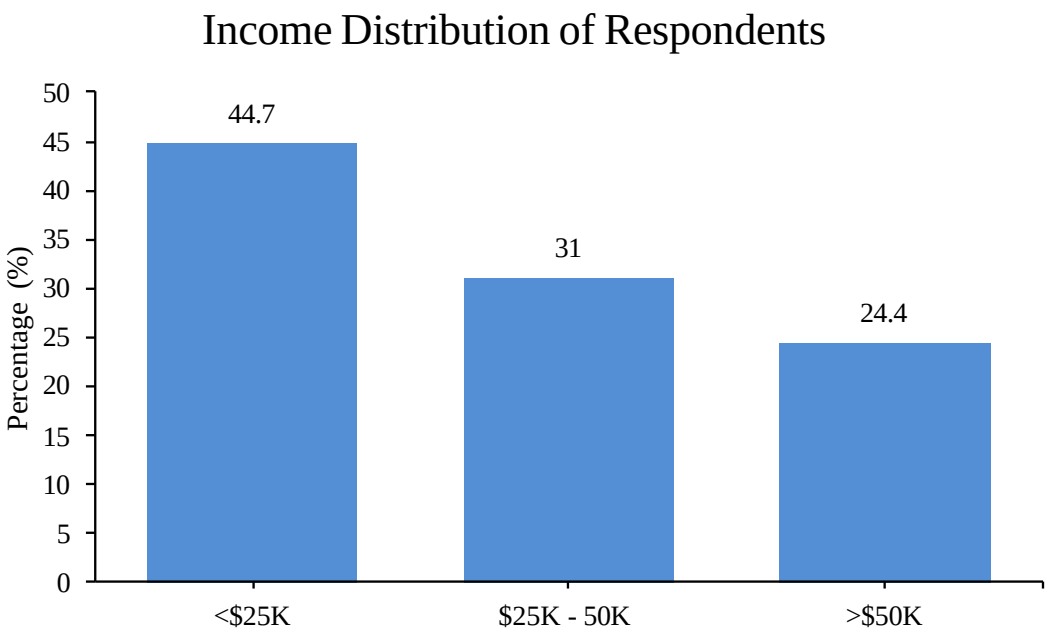


Figure 5: Annual Income of Non-Driver Respondents

Figure 6 shows that a majority of the respondents (76.8%) do not have a disability, while a significant minority (23.2%) report having some form of disability.

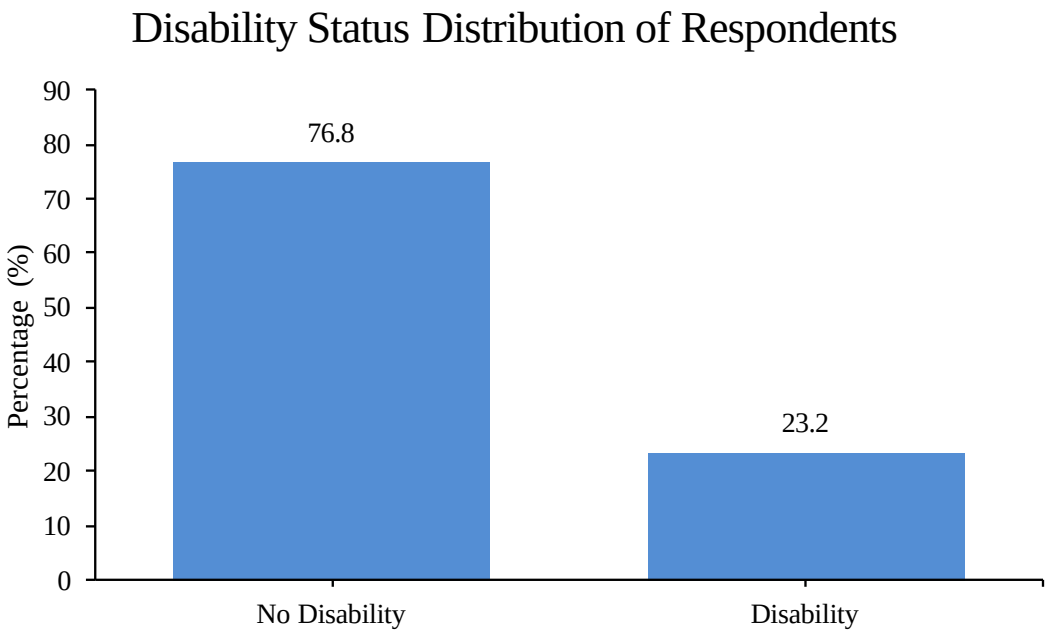


Figure 6: Non-Driver Respondents Disability Status

Among the respondents who reported having disabilities, which can be found below in Table 14, the most common type of disability is physical (40.2%), which includes mobility

impairments that can significantly affect transportation needs. Vision impairment and mental health conditions or neurodivergence also represent substantial portions of the disabled population, with 28.2% and 29.9% respectively.

Table 14: Non-Driver Respondents Disability Type

Disability Type	Number of Respondents	Percentage
Vision impairment (blindness, low vision)	33	28.21%
Developmental or cognitive disability	17	14.53%
Mental health condition or neurodivergence	35	29.91%
Physical disability	47	40.17%
Another disability	13	11.11%
Prefer not to disclose	3	2.56%

4.1.2.2. Non-Driver Adjacent

Of the 763 total responses for the non-driver adjacent group, 755 respondents stated their gender. As shown in Figure 7, the largest respondents group is the female group, which comprises 58.1% of respondents, compared to the male group which comprises 41.9 % of respondents.

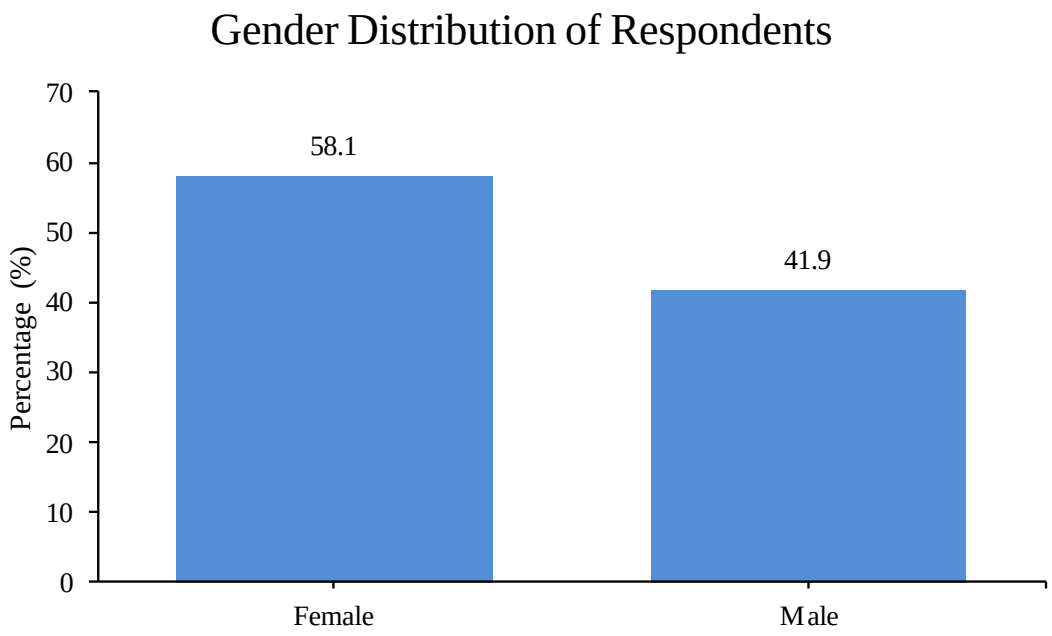


Figure 7: Non-Driver Adjacent Respondents by Gender

Figure 8 show a gradual increase of non-drivers adjacent as the age group increases, but once it reaches the age group over 65, it decreases to a significant amount of 10.1% of

respondents.

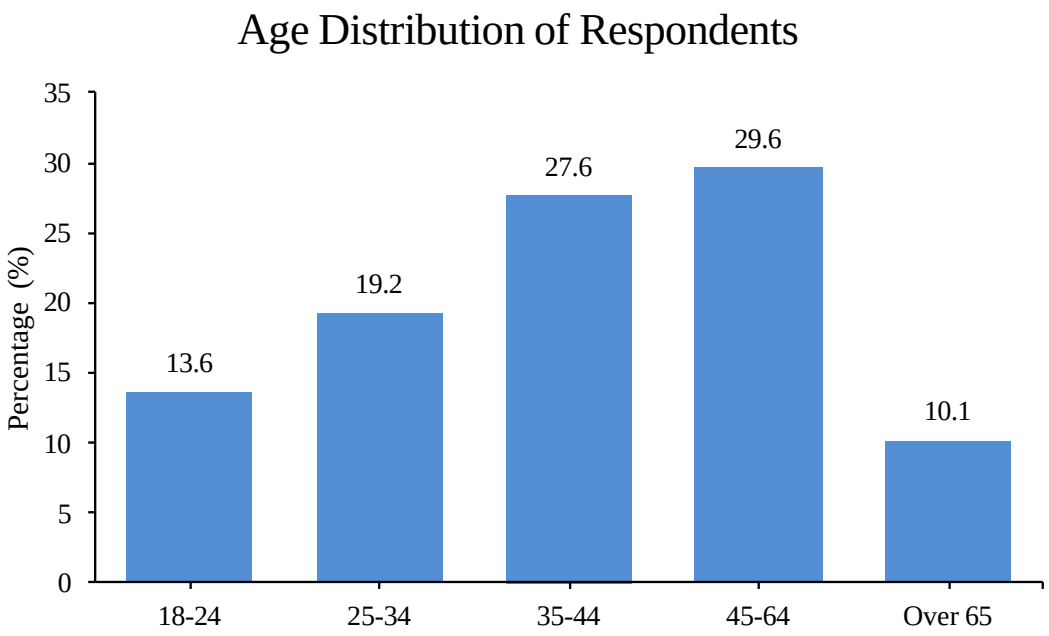


Figure 8: Non-Driver Adjacent Respondents by Ages

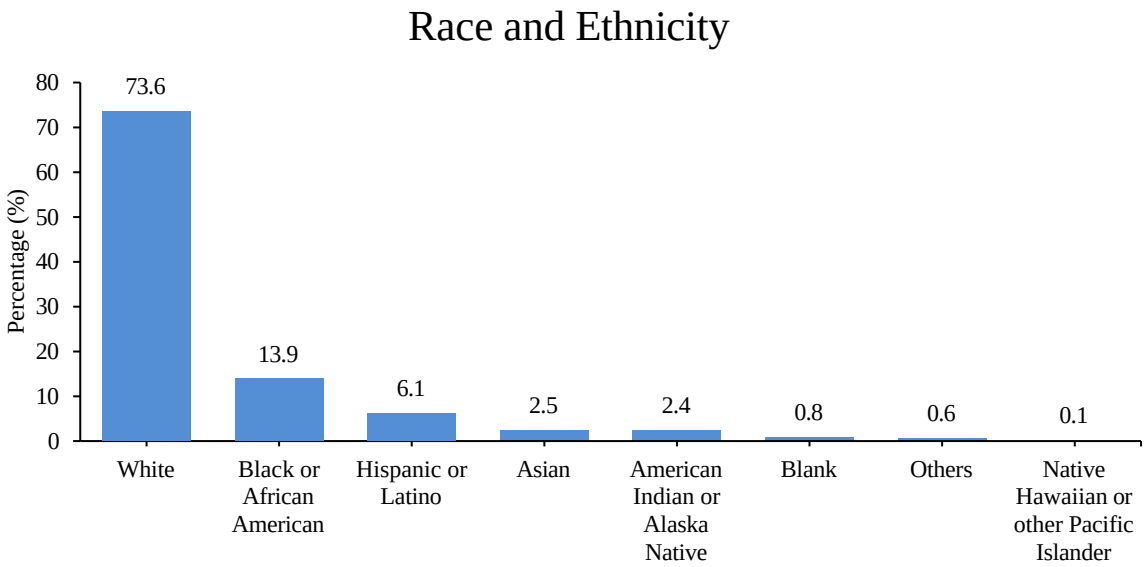


Figure 9: Non-Driver Adjacent Respondents by Race and Ethnicity

The employment status for being employed has the highest percentage of 64.8% respondents, whereas the unemployed, retired, and other group are around the same percentage, which can be seen in Figure 10. Due to a significant number of respondents in the employed group, it can be inferred that being a non-driver adjacent comes with challenges of scheduling so that

it does not coincide with work.

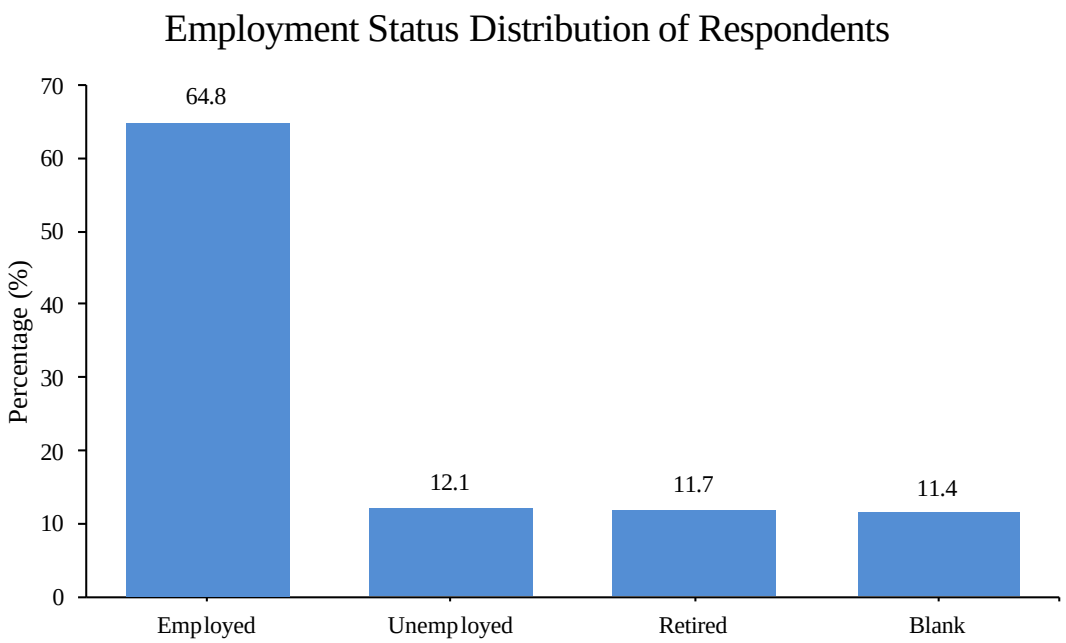


Figure 10: Employment Status of Non-Driver Adjacent Respondents

In Figure 11, the largest income group for the income distribution earns more than $50K (52.2%) annually, whereas the following group that earn between $25K-$50K (26.1%) annually and less than $25K annually (21.7%) are significantly less than the largest group.

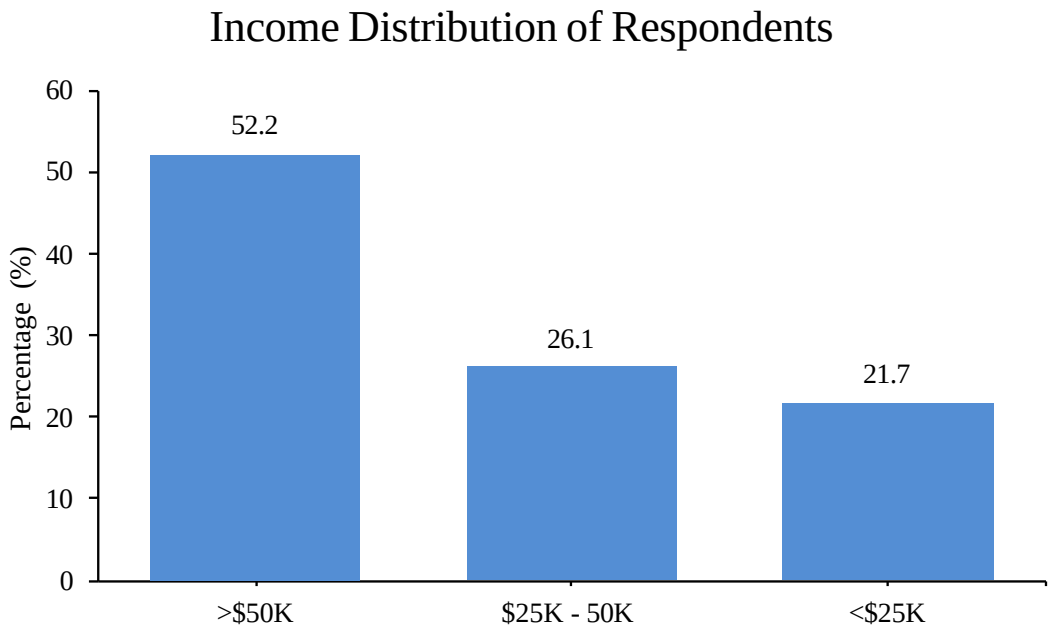


Figure 11: Annual Income of Non-Driver Adjacent Respondents

4.1.3. Survey Topic (Non-Drivers)

4.1.3.1. Reasons for Not Driving

The main key topic for the questionnaire is based on the reason why non-drivers are not driving and the result will compare the reason to the socio-economic characteristics such as gender, age, income, disability, and employment status. The reasons for not driving for non-drivers are listed below and can be seen in Figure 12:

- No driver's license (n=167)
- Vehicle related expenses (n=145)
- Disability Impact (n=117)
- Car-Free preference (n=88)

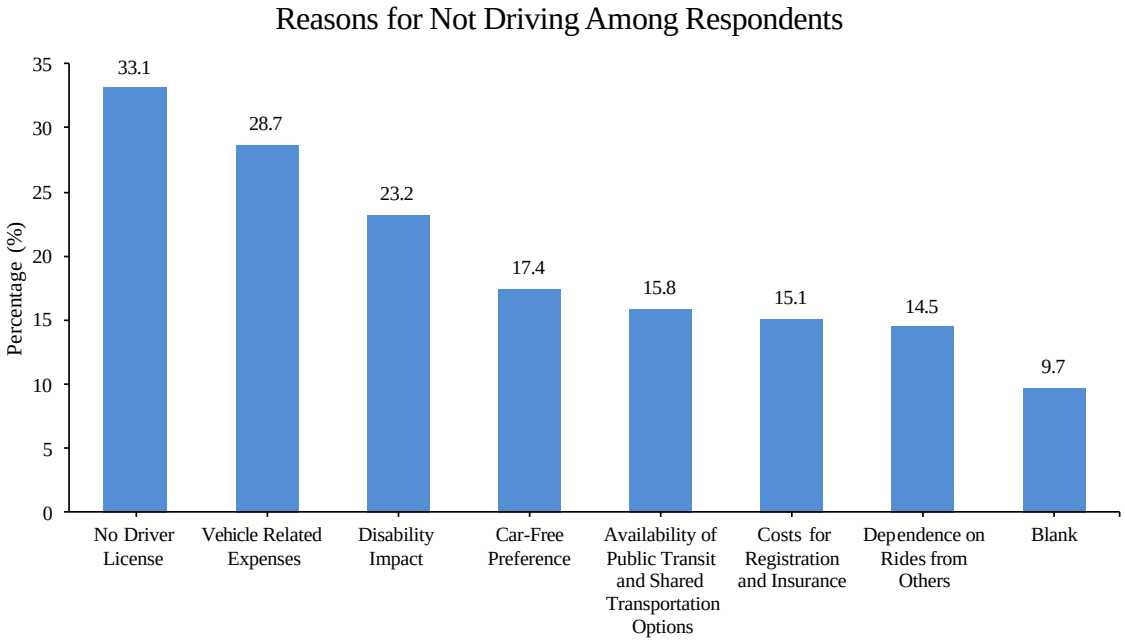


Figure 12: Respondents Reasons for Not Driving

In Figure 13, the high number of respondents without a driver's license is 33% of the overall non-driver responses and it underscores a critical area of need. A substantial portion of both male and female respondents cite the absence of a driver's license as a key reason for not driving. As for the age group, Figure 14 show a significant number of young adults in the 25-34 age group do not have a driver's license, highlighting potential barriers such as cost or lack of interest in driving. In Figure 15, a significant proportion of low-income respondents do not have a driver's license, possibly due to the high cost of obtaining one, while this reason diminishes in higher income groups, where access to licensing is easier. In Figure 16, significant portion of the unemployed and homemaker groups do not have a driver's license,

likely due to financial constraints or reliance on others. Fewer retired individuals lack a license, suggesting they may have had licenses earlier in life. This could be related to the challenges in obtaining a license, such as the cost of driver education or personal or legal barriers.

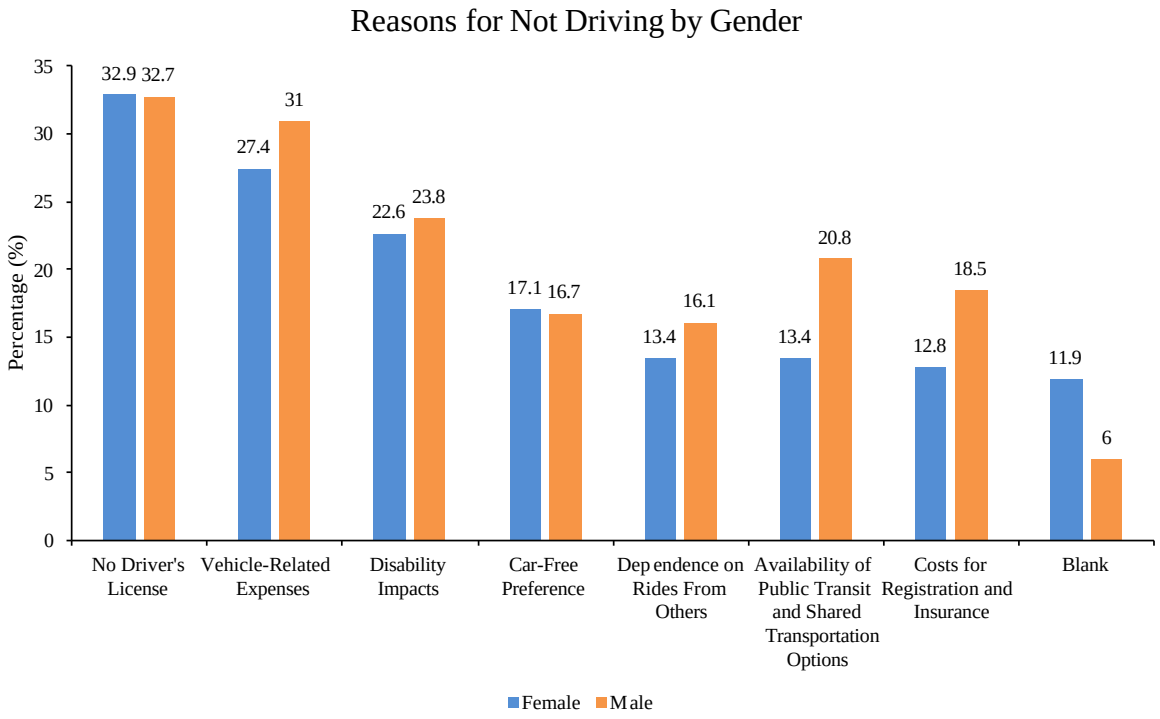


Figure 13: Respondents Reason for Not Driving by Gender

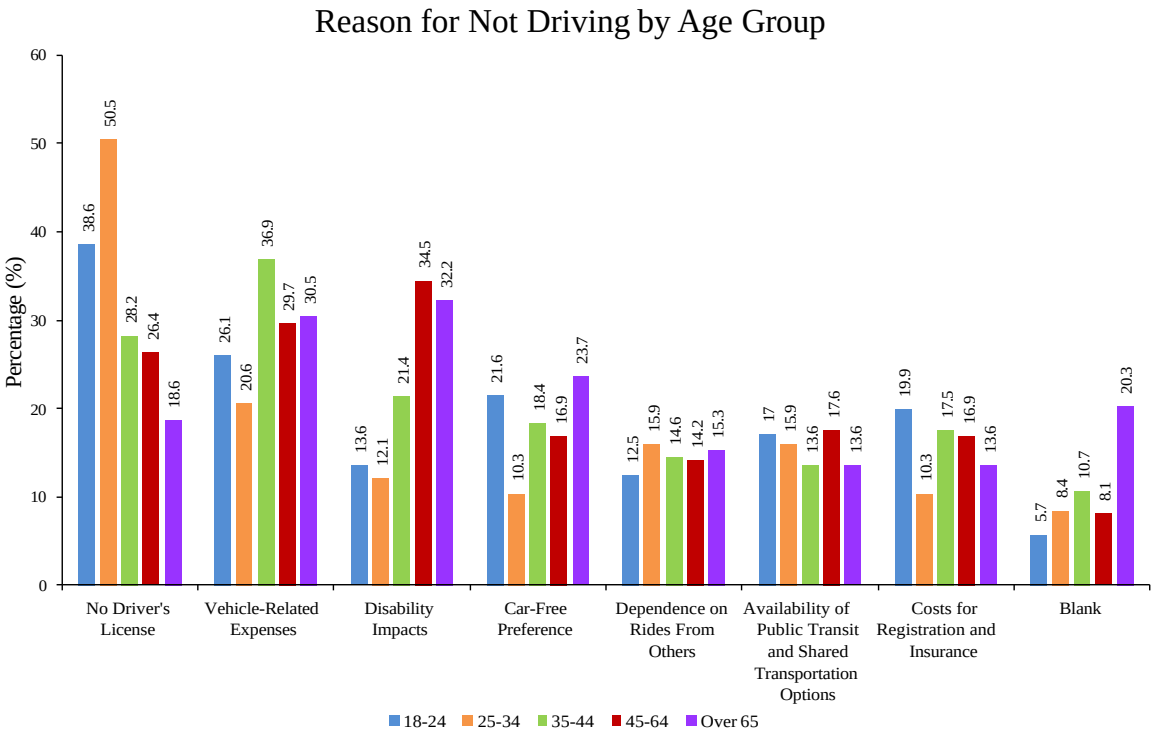


Figure 14: Respondents Reasons for Not Driving by Age Group

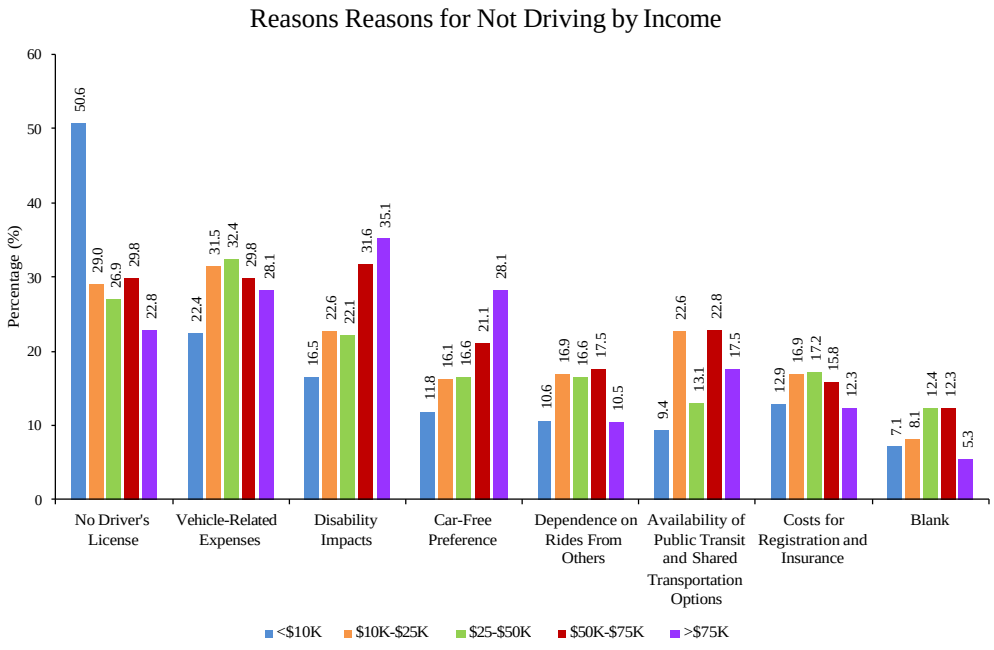


Figure 15: Respondents Reasons for Not Driving by Income

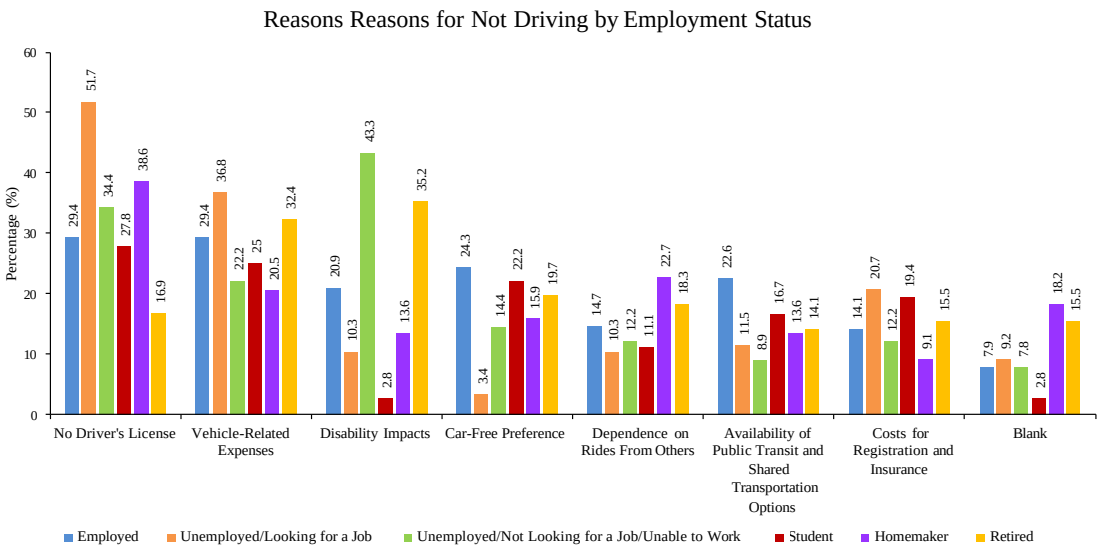


Figure 16: Respondents Reasons for Not Driving by Employment Status

The economic burden of vehicle ownership is a major barrier. In Figure 13, more males than females cited vehicle-related expenses as a barrier, indicating that economic factors like the cost of purchasing, maintaining, and operating a vehicle are significant deterrents, possibly due to differing roles or expectations in household income contributions. In Figure 14, mid-life and older adults report high vehicle-related expenses, indicating economic challenges that may hinder vehicle ownership or maintenance. In Figure 15, vehicle-related expenses are a major barrier for all income groups, but especially for those earning $25K-$50K, likely balancing higher living expenses and vehicle costs. Vehicle-related expenses are a burden across all categories in Figure 16, particularly for unemployed and retired individuals, indicating financial stress associated with vehicle ownership. Policies that reduce the cost of vehicle ownership, maintenance, and operation could help with the economic burden of owning a vehicle.

Disability significantly affects a large group of non-drivers. In Figure 13, disability impacts are similarly significant for both genders, with slightly more men reporting this as a reason. This suggests that physical or health-related barriers to driving are a common concern across genders, underscoring the need for accessible transportation solutions that accommodate individuals with disabilities. Also, in Figure 14, disability impacts increase with age, particularly affecting the oldest groups, which emphasizes the need for accessible transportation solutions for older adults. Disability led to a higher percentage of non-drivers in the >$50K income bracket, which can be seen in Figure 15. In Figure 16, disability is a

significant factor for the unemployed (unable to work) and retired categories, with more than a third affected. This suggests that physical limitations strongly influence driving abilities in these groups. Enhanced vehicle adaptation services, improved paratransit, and accessible public transportation options are vital to support this demographic's mobility.

A noteworthy portion of non-drivers choose not to own a car, possibly for environmental, health, or lifestyle reasons. In Figure 13, nearly equal percentages of men and women prefer not to drive, and in Figure 14 older adults show a strong preference for living car-free, possibly due to reduced mobility needs or dependence on others. Also, in Figure 15, a noticeable portion of higher-income individuals prefer living car-free. Supporting robust, sustainable transportation alternatives like biking, walking, and public transit and the availability of alternative transport options like public transit in urban areas are helpful in maintaining car-free preferences.

4.1.3.2. Travel Purposes and Frequency for Non-Drivers

Respondents' travel purposes include personal education, work, personal business, healthcare, groceries, daycare for children, social activities, and religious activities. Figure 17 shows the percentage of all of the travel purposes frequency for non-drivers and the exact number of respondents are found in Appendix C.

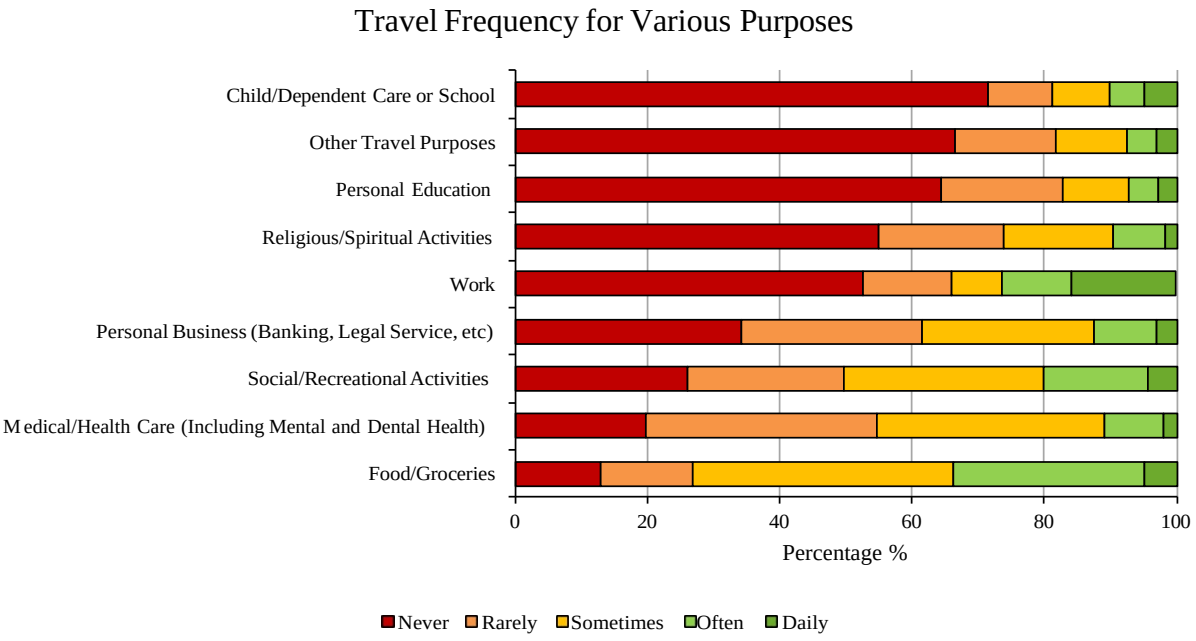


Figure 17: Travel Frequency for Various Purposes

The frequency of travel for personal education, in Figure 17, shows a significant majority of respondents reported that they never travel for personal education purposes (64.3%). Meanwhile, 18.4% of respondents indicated they rarely travel for personal education, 4.3% travel often, and only 2.9% travel daily for personal education. The high response for never traveling for personal education is due to the respondent age group in Figure 14, where the majority of the respondents are over the standard college students age range.

Travel frequency for work is significantly high for the never options at 52.7%. As for the other responses, 13.2% of respondents indicated they rarely travel for work, 7.6% travel sometimes, 10.5% travel often, and 15.9% travel daily, in Figure 17. Reasons for the significantly high response of the "Never" options includes employment status and disability status, which can be seen in Figure 16 for the disability group, the unemployed, not looking for a job, and unable to work. Another possible reason for not traveling for work can be due to working from home, which has become an increasingly favorable option for workers during and after covid.

As for traveling for personal business which includes banking and legal services, in Figure 17, there are 34.2% of respondents indicated never, 27.4% stated they travel rarely, 26% of respondents travel sometimes, 9.5% respondents travel often, and only 2.9% travel daily. Due to the many online banking and with the increase in video conference applications like Zoom and Microsoft Teams, many respondents can take care of their personal business without having to leave their home.

In Figure 17, travel frequency for medical and healthcare has a higher percentage of 34.9% of the respondents for traveling rarely and 34.3% for traveling sometimes. As for the other responses, 19.8% of respondents never travel, 9.1% travel often, and 1.9% travel daily. Medical and healthcare needs are important for respondents' health, therefore constant checkups correspond to regular traveling frequency depending on the needs of the respondents.

The largest group for food and groceries travel frequency respondents are 39.5% of respondents that travels occasionally for groceries, in Figure 17, suggesting periodic shopping trips that align with typical consumer behavior. A significant portion of 28.9% of respondents shop frequently, indicating regular trips to maintain a fresh supply of food. As for the other responses, 12% of respondents never travel for food and groceries, 14% travel rarely, and 4.8% travel daily for food and groceries. With the increase in popularity of food

and groceries delivery, it allows respondents to stay home and not travel for food and groceries. Considering 12.2% of respondents are over 65 age group in Figure 14, it is likely that many have meals prepared for them at retirement homes so there is no need for them to travel.

There is a large response for never traveling for child/dependent care or school of 71.6% respondents in Figure 17. The rest of the responses are significantly small with 9.5% of respondents travel rarely, 8.7% travel sometimes, 5.4% travel often, and 4.8% travel daily for child/dependent care or school. Due to a high respondent for never traveling for child/dependent care or school, this can be because of respondents not having children or there are services provided to pick and drop off children from school to home.

Social and recreational travel frequency, in Figure 17, shows similar respondents' percentage for never (26%), rarely (23.8%), and sometimes (30.2%) traveling to social and recreational activities. The other response shows 15.6% of respondents travel often, and 4.4% travel daily. It shows respondents are evenly divided on how frequently they travel for social and recreational activities.

A significant proportion of 54.9% of respondents do not travel for religious activities, 19% travel rarely, 16.5% travel sometimes, 7.8% travel often, and 0.7% travels daily, in Figure 17. With the high percentage for not traveling for religious activities, this can be due to respondents not having religion.

4.1.3.3. Modes of Transportation for Accessing Activities

The modes of transportation for accessing activities in relation to the travel purposes and frequency are listed below:

- Walk or Roll
- Pedal or Scoot
- Shared Mobility
- Bus
- Train
- Paratransit
- Volunteer/Community Transport
- Taxis and Ride Hail
- Motorcycle
- Car as Driver
- Car Driven by Family/Friends

- Other

The predominant use of walking or rolling (18.9%), and buses (32%) indicates a reliance on accessible, cost-effective modes of transportation for education-related travel, in Figure 18. Also, a notable portion of respondents relying on family or friends (27.7%) for transportation could indicate a lack of personal vehicles or driving ability, or it might reflect the communal nature of transportation in certain demographics or regions.

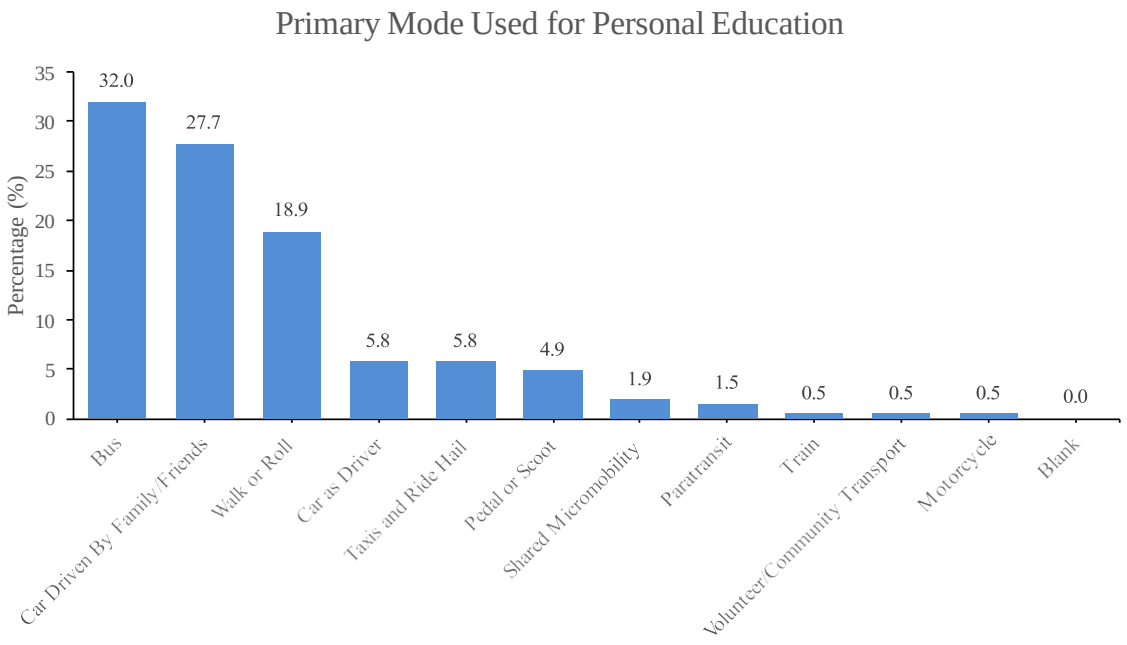


Figure 18: Personal Education Primary Mode of Transportation

In Figure 19, the heavy use of buses (34.2%) and reliance on rides from family or friends (23.7%) indicate essential support systems for daily commuting. Enhancing public transport services and exploring carpooling initiatives could substantially benefit this demographic. The notable use of walking or rolling (12.8%) suggests that when employment locations are accessible, non-drivers are willing to use active transportation modes.

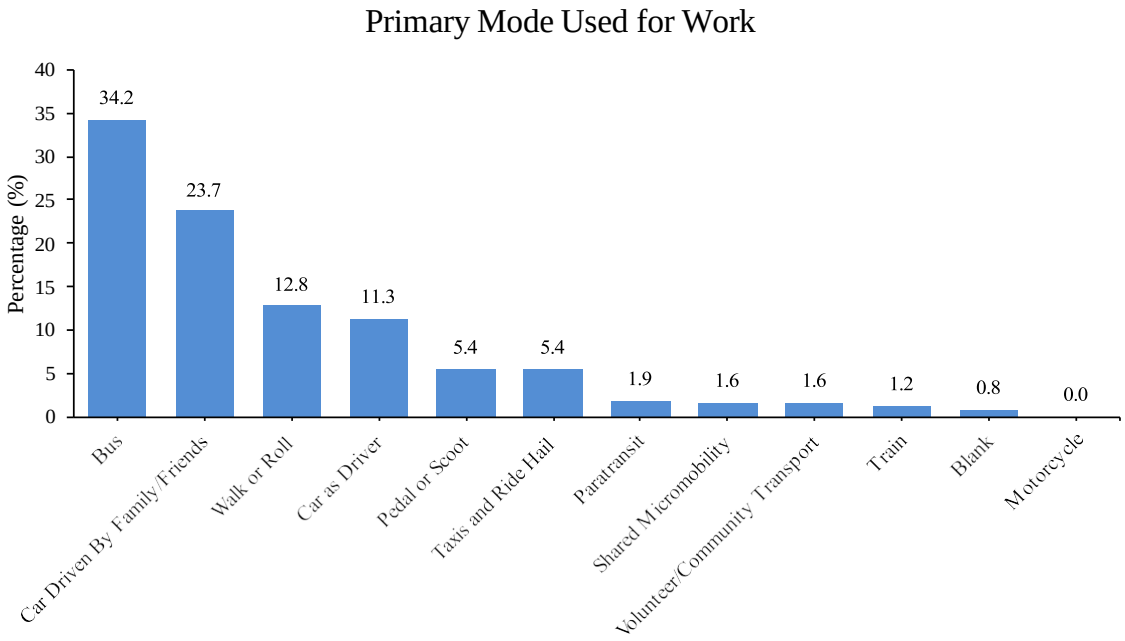


Figure 19: Work Primary Mode of Transportation

In Figure 20, the highest percentage of respondents (40.2%) rely on cars driven by others, which underscores the dependency on others for transportation among those who may not drive themselves. The bus (20.5%) is the second most common mode, which indicates a reliance on public transportation for accomplishing essential tasks.

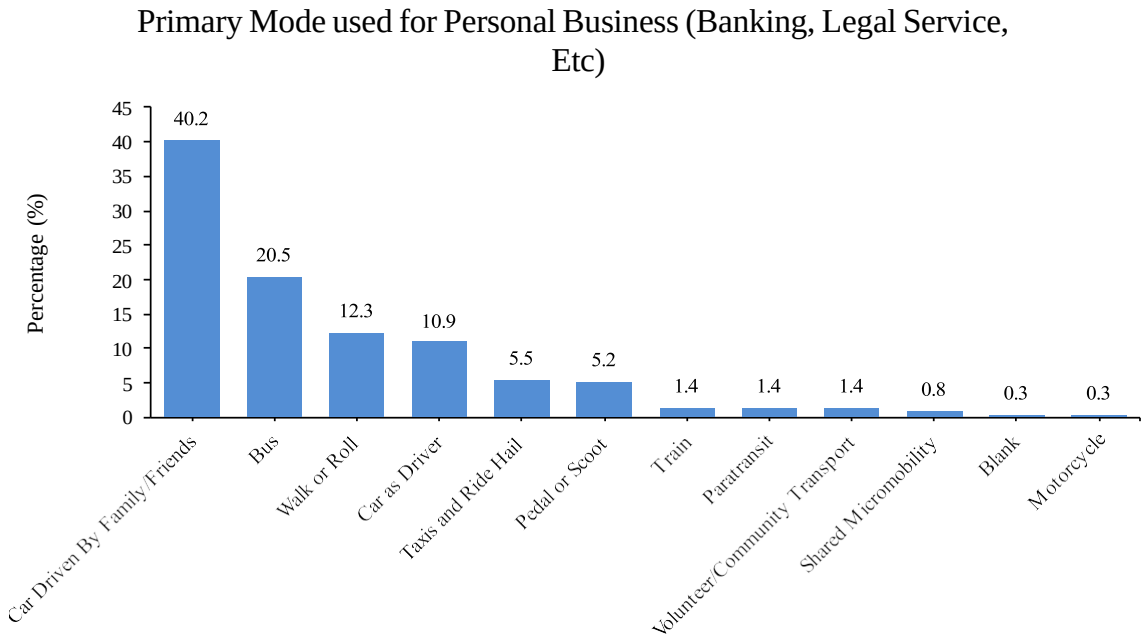


Figure 20: Personal Business Primary Mode of Transportation

Cars driven by family or friends (43.0%) is the most common transportation method, in Figure 21, suggesting that medical visits are often facilitated by them. The bus (19.3%) is the second most chosen primary mode of transportation for traveling for medical and healthcare.

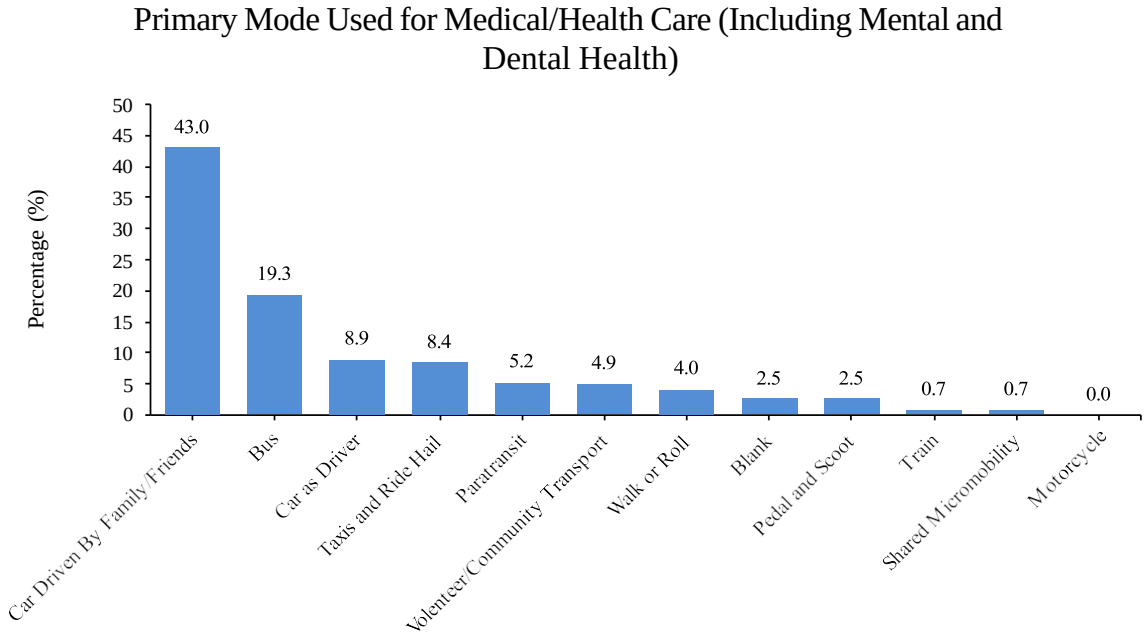


Figure 21: Medical and Healthcare Primary Mode of Transportation

The most common mode of transportation is being driven by family or friends (45.3%), showing that many respondents rely on others for grocery shopping, possibly due to mobility or accessibility issues in Figure 22. Additionally, 17.9% of respondents rely on public buses, emphasizing the critical role of public transportation for those without personal vehicles. Finally, 9.9% either walk or use mobility aids, highlighting the importance of accessibility or proximity of grocery stores for nearly a tenth of the respondents.

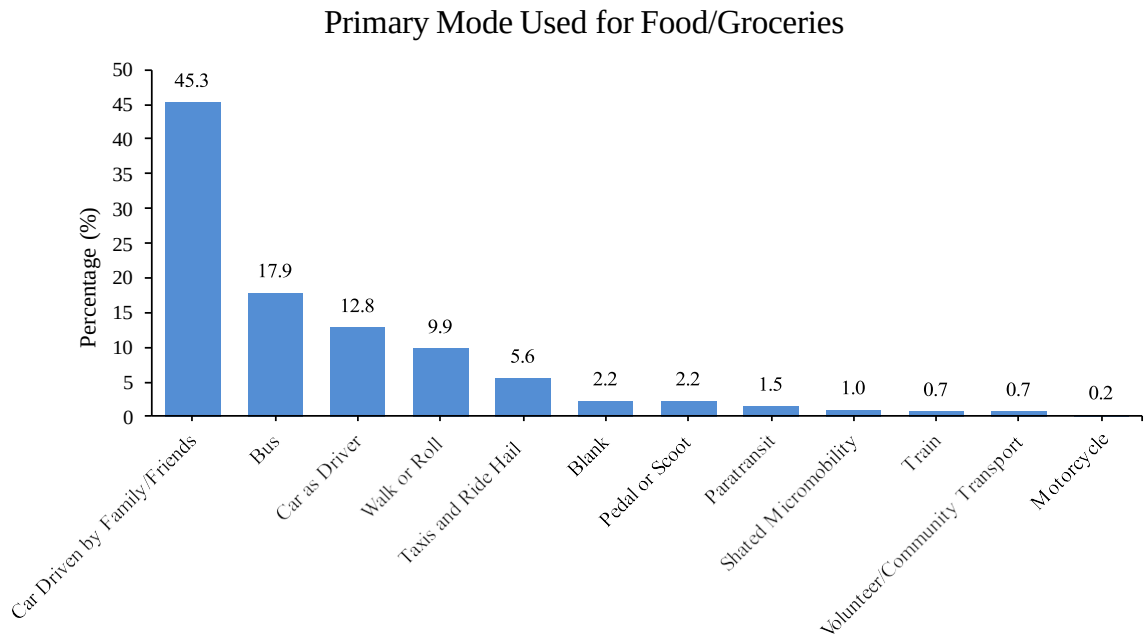


Figure 22: Food and Groceries Primary Mode of Transportation

In Figure 23, a significant proportion of respondents rely on rides from family or friends (31.0%), indicating strong dependence on social networks for children or dependent care transportation. Additionally, 23.2% use public buses as a key mode of transportation for these activities, highlighting the importance of public transit for families without access to a private vehicle. The heavy reliance on family- or friend-driven cars and buses underscores the need for robust support systems and accessible public transportation, especially for non-drivers managing child or dependent care responsibilities.

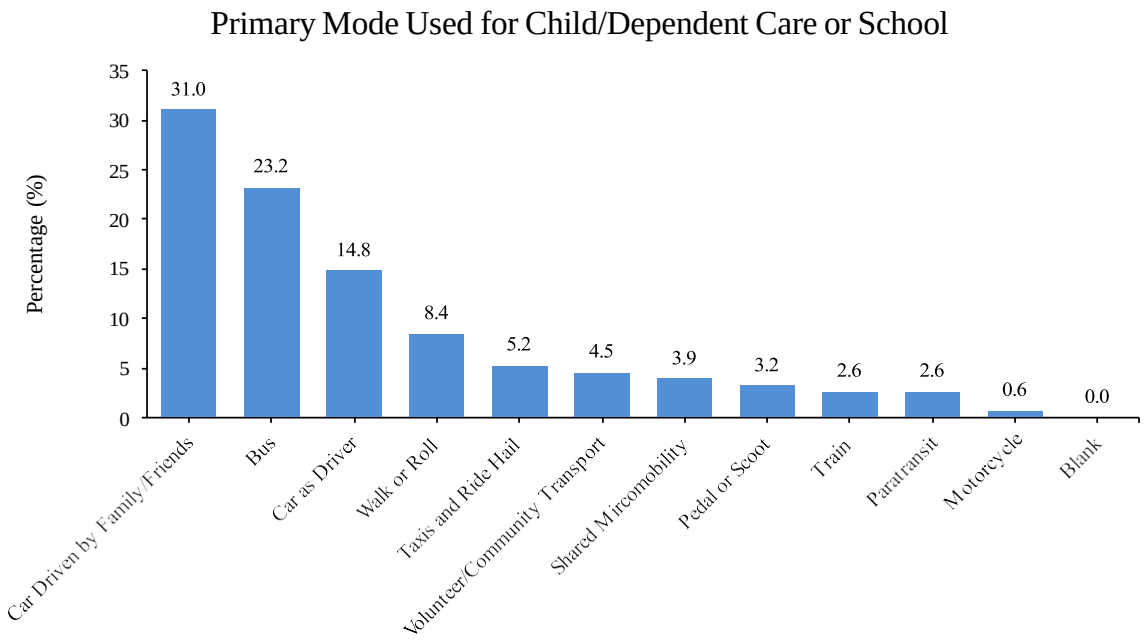


Figure 23: Child and Dependent Care or School Primary Mode of Transportation

Nearly half of the respondents depend on family or friends for transportation (47.0%), in Figure 24, highlighting a significant reliance on personal networks for social and recreational outings. Public buses, used by 19.0% of respondents, are the second most common mode of transportation, emphasizing the importance of accessible and reliable public transit for ensuring social participation, especially among non-drivers.

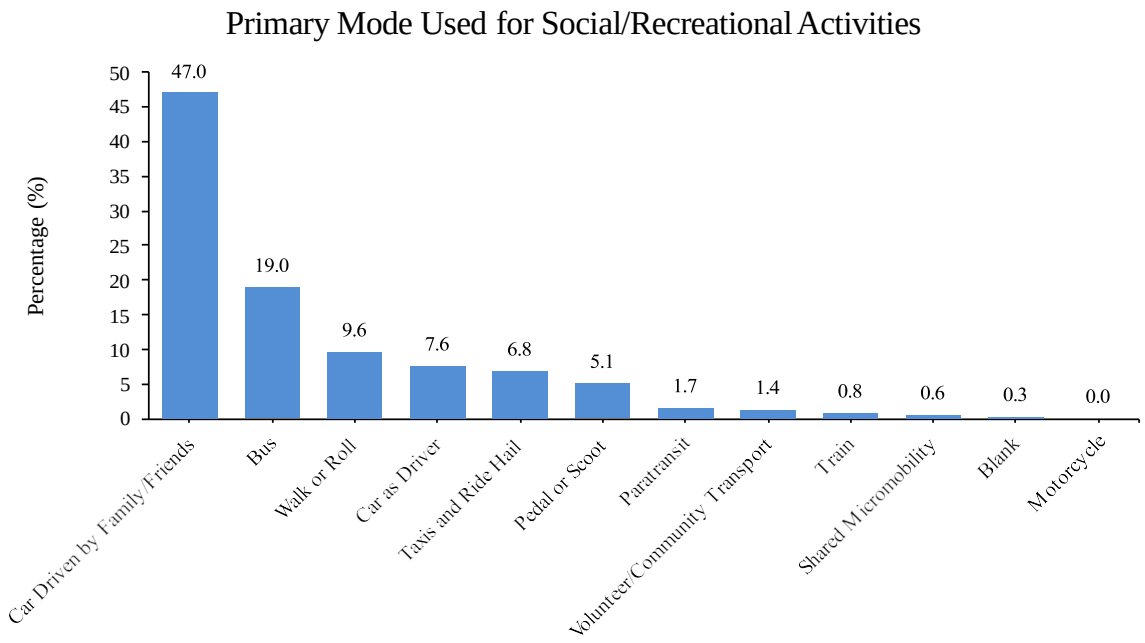


Figure 24: Social Recreational Activities Primary Mode of Transportation

The most common transportation method for attending religious services is being driven by family or friends (42.5%), in Figure 25, indicating that many individuals rely on social support networks to access religious activities, likely due to not driving themselves. Public transportation, particularly buses, plays a significant role for 22.0% of respondents, enabling them to attend religious services, especially for those without access to private vehicles. Additionally, 13.1% of respondents walk or use mobility aids, suggesting that some live near their places of worship or prefer active transportation options.

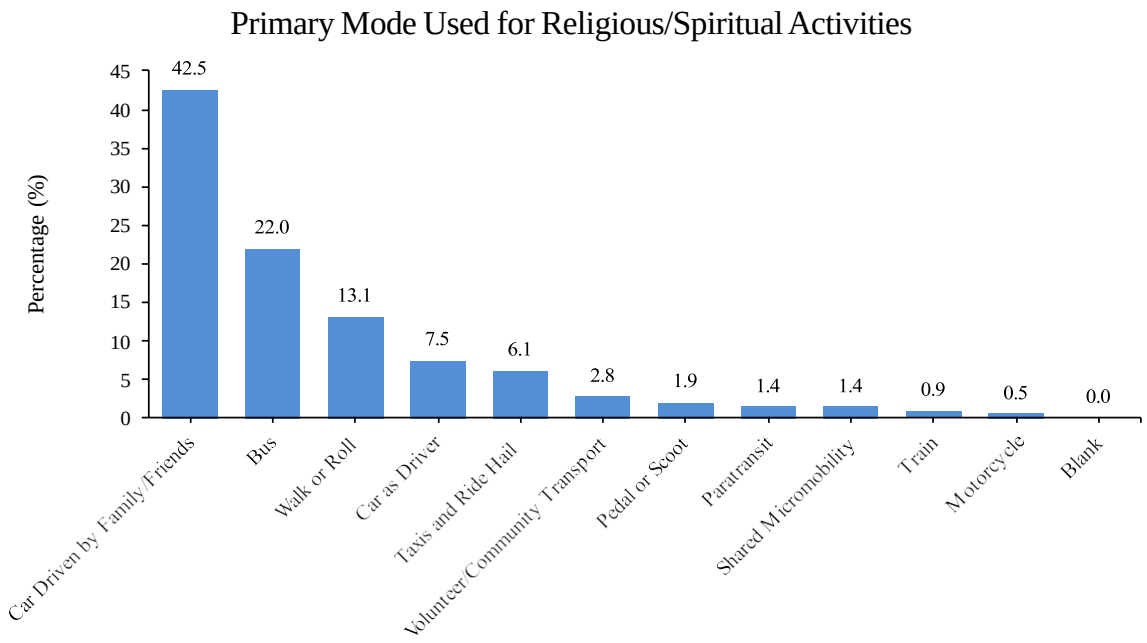


Figure 25: Religious and Spiritual Activities Primary Mode of Transportation

4.1.3.4. Ease of Access to Various Activities

The ease of access of food and groceries is the largest percentage (35.1%) for being very easy to access compared to other activities listed in Figure 26. The second largest is from medical and healthcare, which has 27.7% of respondents stating having easy access. However almost all activities have somewhat easy to access options as the largest portion for each activity, except for other and child and dependent car or school activities, which shows that most respondents are able to access each activity. However, in regard to individual activity groups such as, food and groceries, medical and healthcare, social and recreational, and personal business, these groups show that it has less difficulty accessing these activities compare to other activity group such as work, religious and spiritual activities, personal education, and child dependent care.

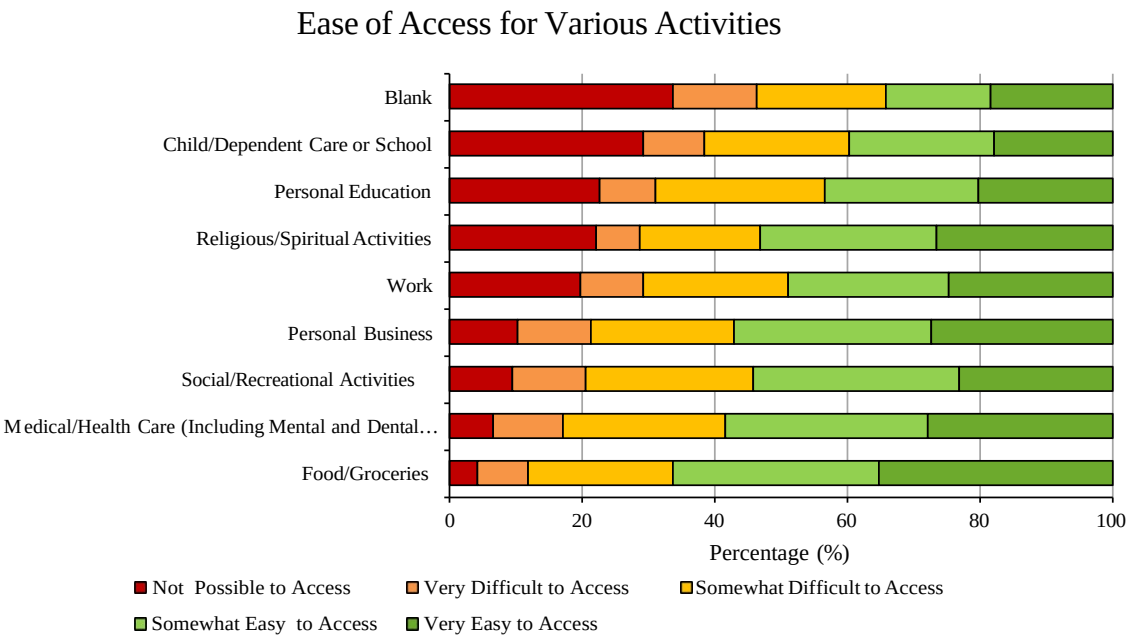


Figure 26: Ease of Access to Various Activities

4.1.3.5. Useability of Transportation Options (IPA)

The useability of transportation options is separated into three sections, the importance of transportation options, the performance of transportation options, and the importance performance analysis. The importance of transportation helps to identify which modes of transportation are favored by the respondents, and the performance of transportation options indicates how satisfied the respondents are with the services given by each mode of transportation. The importance performance analysis combined the importance of transportation options to the services provided to help understand the respondents' choice in choosing their primary mode of transportation.

4.1.3.5.1. Importance of Transportation Options

Based on the importance of each transportation option, being driven by family members (67.5%) is considered extremely important by the respondents in Figure 27. The second and third most important transportation options for the respondents are walking or rolling (64.5%) and riding the bus (52%). This indicate respondents are more likely to rely on household drivers to get around, and if that is not possible, they rely on walking or using public transit.

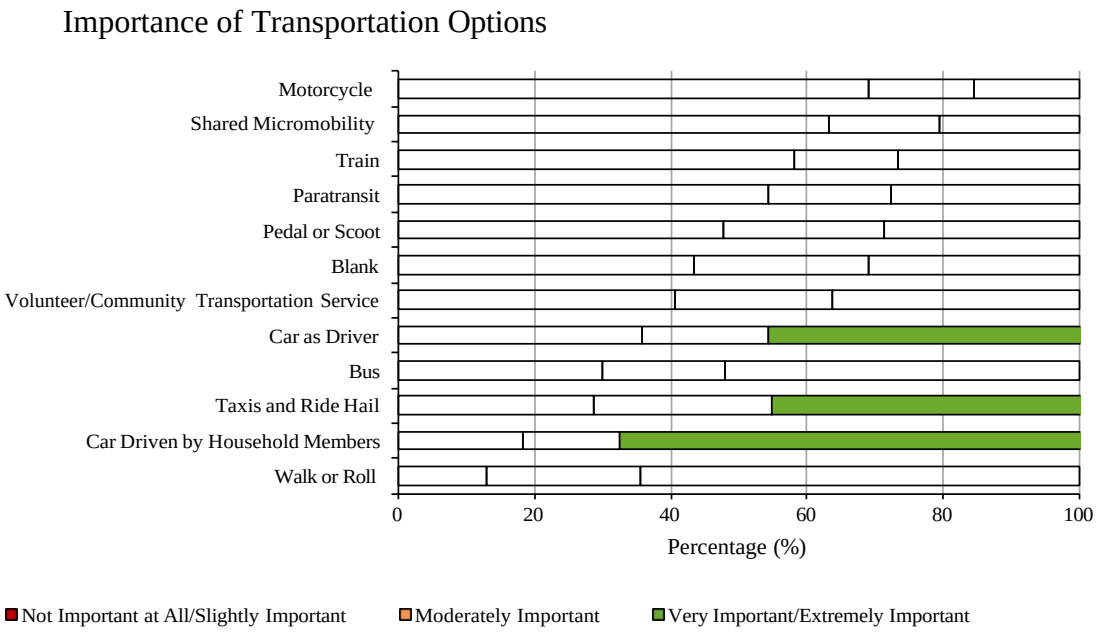


Figure 27: Importance of Transportation Options

4.1.3.5.2. Performance (Satisfaction) with Transportation Options

The best transportation option indicated by respondents is through household members driving (72.5%) them around, which the respondent stated gives them the most satisfaction in Figure 28. This shows that respondents' ability to communicate easily with drivers and the comfort and ease of using the service is what respondents are looking for in transportation options. Most vehicles, for example, cars, taxis and hail rides, and buses are by far given the highest satisfaction by respondents. This indicate that travel time in different transportation mode can make respondents satisfaction level increase or decrease.

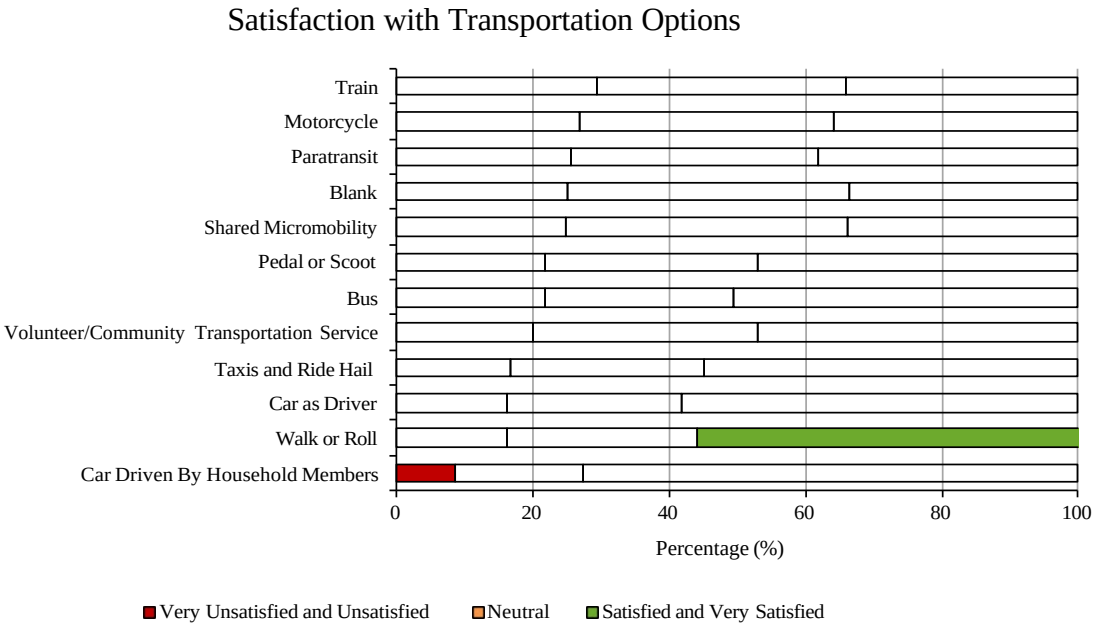


Figure 28: Satisfaction with Transportation Options

4.1.3.5.3. Importance Performance Analysis

The importance and performance analysis focus on vehicles that respondents chose as the primary mode of transportation. Based on Figure 18, there are five vehicle types that are listed as transportation options. Riding bus is the top vehicle choice followed by cars driven by household members, taxis and ride hail, paratransit, and volunteer/community transportation. In Figure 29, the major concerns are in service frequency, direct transit route, and travel time to destination. Based on the importance and performance analysis on riding the bus, respondents would like more buses on each route which would allow for shorter travel times to destination and allow for implementation of certain bus having fewer stops.

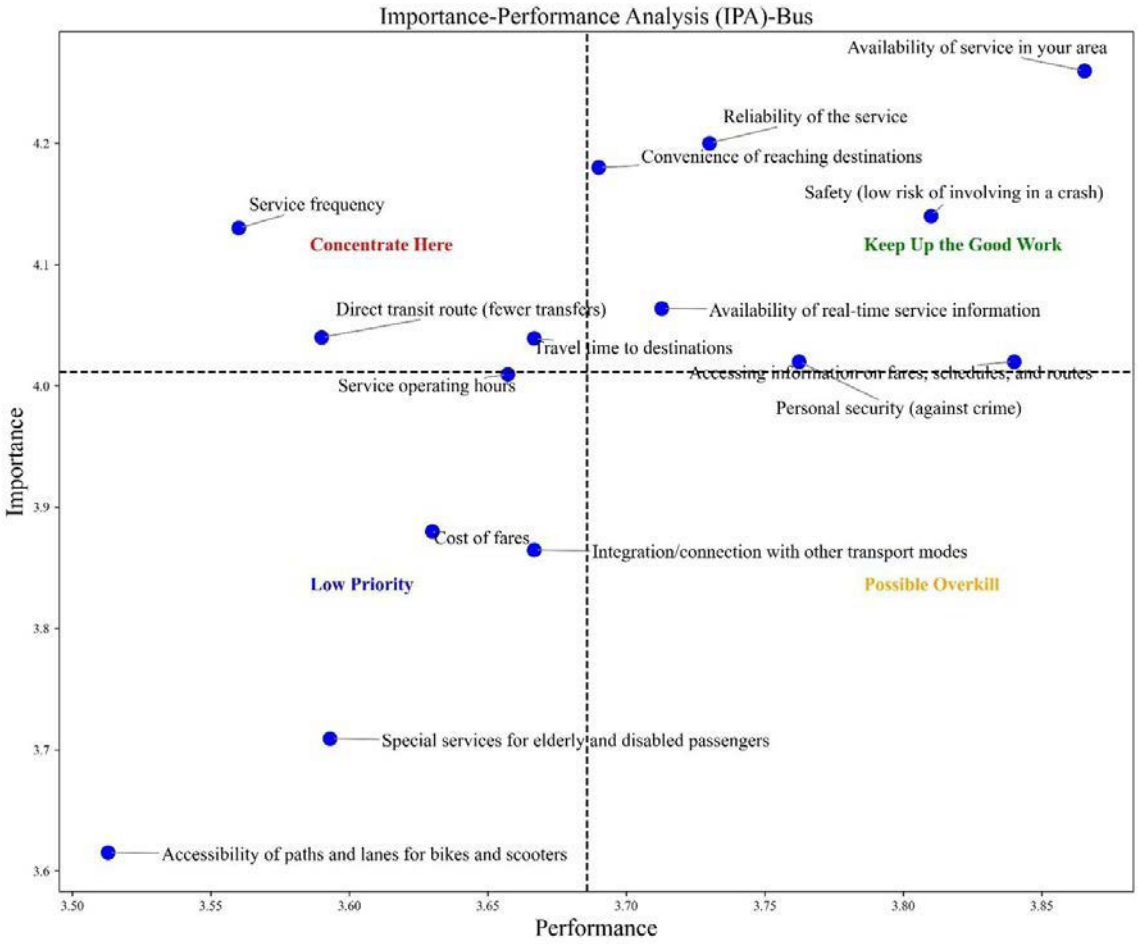


Figure 29: Importance Performance Analysis - Bus

In Figure 30, the major concerns for respondents regarding cars driven by household members are service availability, service operating hours, and service frequency. Since respondents' household members, who drive, may have to work, attend school, or have another plan, it can lead to conflict in schedule. Schedule conflict leads to respondents having to reschedule activities to different time and may not be able to frequently attend activities as much as they want to.

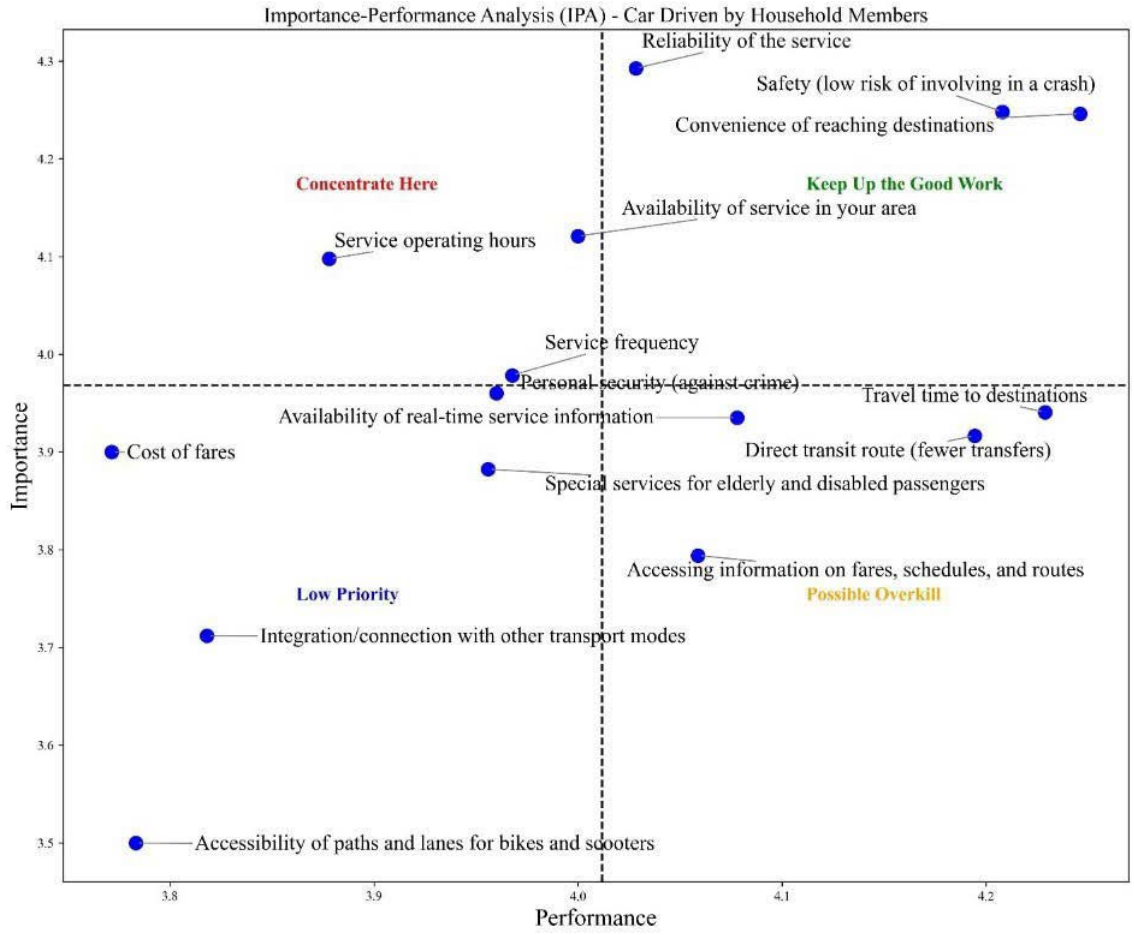


Figure 30: Importance Performance Analysis - Car Driven by Household Members

In Figure 31, the main concerns for respondents regarding taxis and ride-hail are service availability, safety, service reliability, service operating hours, and cost of fares. Depending on where respondents live, the availability of taxis and ride-hail services may not be found. This leads to respondents not being able to rely on it when they might need it. Safety of respondents to be able to safely get to and from activities are important for respondents. Also, the cost of the service may increase if the destinations are farther away or if the service is used during hours when there are less drivers on the job. However, respondents still consider taxis and ride-hail service as important transportation options since it allows them the convenience of being picked up from their home to their destination with less commute time.

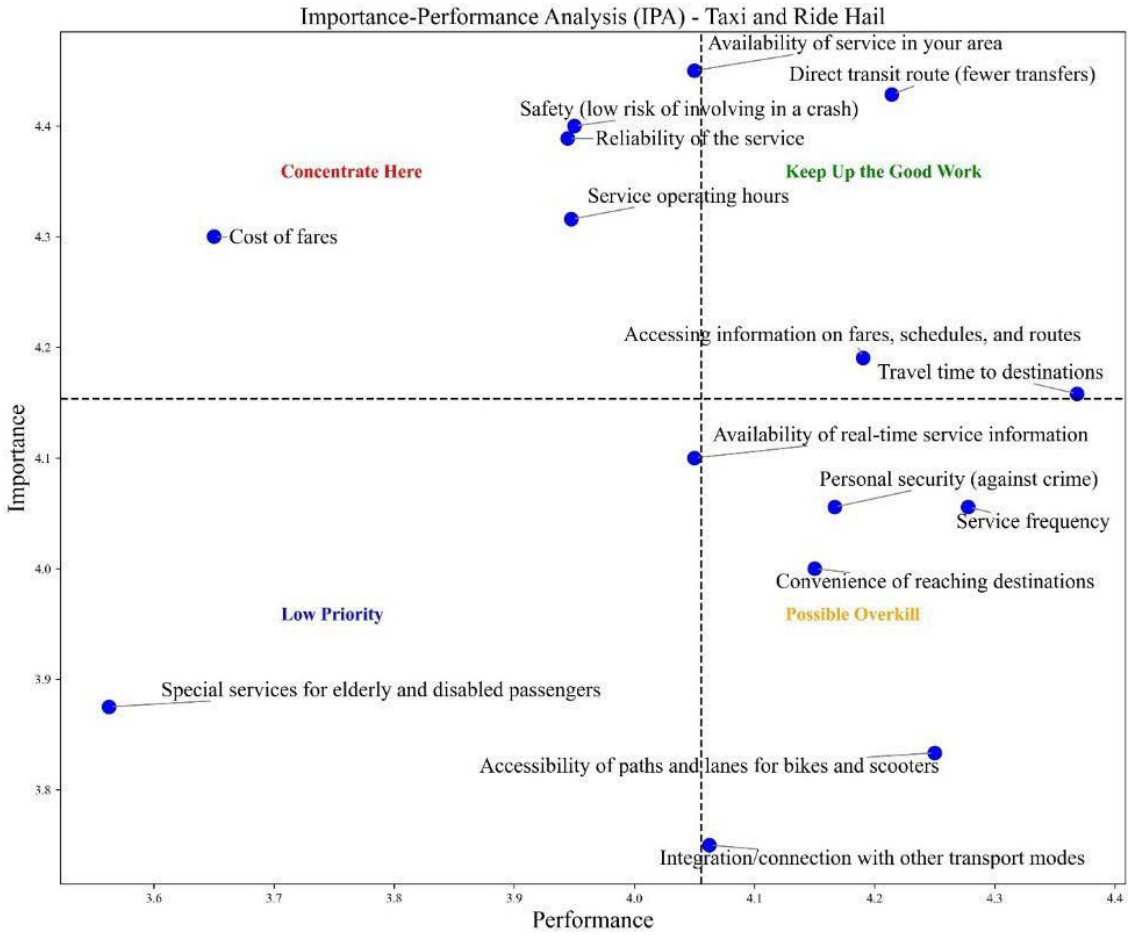


Figure 31: Importance Performance Analysis - Taxis and Ride Hail

In Figure 32, respondents that chose paratransit as the primary mode of transportation are concerned about service availability, service frequency, service reliability, and direct transit route. Respondents also have a hard time accessing information on fares, schedules, and routes, which are important for respondents to know before planning activities. If activities runs late, not knowing the schedules can cause issue for respondents that rely on this mode of transportation.

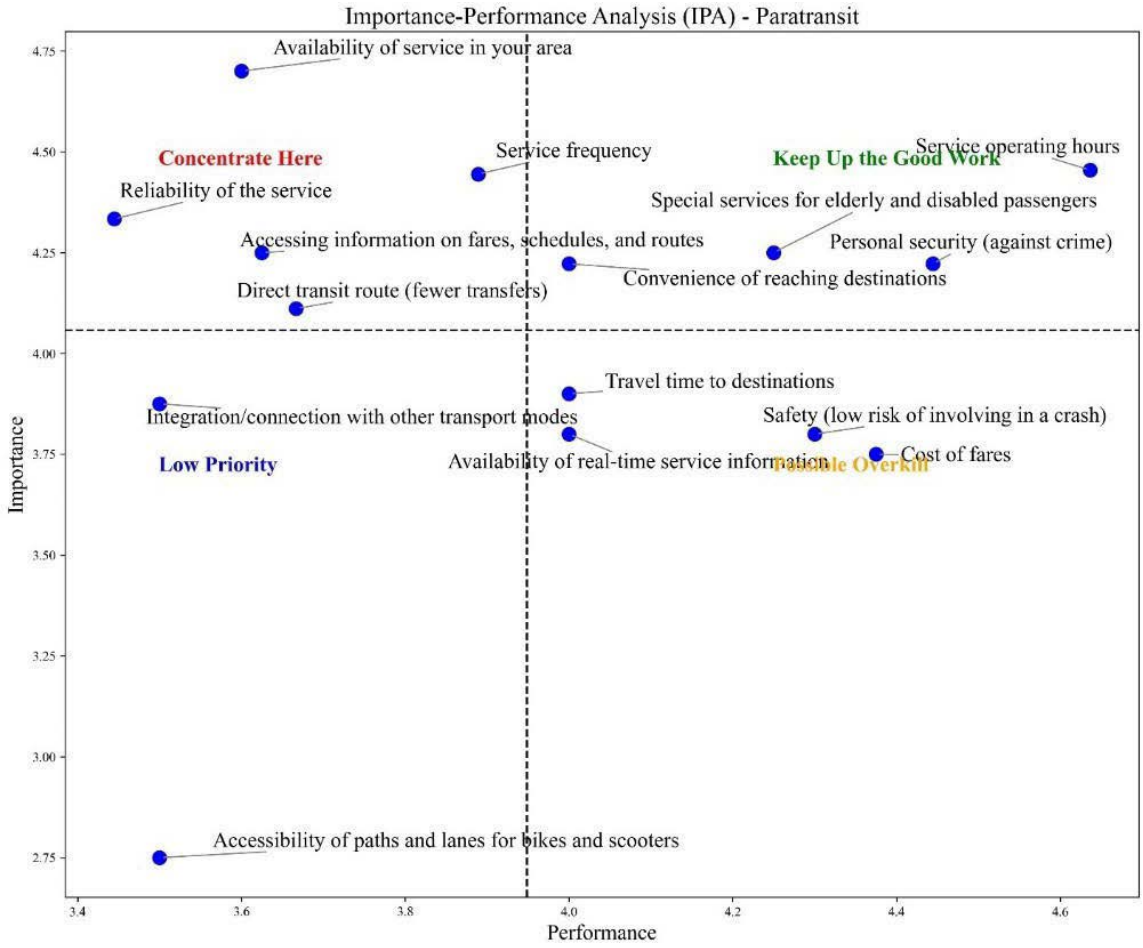


Figure 32: Importance Performance Analysis - Paratransit

In Figure 33, the main concern of respondents in regard to volunteer/community transport are due to reliability of service, convenience of reaching destination, and not having direct transit route. Respondents are worried that volunteers may not have training to transport those with disabilities. Also, if there are days with no volunteer to drive, respondent may not be able to attend planned activities, which leads to respondent not being able to rely on volunteer/community transport to get to activities. However, respondents appreciate having a way to get to activities with little to no cost.

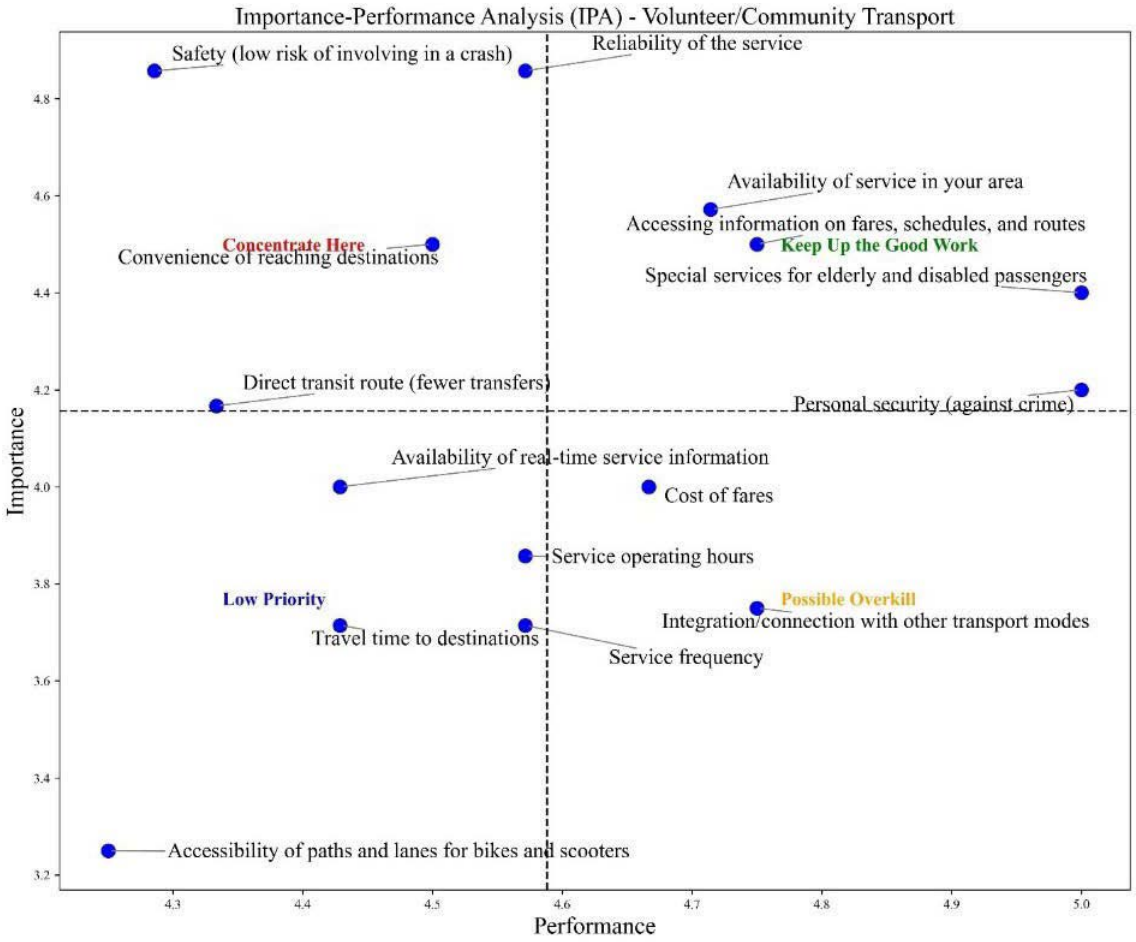


Figure 33: Importance Performance Analysis - Volunteer/Community Transport

The summarized analysis includes all primary mode of transportation. However, based on the analysis of each vehicle type, the most important transportation type with the best performance, from the summarized analysis in Figure 34, are bus and volunteer/community transport.

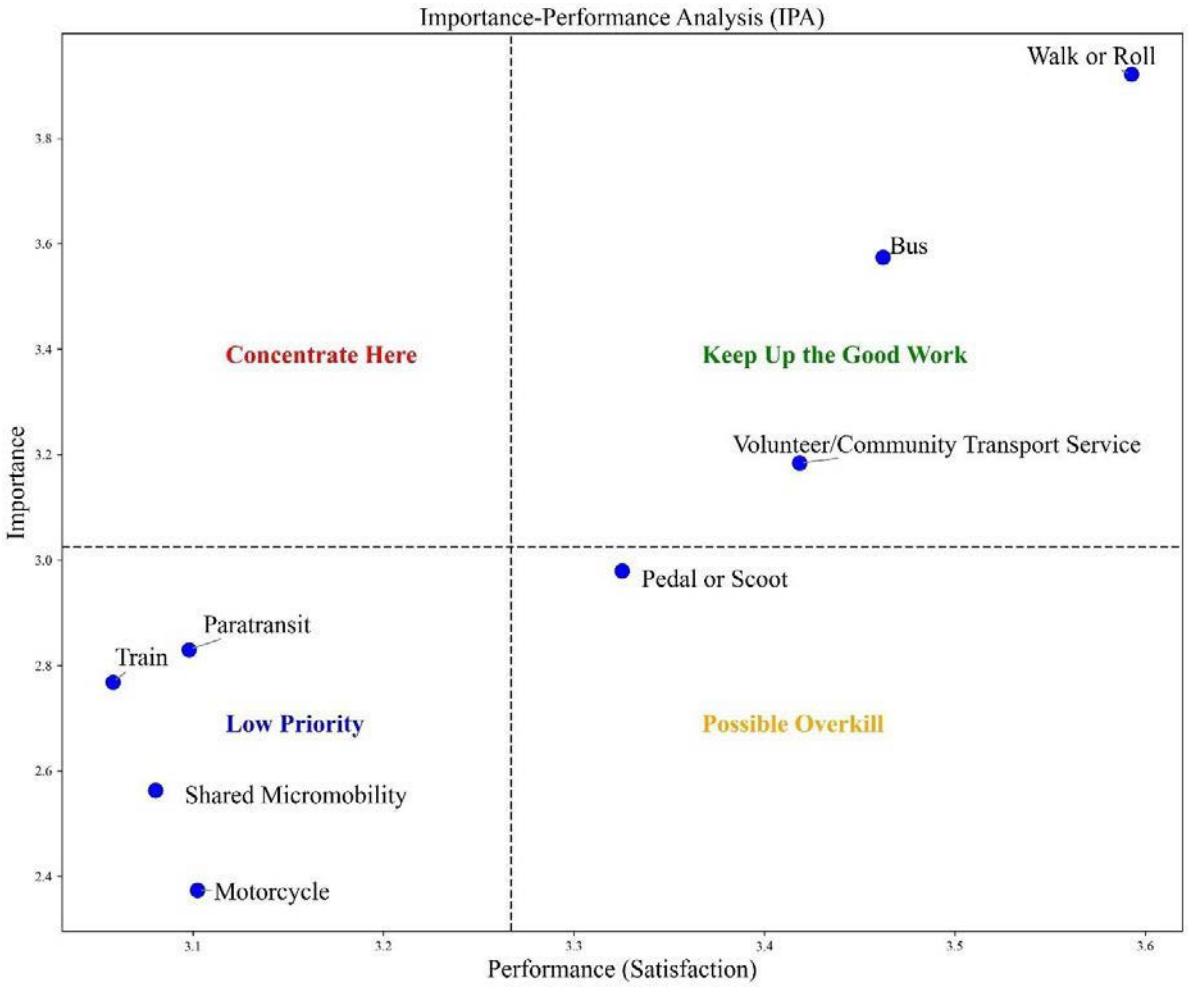


Figure 34**: Importance Performance Analysis Summary**

4.1.3.6. Assessing Key Aspects of Primary Mode of Transportation

The key aspects of primary mode of transportation will focus only on transportation services provided outside of household members. The key aspect of primary mode of transportation will be split into two sections, 1) the importance of transportation services available, and 2) the performance or satisfaction of transportation services experience by the respondents. The actual number counts of each transportation type will be in Appendix D.

4.1.3.6.1. Transportation Service Importance Questionnaire

In Figure 29, the top three most important transportation services for public transit are the following: the convenience of reaching destinations (78.6%), availability of services (public transit) in your area (78.3%), and reliability of the services (public transit) (76.9%). However, almost all other services in regard to public transit are still extremely important to the respondents. Having fewer transit routes, availability of travel destination time, and low cost of fare would be helpful for non-drivers to plan their travel. Fewer transit routes mean less

time it takes to get to the destination and since some drivers do have disability, as indicated in Figure 12, having special services for the elderly and disabled persons can be beneficial to these group of people. Overall, for most respondents, including these services in public transit is extremely important.

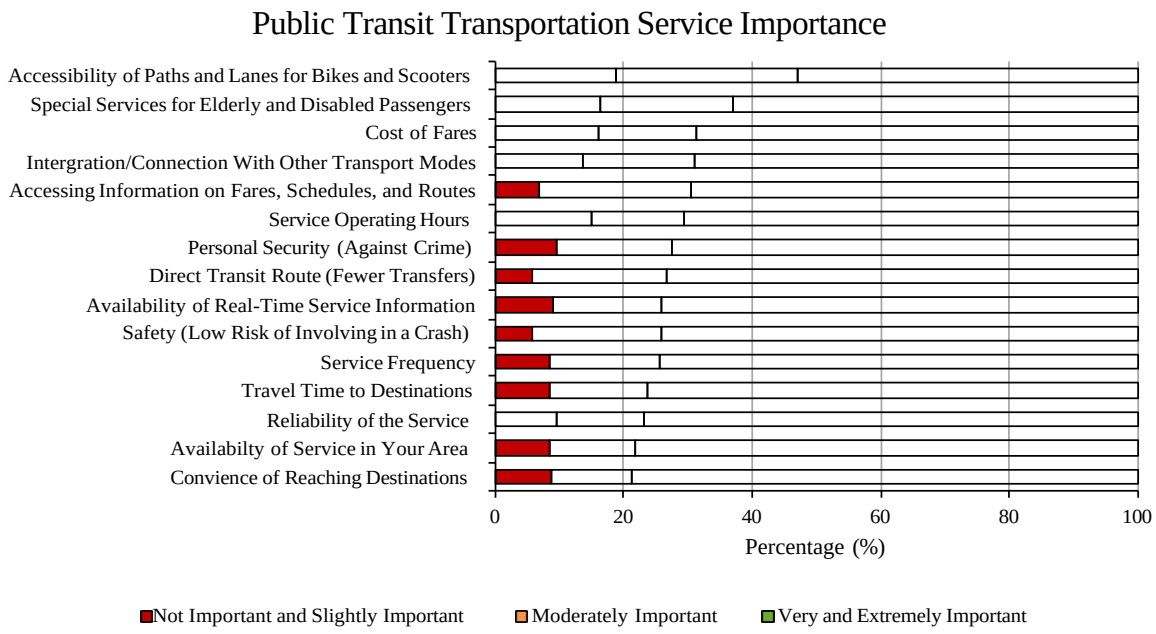


Figure 35: Public Transit Transportation Service Importance

The availability of paratransit and community services is extremely important to respondents, considering 94.4% of the respondents selected it, in Figure 30. The paratransit service operating hours (83.3%) is also an extremely important factor for respondents, which can indicate that operating hours of paratransit can limit their travel activities if service operating hours are not within respondents need. Other service factors, however, are also considered important to respondents since having these services will benefit the respondents greatly.

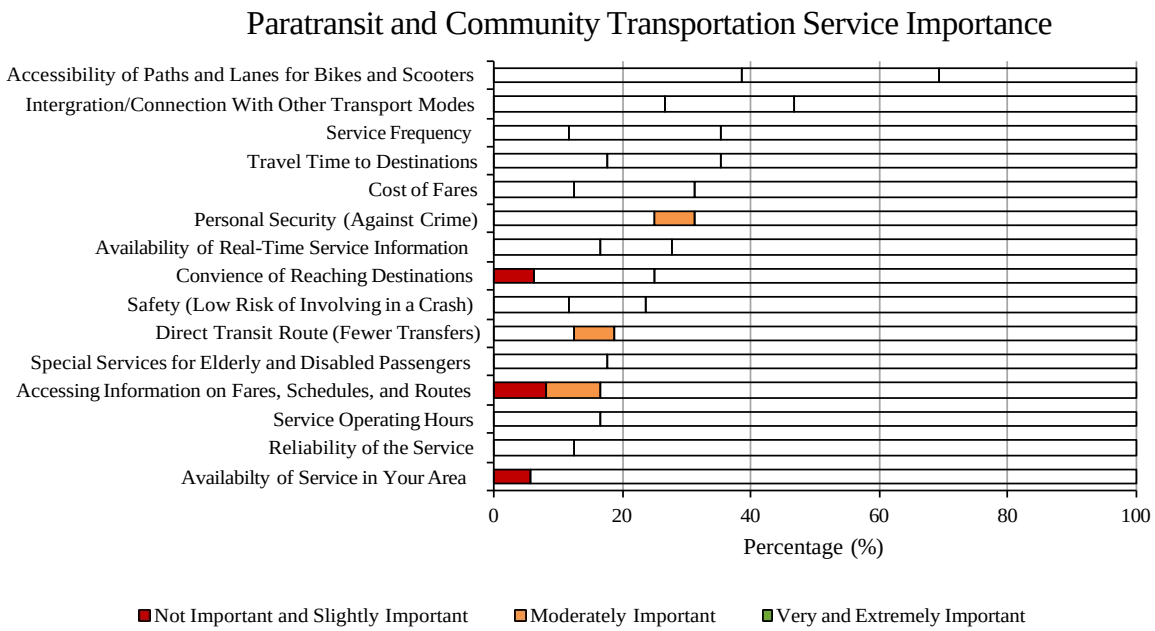


Figure 36: Paratransit and Community Transportation Service Importance

As for private ride-hailing services, the cost of fares and the availability of the services, in Figure 31, are tied with 90.5% of respondents agreeing that it is very important. With the ride-hailing services the cost of using the service can be extremely expensive depending on how far the destination is but being able to be picked up at a specific location can be helpful and safe for respondents during extreme weather.

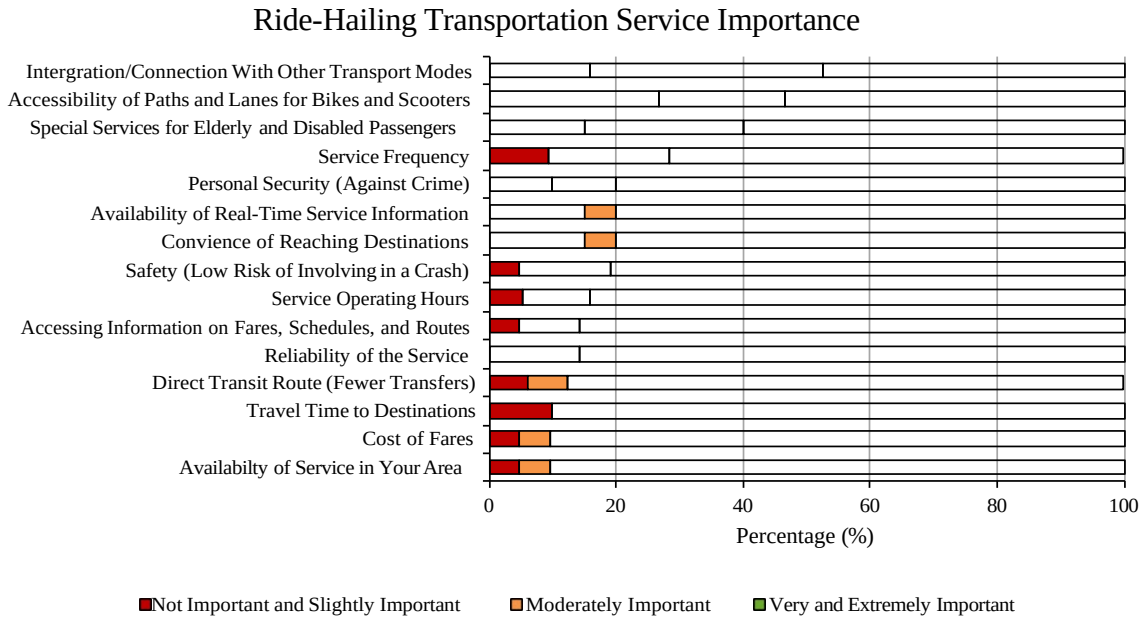


Figure 37: Ride-Hailing Transportation Service Importance

4.1.3.6.2. Transportation Service Performance Questionnaire

Figure 32 shows satisfaction with public transit services. Respondents are most satisfied with being able to access information on fares, schedules, and routes (70.5%). This information allows drivers to not only know the cost of travel but also plan for their travel, so they can get to their destination on time. The following most satisfying service after accessing information is the availability of public transit in the area. Depending on where respondents live, there may be less availability of public transit. Those in rural areas might not have any public transit available compared to suburban areas that may have some available and urban areas that have the most availability of public transit. Not being able to access public transit means less transportation options for non-drivers, which may lead to non-drivers having a hard time accessing activities as shown in Figure 26.

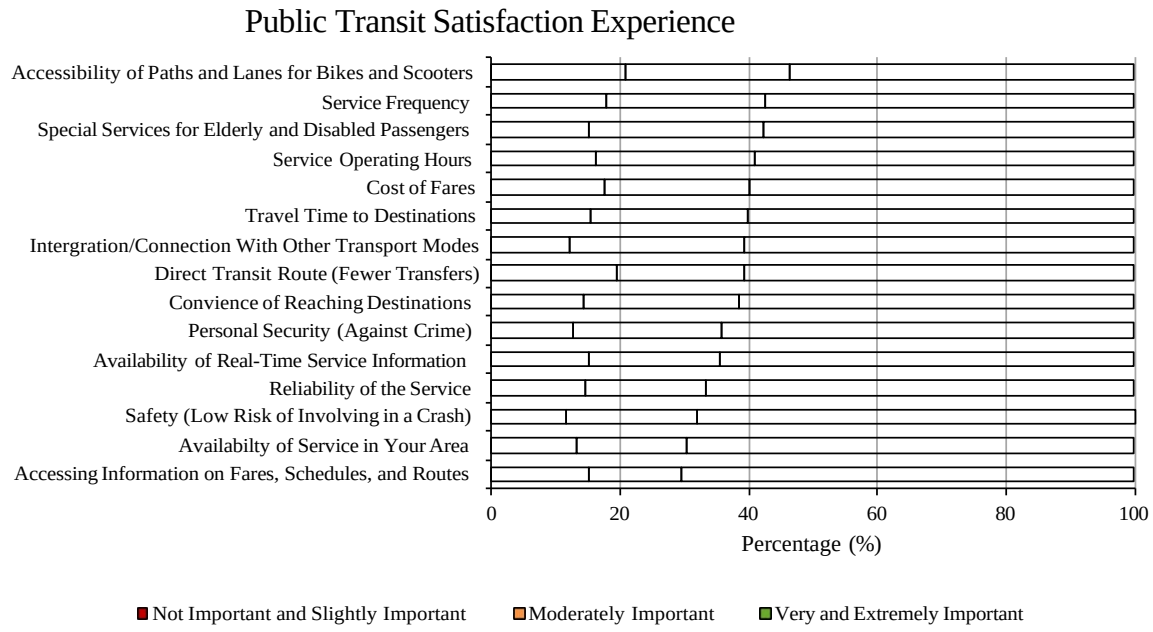


Figure 38: Public Transit Satisfaction Experience

In Figure 33, respondents are very satisfied with the paratransit operating hours (94.7%) and its service frequency (94.1%). This indicates that paratransit is available to respondents when needed. Almost all other service factors are above the 70% threshold, however a few factors are below the threshold, which may indicate that accessing information about the paratransit needs to be improved so that respondents are able to find the information easily. There may be less direct transit routes, which can cause respondents to feel uncomfortable with transferring to another paratransit, since it is a challenge for those using the paratransit in the

first place. However, with improvements in paratransit services, people can travel at ease.

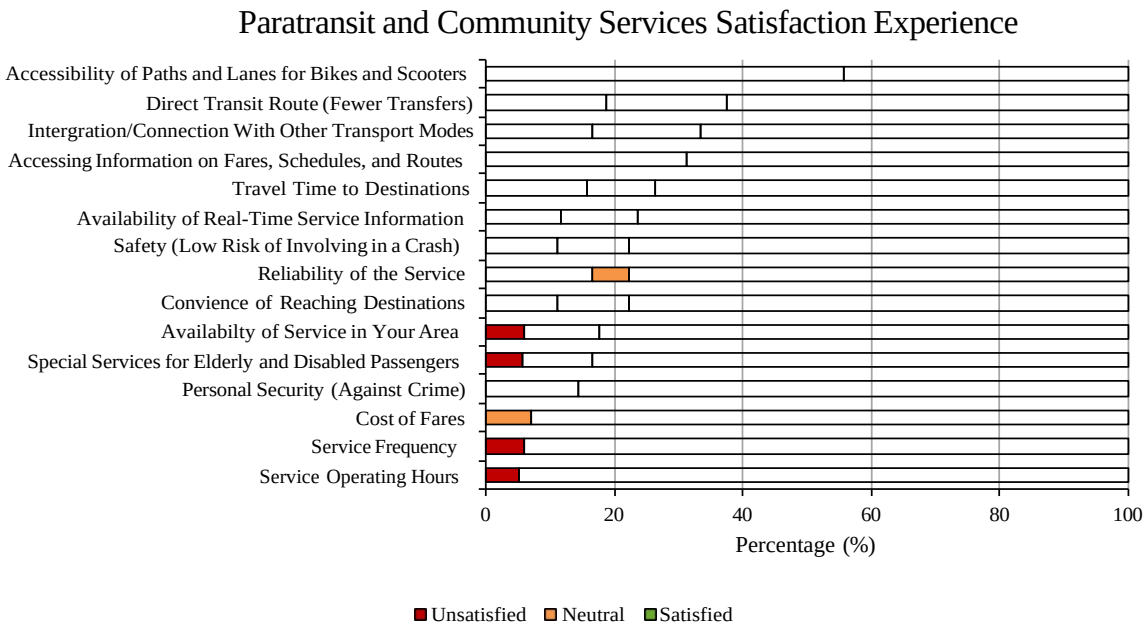


Figure 39: Paratransit and Community Services Satisfaction Experience

Figure 34, provides the satisfaction percentage of using ride-hailing services. Respondents are most satisfied with the travel time to destinations, which indicates that respondents are able to get to their destination at a reasonable time, considering that they did not need to transfer out like other type of transportation option. However, it seems that the cost of fare and safety are part of one of the lowest satisfaction service factors. The cost of fare can fluctuate depending on the time of day and day of week. As for the safety factors, the respondent's safety is relied upon by the drivers, which depends on the ability of the drivers, the respondents may feel unsafe and even uncomfortable to voice their concerns to the driver.

Figure 40: Ride-Hailing Satisfaction Experience

4.1.3.7. Transportation Impact

Respondents are avoiding going to activities due to transportation challenges. Most respondents stated that they decided to not attend activities every few times a month (28.5%) due to the challenge of finding and arranging transportation. However, the second highest choice was respondents rarely (23.1%) avoiding going somewhere due to transportation challenges. Based on Figure 35, the combined percentage of daily, often, and sometimes options for avoiding activities due to transportation challenges are higher compared to the other two options combined. This shows that respondents do avoid going to activities because of finding transportation.

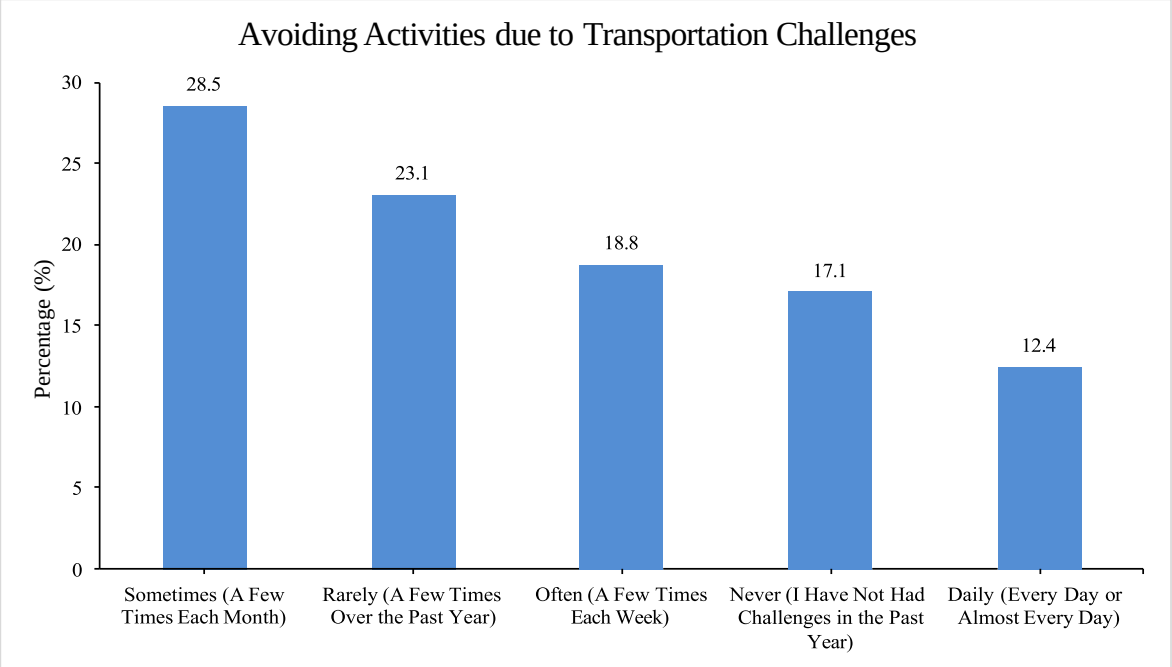


Figure 41: Avoiding Activities due to Transportation Challenges

In Figure 36, the highest percentage of respondents are in the rarely option with 32.9% and the second highest is from the never option with 27.2%. Respondents being late due to transportation challenges are unlikely since most respondents are not always late for their destination. The reason for respondents being on time may be due to the time management of the respondents. Some possibilities that can cause respondents to be late could be weather conditions, vehicle startup issues, and traffic delays due to crashes and construction.

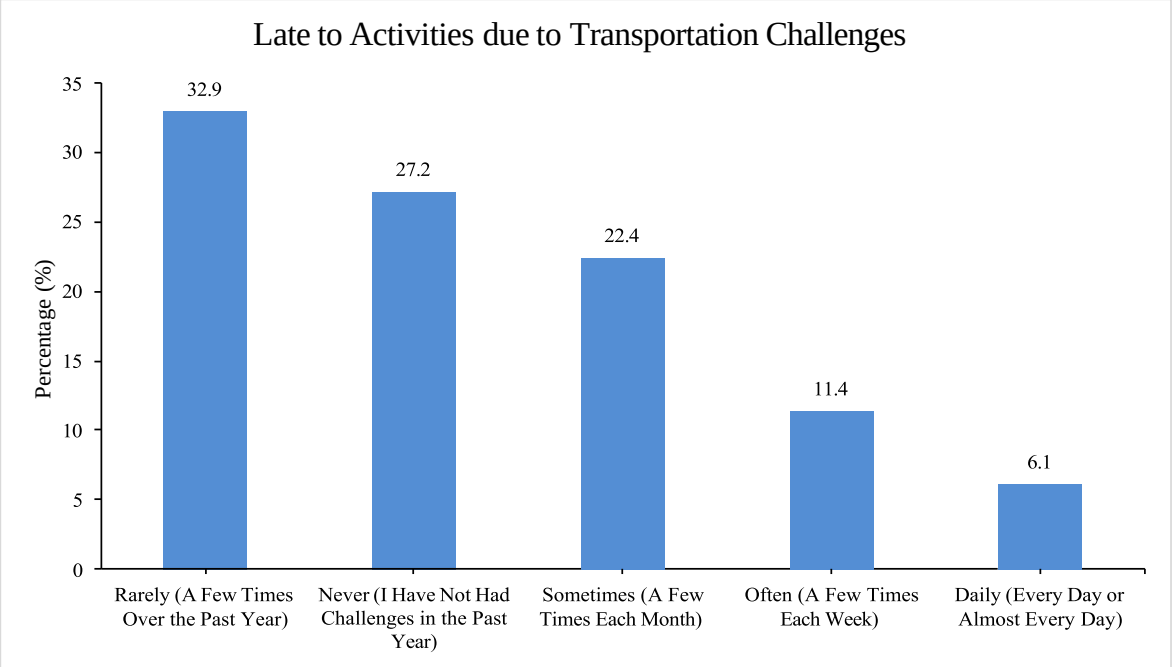


Figure 42: Late to Activities due to Transportation Challenges

4.1.3.8. Open-ended Questions

The non-driver respondents were also asked to provide their opinions at the end of the survey with several open-ended questions, covering the following main topics:

- Challenges traveling or participating in activities
- Suggestion for improvements in transportation options
- Can apps and smartphones improve transportation needs

This section will present a brief summary of the analyses for each of the aspects mentioned above. For full responses and analysis, please refer to Appendix E.

4.1.3.8.1. Challenges (Q34)

The challenges raised by the respondents can be categorized into the following:

Health-Related Issues (Physical and Mental):

Health related issues include physical and mental challenges in regard to traveling and participating in activities. Regarding physical disabilities, respondents with physical limitations, such as vision problems or mobility issues, may struggle to get in and out of vehicles and navigate transportation independently. As for the mental health challenges, anxiety, PTSD from car accidents, and general fear of driving are significant barriers to mobility.

Lack of Accessible Transportation:

Many respondents in rural areas reported a lack of public transportation, forcing them to rely on costly services like Uber or to depend on others. In urban areas, respondents noted the difficulty in finding accessible sidewalks and safe walking paths.

Financial Constraints:

The cost of maintaining a vehicle, using rideshare services, or even affording public transportation was a significant concern, particularly for those on fixed incomes. Respondents mentioned the financial burden of owning a car, including costs for insurance, gas, and maintenance, as major barriers.

Social Isolation and Dependency:

Many respondents feel isolated because they cannot drive themselves, leading to missed social events and a reduced ability to maintain relationships. Reliance on family, friends, or community members for transportation was commonly seen as a challenge, with respondents feeling like a burden or constrained by others' availability.

Safety Concerns:

Concerns about reckless driving and general safety while using private transportation are what makes respondents fearful of driving or even riding a vehicle.

Time Constraints and Inconvenience:

Long travel times and the unpredictability of public transport schedules made it difficult for respondents to plan their activities or ensure timely arrival at their destinations. This leads to respondents feeling inconvenienced by the transportation option they use.

Solutions:

In regard to the challenges, respondents were also asked for potential solutions. One solution many respondents proposed was to rely on family and friends for transportation, although this comes with challenges of coordination and perceived burden. A second solution some respondents mentioned was the potential for more organized community support, such as volunteer drivers or ride-sharing groups to help solve the challenges of traveling to activities.

4.1.3.8.2. Suggestions to improve transportation options (Q35)

Suggestions for improving transportation options can be categorized into the following:

Health related:

Respondents believed better resources, accessibility of paratransit, and adding experienced personal care assistants in vehicles used by persons with disability can help improve transportation options.

Enhancing Public Transit and Infrastructure:

Many respondents would like to have more access to public transit in small town and rural areas, and easy access to information regarding the public transit schedules, cost, and travel time. By expanding and improving transit services, respondents will have accessibility to public transit and transit information.

Financial Assistance and Affordability:

The costs of traveling are significant for non-drivers. Implementing policies to reduce public transit fare and access to possibly owning a vehicle would be extremely helpful.

Safety:

Implementing policy to retest drivers every few years so drivers will have the newest road traffic knowledge to navigate.

Technological Solutions and Innovations:

Respondents would like smart technology to be implemented for a more efficient traffic management that will reduce the travel time and delay.

Volunteer and Community Support:

Promote and recruit volunteers to help drive community members and support ridesharing for more transportation options.

4.1.3.8.3. Suggestions on Smartphone and Applications (Q36)

The ability smartphone and applications to improve the meeting of transportation needs are placed into two categories below:

Yes:

Respondents that answer yes to applications and smartphones as a way to improve the meeting of transportation needs, believe having real-time tracking and navigations are useful for travel planning, since it allows persons of disability to find the best transportation option for them. Respondents also shared that ride-hailing and ride-sharing applications are helpful in handling and arranging transportation.

No:

Respondents that answered no to applications and smartphones as a way to improve the meeting of transportation needs, have general skepticism about the applications and others have technological barriers, since they have a hard time navigating a smartphone.

4.1.3.9. Latent Class Analysis

Based on the socio-demographic of the survey results, responses show that the majority of respondents (76.8%) do not have a disability, while a significant minority (23.2%) report having some form of disability. Among those who reported having disabilities, the most common type is physical (40.2%), which includes mobility impairments that can significantly affect transportation needs. Vision impairment and mental health conditions or neurodivergence also represent substantial portions of the disabled population, at 28.2% and 29.9%, respectively.

In terms of vehicle availability, 59% of households have access to a vehicle. Around 45% of these households have an income below $25K, and 75% have an income below $50K. Additionally, 55% of respondents do not have a driver's license. Employment status is evenly split, with 35% employed and 35% unemployed. A significant portion of individuals under 34 years old and earning less than $25K do not have a driver's license. Additionally, 67% of respondents with disabilities do not have a driver's license. Among the respondents, most unemployed individuals also do not possess a driver's license.

The primary reasons for not driving in Wisconsin are multifaceted. Latent class analysis reveals three distinct categories: Class 0, Class 1, and Class 2. For each class, the characteristics, travel purposes, and concerns of non-drivers are summarized.

4.1.3.9.1. Class 0

Car-free preference (impacting all age groups, focusing on ages 45-65 with 40%, with 62% having incomes below $50K) include employed individuals (43%) with driver’s licenses (69%) and vehicle access (74%) who primarily rely on cars driven by household members, buses, and walking or rolling. The most frequent travel purposes are for food/groceries, social and recreational activities, medical and healthcare, and personal business, respectively. However, there were a few concerns. For non-drivers to choose cars driven by household members, the main concerns are service reliability, availability of real-time service information, fare costs, and personal security. Compared to cars driven by household members, these factors significantly influence non-drivers’ choice and comfort level when using external transportation services. The concerns related to buses include service

frequency and direct transit routes. For walking, important factors include traffic safety for pedestrians, cyclists, and scooters, distance to common destinations, and street lighting for walking, bicycling, and scooting at night. For pedaling and scooting, important factors include traffic safety for pedestrians, cyclists, and scooters, and the availability of scooter- and bicycle-friendly lanes, storage and parking options for bicycles and scooters, accessibility of paths and lanes, quality of sidewalks and pathways, and traffic safety for pedestrians, cyclists, and scooters. Refer to Appendix F for detailed profile of Class 0.

4.1.3.9.2. Class 1

The lack of a driver's license impacts on all age groups, particularly those 25-34 and 45-64, with incomes below $50K (53% under $25K). Results show that those that lack a driver's license are mostly unemployed (46%) and do not have a vehicle available in their household (56%), Therefore this group relies on cars driven by other household members and buses. The most frequent travel purposes are for food/groceries, medical and healthcare, and social and recreational activities, respectively. The main concerns related to buses include service frequency, operating hours, and convenience of reaching destinations. Additionally, the main concerns related to cars driven by household members are service reliability and operating hours. Refer to Appendix G for detailed profile of Class 1.

4.1.3.9.3. Class 2

Vehicle-related expenses along with disability, with no effect from lack of a driver's license, affect all age groups, particularly those aged 35-64 (59%), with incomes below $50K (77%). This class also includes both employed and unemployed individuals (67%) who have driver's licenses (66%) and vehicle access (63%) but rely on cars driven by household members, buses, and walking or rolling. The most frequent travel purposes are for food/groceries, social and recreational activities, medical and healthcare, and personal business, respectively. Main concerns related to buses include service frequency, direct transit routes, convenience of reaching destinations, and service reliability. Additionally, main concerns related to cars driven by household members are operating hours, service availability in the area, fare costs, and personal security. Refer to Appendix H for detailed profile of Class 2.

To summarize, in Wisconsin, the primary modes of transportation are cars driven by household members, buses, and walking or rolling (for those using mobility devices). Major concerns regarding trips other than cars driven by household members are due to service operating hours, service availability, and service frequency. Major concerns for bus users are

due to service frequency, travel time to destination, and direct transit routes. For individuals who walk, important factors include the distance to common destinations, street lighting, weather conditions, and pedestrian traffic safety, all of which have a significant impact on their ability to use this mode of transportation. For individuals who pedal or scoot, important factors include traffic safety for cyclists and scooter users, the availability of scooter- and bicycle-friendly lanes, weather conditions, and personal safety from crime while using these modes of transport. These factors greatly affect their ability to use these transportation options.

4.1.4. Survey Topic (Non-Driver Adjacent)

4.1.4.1. Type of Non-Drivers Household Members

Table 15, provides a description of the type of non-drivers that non-driver adjacent group provides ride to. Children (57.9%) was the largest group that non-driver adjacent provided ride for, followed by elderly family members (28.3%), then those with disabilities (19.6%), and other non-drivers (14.2%).

Table 15: Non-Drivers Household Members

Non-Driver Type	Number of Respondents	Percentage
Children	434	57.9%
Dependents with disabilities	106	14.2%
Elderly family members	212	28.3%
Other non-drivers in the household	147	19.6%

4.1.4.2. Reason for Providing Ride

The top three reasons why non-drivers adjacent persons provide rides are because of household members lack of driver’s license (52.58%), disability (23.78%), and helping reduce vehicle related expenses (22.06%), which can be seen in Table 16.

Table 16: Non-Driver Adjacent Reason for Providing Ride

Reason for Giving Rides	Number of Respondents	Percentage
Household member has a disability	180	23.78%
Household member does not have a driver's license	398	52.58%
To reduce household vehicle-related expenses	167	22.06%
To reduce household costs for registration and insurance	113	14.93%
Household member has a car-free preference	90	11.89%
Insufficient availability of public transit and shared transportation	138	18.23%
Other	38	5.02%

4.1.4.3. Frequency of Ride Given

The highest frequency of rides given by non-driver adjacent persons were due to taking children to school or daycare (19.5%) in Figure 37. Work (18.6%) was found to be the second most frequent rides given, followed by rides for non-drivers to personal educational places (16.4%), and shopping for food and groceries (11%). However it seems, the lower frequency of rides provided by non-driver adjacent persons were to religious and spiritual (3.6%) and medical and healthcare activities (4.8%). This indicate that most non-drivers may have a harder time finding rides to these activities considering that medical and healthcare activities may not fit into non-driver adjacent persons schedule and religious and spiritual activities may align with non-drivers rest day.

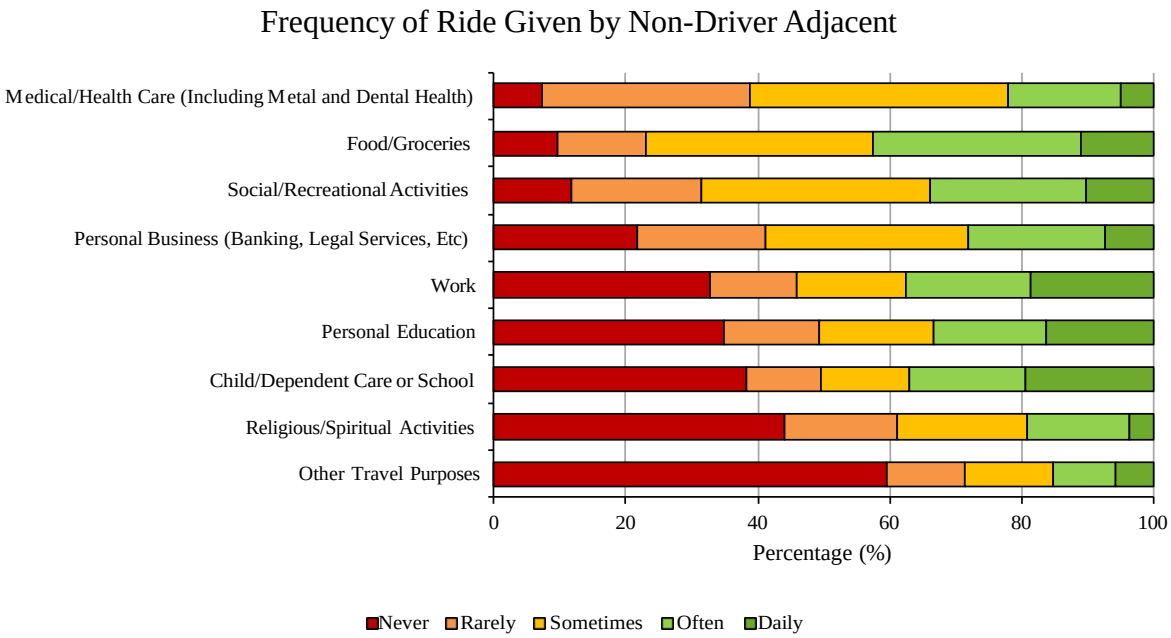


Figure 43: Frequency of Ride Given by Non-Driver Adjacent

4.1.4.4. Disability Affecting Non-Drivers Household Members Receiving Rides

The top three disability types of non-drivers that create the need for non-driver adjacent persons to provide a ride is due to physical disability (44.84%), mental health conditions or neurodivergence (33.18%), and vision impairment (26.46%), which can be seen in Table 17.

Table 17: Disability of Non-Drivers Household Members

Disability Type	Number of Respondents	Percentage
Vision impairment	59	26.46%
Developmental or cognitive disability	48	21.52%
Mental health condition or neurodivergence	74	33.18%
Physical disability	100	44.84%
Another disability	14	6.28%
Prefer not to disclose	8	3.59%

4.1.4.5. Handling Transportation Arrangements

Besides providing ride to non-drivers, a significant number of non-drivers adjacent persons stated they did not handle arranging other transportation for non-drivers (63%), in Figure 38, whereas 35.6% of respondents said yes, they arranged transportation for non-driver household members. Transportation Arrangements for Non-Drivers

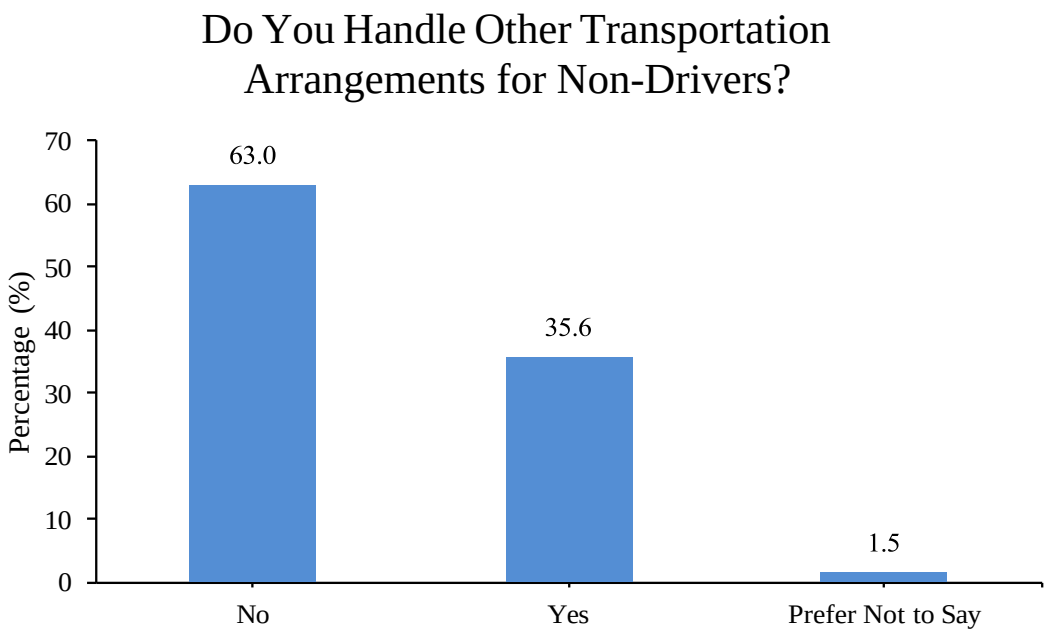


Figure 44: Transportation Arrangements for Non-Drivers

4.1.4.5.1. Types of Transportation Arranged

Respondents that stated yes to arranging transportation for non-drivers were asked what types of transportation were arranged which are listed in Table 18. Arranging other household members to provide rides is the largest group with 43.51% of respondents, followed by asking non-drivers to walk (38.93%), and/or arranging for school bus (30.92%) to pick and drop off the non-drivers. Since school bus was listed as part of an arrangement type, it shows that many respondents are in charge of finding or providing transportation for children to school, which corresponds to Table 15.

Table 18: Arranged Transportation Type

Transportation Type	Number of Respondents	Percentage
School bus	81	30.92%
Public transport (Bus, train, subway)	56	21.37%
Walk	102	38.93%
Car driven by other household members	114	43.51%
Taxis and ride hail (Uber, Lyft for older children)	64	24.43%
Paratransit	15	5.73%
Volunteer/community transportation service	24	9.16%
Other	20	7.63%

4.1.4.5.2. Type of Household Member Transportation Arrangement was Made

Table 19 provides a list of household members that non-drivers adjacent makes arrangements for. Children (61.22%) were the top reason for arranging transportation, followed by the elderly (29.66%), and dependents with disabilities (18.63%), since they may not be able to or have a hard time arranging transportation for themselves.

Table 19: Type of Household Member Transportation Arrangement was Made

Non-Driver Type	Number of Respondents	Percentage
Children	161	61.22%
Dependents with disabilities	49	18.63%
Elderly family members	78	29.66%
Other non-drivers in the household	29	11.03%

4.1.4.6. Open-Ended Questions

The non-driver adjacent respondents were also asked to provide their opinions at the end of the survey with several open-ended questions, covering the following main topics:

- How transportation affects non-driving household members' participation in activities
- How the needing to provide rides to non-driving household members affects non-driver adjacent own life
- Suggestions for improving transportation options for non-driving household members
- Potential benefits of accessible applications or smartphones for improving transportation needs

This chapter will present a brief summary of the analyses for each of the aspects mentioned above. For full responses and analysis, please refer to Appendix I.

4.1.4.6.1. Concern of Transportation Impact Non-Drivers Activities Participation (Q53)

Logistics and Scheduling:

Many respondents reported that managing multiple schedules led to missed appointments and delayed participation in activities. When the primary driver is unavailable, non-drivers are unable to attend activities. However, primary drivers stated they face difficulty managing and arranging transportation when several household members have activities at the same time.

Dependency and Loss of Independent:

The lack of independent transportation prevents non-drivers, especially elderly or disabled members, from attending social activities and non-drivers are unable to participate in spontaneous or unscheduled activities due to their reliance on non-driver adjacent. Non-drivers often feel that they are imposing on non-drivers adjacent, which reduces their willingness to ask for rides.

Safety:

Some non-drivers feel unsafe using public transport due to mental health or physical disability concerns, therefore non-drivers adjacent are worried about keeping non-drivers feeling safe while providing them ride.

Cost and Financial Impact:

Frequent driving and the increase in the cost of gas, results in high maintenance costs for non-driver adjacent, therefore it makes it difficult for non-driver adjacent to provide regular transportation. Also, services like Uber or Lyft are considered too expensive for frequent use so relying on these services can be a financial burden for non-drivers and non-driver adjacent alike.

Lack of Accessible Alternatives:

Many respondents, especially in rural areas, reported no availability of public transportation and although some may have access to public transit, some public transportation options are not accessible for individuals with disabilities.

Time Constraint and Flexibility Issues:

Non-driver adjacent work or personal schedules often limit their ability to provide rides, which leads to non-drivers often having to adjust their plans around the non-drivers adjacent availability.

Solutions:

To combat the concern listed above, a few solutions were given by the respondents.

1) Develop a system that allows caregivers and non-drivers to schedule rides more effectively, offering real-time updates and flexibility in adjusting schedules. Encourage carpooling or ridesharing within communities, leveraging local resources to help manage overlapping activities and reduce dependence on a single driver. Establish volunteer driver networks within communities, where people can offer rides to non-drivers for scheduled

activities and for essential activities like grocery shopping and medical appointments, which reduces dependence on family members. Also expand programs like paratransit to offer flexible scheduling options, allowing non-drivers to attend spontaneous or unscheduled activities.

2) Advocate for public transit systems to extend their operating hours, especially in rural or suburban areas where transportation options are limited. Advocate for the expansion of public transportation services in rural areas and underserved urban regions. Ensure that public transit systems include accessible features for individuals with physical and cognitive disabilities, such as wider doorways, ramps, and accessible stops.

3) Introduce subsidized ride-hailing services that allow non-drivers to travel independently without the financial burden. This should be targeted at the elderly and disabled. Collaborate with ride-hailing services to offer discounted or free rides for non-drivers, especially for essential appointments like medical visits.

4.1.4.6.2. Impact of Life Due to Providing Ride (Q54)

Time Management:

Many respondents expressed that providing rides takes away time from their personal activities, work, or relaxation and they often have to rearrange or cancel their plans to provide rides.

Financial Impact:

Many caregivers highlighted the financial strain of constantly paying for gas and frequent use of their vehicle to provide rides increases maintenance costs, such as repairs and servicing.

Emotional and Psychological Strain:

Non-drivers adjacent expressed feelings of exhaustion from the constant need to provide transportation and some feel like they are always "on call" and have to be available whenever someone needs a ride.

Conflicting Schedules:

Non-drivers adjacent reported difficulty in managing multiple schedules for their household members and some mentioned the stress caused by last-minute ride requests.

Physical Strain:

Non-driver adjacent mentioned feeling physically tired from driving long distances or multiple times a day and although some non-drivers adjacent have health issues that make

driving difficult, they still need to provide rides, since they are the only one the non-drivers can rely on.

Solutions:

To combat the concern listed above, a few solutions were given by the respondents.

1) Develop tools that allow flexible ride scheduling, reducing the need for last-minute changes. Encourage shared transportation duties among household members, neighbors, and implementing community carpool systems to share transportation responsibilities can help to reduce stress and burden on one person.

2) Provide non-drivers with discounted or free public transportation passes to reduce the reliance on personal vehicles and help the non-driver adjacent reduce vehicle-related expenses.

4.1.4.6.3. Improve Transportation Options (Q58)

Enhancing Public Transportation Services:

Expand the availability, routes, and timing of public transportation, especially in rural and suburban areas. Extend service hours for buses to accommodate early morning and late-night trips and ensure buses and public transit systems are accessible for individuals with disabilities (e.g., ramps and space for wheelchairs).

Carpooling and ride-sharing options:

Encourage and implement community carpooling programs, allowing neighbors to share rides, especially for work and school commutes. Introduce a local rideshare subsidy program for families in rural or underserved communities, enabling more people to afford these services. Create a public awareness campaign that educates residents about carpooling benefits and how to utilize ridesharing apps effectively.

Driver's License and Training Program:

Introduce initiatives that provide low-cost driver's education, especially for low-income individuals. Create community programs offering driving lessons and launch a vehicle-sharing program where individuals who do not own a car can borrow a vehicle to take their driving test.

Financial Assistant:

Offer financial support for transportation costs, including fuel, vehicle maintenance, and

alternative transport.

Community-Based Transportations:

Create volunteer driver programs that help transport elderly or disabled individuals to appointments and errands. Implement small-town taxi services or “on-call” transportation, similar to public transit but specifically for non-drivers.

Technology and Infrastructure Improvement:

Improve transportation infrastructure by adding bike lanes, sidewalks, and pedestrian-friendly routes. Increase the availability of electric scooters and bikes for short-distance travel.

Medical and Specialized Transportation:

Expand Non-Emergency Medical Transportation (NEMT) services, especially in rural areas. Collaborate with healthcare providers to identify high-need areas and create transportation networks tailored to medical visits. Develop a regional volunteer transportation service that specifically cater to individuals with disabilities or medical needs.

4.1.4.6.4. Smartphone and Applications Improve Transportation Need (Q59)

Ride-Sharing and Public Transportation Apps:

No availability of public transit apps in rural ones, and lack of ride-sharing options leads to high cost of ride-sharing services in rural areas.

Navigation and Scheduling Apps:

Respondents highlighted the utility of navigation apps like Google Maps and the desire for better scheduling apps for public transport.

Accessibility and Usability for Elderly and Disabled Users:

Many elderly and disabled users find it difficult to use smartphones or apps to organize transportation.

Lack of Infrastructure and Services in Rural Areas:

Respondents in rural areas expressed frustration with the lack of available public transportation services and ride-sharing services.

Support for Coordination and Communication:

Lack of apps that support family communication or ride coordination, especially for elderly or disabled members.

Solutions:

To combat the concern listed above, a few solutions were given by the respondents.

1) Introduce and promote affordable public transit apps in underserved regions and expand the availability of real-time scheduling apps for buses and public transportation. Work with ridesharing companies to expand coverage and provide discounted rates. Implement community-based transportation solutions, such as volunteer driver programs or small-scale transit services Launch public awareness campaigns about existing ride-sharing options and public transportation apps.

2) Develop apps that simplify transportation scheduling and coordination within families, particularly for dependent family members and integrate family ride coordination features into existing apps. Develop simpler, more user-friendly transportation apps designed for elderly or disabled users and offer training programs to help the elderly and disabled learn how to use transportation apps.

4.1.4.7. Latent Class Analysis

Based on the socio-demographic of the survey results, responses show that 52% of non-driver adjacent respondents have an income over $50K, 80% have an income over $25K, and 22% have an income below $25K. The main reasons for non-drivers adjacent providing rides to non-drivers include lack of a driver's license, disability, and reducing household vehicle-related expenses. Physical disabilities, mental health conditions, and vision impairments are common disabilities that affect the driving ability of those receiving rides. Also, 65% of household members who give rides to others are employed and most of them who provide rides to others are between 35 and 64 years old (57%). The 25-64 age range and a high percentage of 35-44 age group (37%), primarily provides rides for children, while those over 45 mostly give rides to elderly family members. Homemakers and employed individuals provide the most rides for children, while retired and employed individuals tend to drive elderly family members. The most frequent trips (more than 4 times per week) are for food/groceries (42.7%), work (37.7%), school (37.1%), and social/recreational activities (33.8%). The types of non-driving household members for whom non-driver-adjacent individuals provide rides are categorized into three groups—Class 0, Class 1, and Class 2—based on the results of latent class analysis.

4.1.4.7.1. Class 0

Most trips are for other non-drivers in the household (e.g., friends, spouse, neighbors) who

also use walking, public transportation, and taxi or ride-hail services, in addition to receiving rides (41%). The main reasons household members give rides to non-drivers are lack of a driver's license (44%), disability (24%), and reducing household vehicle-related expenses (23%), respectively. The most frequent travel purposes are for food/groceries, personal business, social and recreational activities, work, and medical and healthcare, respectively. Refer to

Appendix J for detailed profile of Class 0.

4.1.4.7.2. Class 1

Most trips are for children who also use the school bus, walking, taxi or ride-hailing services, and public transportation, in addition to receiving rides (44%). The main reasons household members give rides to non-drivers are lack of a driver's license (66%), reducing household vehicle-related expenses (20%), insufficient availability of public transit and shared transportation (18%), and disability (17%), respectively. The most frequent travel purposes are for food/groceries, social and recreational activities, child/dependent care or school, and medical and healthcare, respectively. Refer to Appendix K for detailed profile of Class 1.

4.1.4.7.3. Class 2

Most trips are for elderly family members who also use walking, taxi or ride-hail services, and public transportation in addition to receiving rides (44%). The main reasons household members give rides to non-drivers are disability, reducing household vehicle-related expenses (28%), insufficient availability of public transit and shared transportation (24%), and lack of a driver's license (23%), respectively. The most frequent travel purposes are for food/groceries, medical and healthcare, personal business, and social and recreational activities, respectively. Refer to Appendix L for detailed profile of Class 2.

4.2. Summary

This chapter presents the results of a survey conducted among both non-drivers and non-driver-adjacent groups in Wisconsin. The primary purpose of the survey was to understand the reasons for not driving and for providing rides, the importance of various transportation options, and suggested improvements.

The survey yielded valuable insights into transportation accessibility and services, with a total of 1,268 responses—505 from non-drivers and 763 from non-driver-adjacent individuals. The analysis focused on socio-demographic characteristics and survey topics such as reasons for driving or providing rides, travel patterns, satisfaction with transportation services, travel challenges, and suggestions for improvement.

Socio-Demographic Characteristics

The survey revealed that the majority of respondents in both groups were female: 66.1% of non-drivers and 58.1% of non-driver-adjacent individuals. Among non-drivers, the age

distribution showed higher representation in both younger and older age groups. In contrast, non-driver-adjacent respondents exhibited a steady increase in representation with age. Income disparities were evident: 44% of non-drivers reported earning less than $25,000 annually, while 52.2% of non-driver-adjacent respondents earned over $50,000 annually.

Mode Preferences and Travel Patterns

The survey explored transportation preferences and travel behaviors. Respondents from both groups cited the lack of drivers and disabilities as primary reasons why non-drivers do not drive and why non-driver-adjacent individuals provide rides. Public transit (32%) and reliance on friends and family (27.7%) emerged as dominant transportation modes for non-drivers. Additionally, walking or rolling (18.9%) was a preferred mode due to vehicle-related expenses, as many non-drivers have limited income. A minority of non-drivers (17.43%) expressed a preference for a car-free lifestyle, making walking, rolling, and public transit appealing options.

Regarding travel patterns, the most critical travel activities for both groups were grocery shopping and medical appointments. Conversely, childcare and personal education were rated as the least important travel purposes. Religious and spiritual activities also ranked low in importance for both groups.

Satisfaction, Concerns and Suggestions

Non-drivers expressed the highest satisfaction with rides provided by household members (72.5%). However, scheduling conflicts posed significant challenges, as non-drivers often felt constrained by the availability of non-driver-adjacent individuals. Public transit (50.4%) and paratransit (38.1%) services were moderately satisfactory but required infrastructure improvements to address accessibility issues in certain areas. Non-driver-adjacent respondents emphasized the need for more affordable transportation options due to the high costs of ride-hailing services and vehicle maintenance.

Non-drivers emphasized the need for affordable and accessible transportation options, given their lower income levels. Non-driver-adjacent respondents supported cost-friendly and expanded transportation options, as these changes would alleviate their time and financial burdens. Simplifying technology would empower non-drivers to manage transportation independently and reduce scheduling stress for non-driver-adjacent individuals.

The survey findings provide critical insights into the needs of non-drivers and non-driver-adjacent individuals in Wisconsin. Key areas for improvement include increasing the availability of transportation options, addressing financial constraints, and simplifying technology for transportation information and arrangements. These insights can guide targeted strategies to enhance transportation services and better meet the specific needs of these groups.

5. IMPLEMENTATION PLAN

In this section, the implementation plan outlines the strategies, both short-term and long-term, to address the findings and recommendations based on the results from both literature review and the statewide surveys. The plan tends to enhance the state's multimodal transportation system, accessibility, safety and equity to better serve the needs of non-drivers and promote inclusivity and equity in transportation, considering geographic disparities, public transit, accessibility improvements, transportation equity, public-private-community partnerships, technology innovation and integration and education and outreach.

5.1. Strategies Based on Non-Driver Survey Responses

Based on an analysis of non-driver survey responses, the project team has proposed nine candidate strategies to enhance mobility options for non-drivers in Wisconsin (Table 20). These strategies address a diverse range of non-driver needs, organized across five key areas: Infrastructure, Information & Technology, Operations, Partnership and Policy, and Training & Education, with a focus on WisDOT's leadership and involvement.

The following legends are used to categorize recommended implementation duration, strategy types, and non-driver road users.

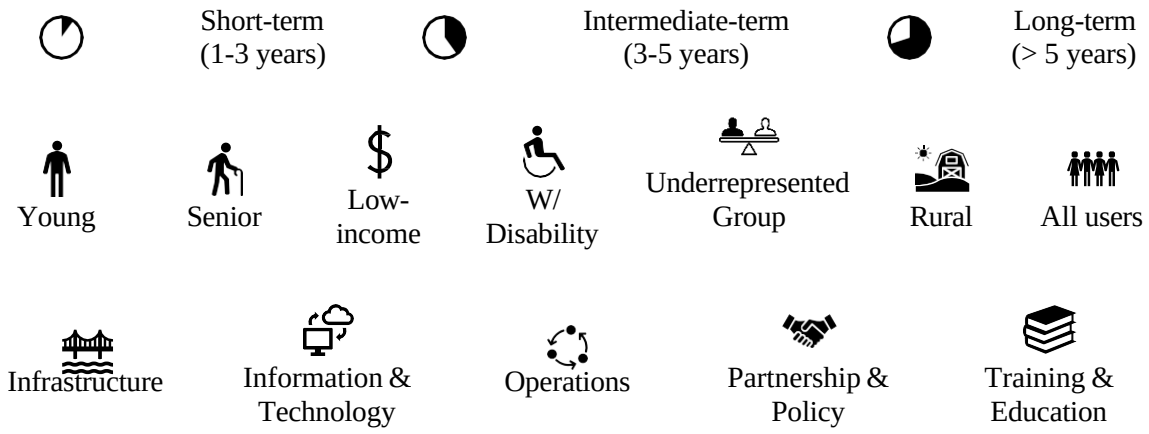
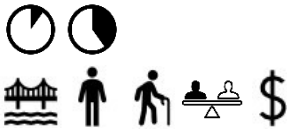


Table 20: Proposed Strategies for Non-Driver

ID	Strategy	Description
S1	Resilient Mobility Solutions for Non-Drivers: A Community-Based Approach 	With limited public funding, community-driven mobility efforts can thrive by catering to specific local needs, supported by a strategic mix of local partnerships, technology, and community engagement. WisDOT can play a key role as a convener and sponsor, offering seed grants to support and promote these initiatives. To address equity gaps, transportation strategies should prioritize outreach and tailored solutions for underrepresented groups, for example Black or African American and Hispanic or Latino communities. Key strategies include: • *Partnerships with Local Businesses and Organizations:* Local entities like grocery stores and health clinics can collaborate to increase community accessibility and reduce mobility gaps. Partnering with organizations, such as cultural centers or faith-based groups, that serve underrepresented communities, can help identify specific barriers and co-design solutions that address their unique needs. • *Volunteer-Based and Rideshare Programs:* Volunteer driver programs have successfully operated in rural Wisconsin for years, benefiting seniors, persons with disabilities, and low-income residents. Expanding these programs to other rural areas and introducing them to urban communities through nonprofits or neighborhood associations can further extend their reach and impact. Outreach efforts should focus on engaging underrepresented communities through trusted leaders and culturally relevant channels, such as churches or community centers, to ensure inclusivity and participation. • *Flexible Micromobility Options:* Community bike and e-scooter programs, supported by private funding or local grants, can be viable in areas with sufficient population density and demand. To ensure equitable access, these programs should offer subsidized memberships, provide training, and locate docking stations in underserved neighborhoods, for example those with higher concentrations of Black and Hispanic residents. *Crowdsourced Funding and Local Grants:* Financial support from local grants, charitable organizations, and community crowdfunding campaigns can provide a sustainable funding base for these initiatives.
S2	Enhancing Non-Driver Mobility through Smart Technology and Integrated Service Strategies 	WisDOT can leverage smart technology to create a more efficient, user-friendly, and integrated transportation system for non-drivers. Some of them are: • *Integrated Mobility Platforms*: Develop a centralized app that integrates various transportation options (public transit, volunteer driver programs, carpooling, and micromobility services) into one user-friendly platform. • *Predictive Analytics for Service Optimization*: Leverage predictive analytics to analyze transportation data for optimizing transit routes and scheduling. • *Implement IoT-Based Monitoring Systems*: Use IoT technology to track and monitor paratransit services and volunteer driver programs in real-time. • *Smart Transit Stops*: Equip transit stops with smart technology, including real-time arrival displays and mobile charging stations.

ID	Strategy	Description
S3	Transforming Paratransit Through Cost-Effective Solutions 	Improving paratransit services for people with disabilities requires a combination of innovation and cost-effectiveness. WisDOT can consider several strategies, including: • *Technology Integration*: Implement advanced scheduling and routing software to optimize paratransit operations and improve service efficiency. • *Flexible Service Models*: Adopt a flexible service model that integrates both fixed-route and on-demand services, allowing for greater adaptability to riders' needs. • *Driver Training Programs*: Enhance training for paratransit drivers to ensure they are well-equipped to understand and address the unique needs of riders with disabilities.
S4	Connecting Communities: Increasing Awareness of Rural Transportation Needs 	WisDOT can significantly increase public awareness of the mobility challenges faced by non-drivers in rural areas and work toward effective solutions through: • *Launch Campaigns and Community Engagement*: Focus on rural areas through targeted campaigns and workshops, community forums and stakeholder meetings that engage the community and raise awareness of available options. • *Coordinate with Advocacy Groups*: Align with local and state advocacy organizations to set standards for services and improve service reliability. • *Conduct Community Surveys and Needs Assessments*: Gathering firsthand data from rural residents about their mobility challenges. • *Create Informative Online Platforms*: A centralized online resource for mobility options can help residents easily find information on public transit, vehicle-sharing, and volunteer driving services.

ID	Strategy	Description
S5	Creating Inclusive Pathways: Strategies for Accessible Mobility Infrastructure 	WisDOT can adopt a multimodal roadway planning and design process that is focused on serving all road users but prioritizes the needs of pedestrians and people with disabilities. To address equity gaps, infrastructure improvements should prioritize outreach and tailored solutions for underrepresented groups, such as Black or African American and Hispanic or Latino communities. Some examples include: • *Install Well-Lit Transit Stops with Shelters*: Ensure these stops are strategically located in low-income and rural areas, with connected sidewalks and safe crosswalks to improve accessibility. Prioritize areas with higher concentrations of Black and Hispanic residents to address historical inequities in infrastructure investment. • *Upgrade Senior-Friendly Infrastructure*: Focus on pedestrian facilities that accommodate the needs of seniors and individuals with disabilities, addressing distance challenges. Partner with organizations serving Black and Hispanic seniors to ensure designs meet their specific needs if necessary. • *Create Bike-Friendly Infrastructure*: Develop secure bike and scooter parking at transit stops and schools, as well as bike-friendly pathways, to encourage active transportation options. • *Implement Wayfinding Systems*: Clear signage and maps will aid non-drivers in navigating their routes. • *Invest in accessible multi-modal transit hubs*: the hubs integrate micromobility options alongside traditional modes like buses, community shuttles, and ride-sharing services. facilitate seamless connections between transit options, improving mobility for non-drivers and enabling efficient, independent access to essential destinations.
S6	Promoting Car-Sharing for Young and Low-Income Licensed Drivers 	Peer-to-peer (P2P) car-sharing can be a practical option for young and low-income licensed drivers who only need occasional access to a vehicle without the financial burden of vehicle ownership. WisDOT can assist in expanding car-sharing programs in areas with higher population density, while prioritizing outreach to underrepresented groups, for example Black or African American and Hispanic or Latino communities. Partnering with community organizations, advocacy groups, and local businesses to offer discounted rates, flexible payment options, and multilingual resources can help increase accessibility and ensure equitable participation for these users.
S7	Expanding Mobility Options for Low-Income Families Through TNC Partnerships 	Partnering with Transportation Network Companies (TNCs) can be a powerful strategy to enhance mobility options for low-income families, particularly in underrepresented communities such as Black or African American and Hispanic or Latino populations. WisDOT can play a crucial role in establishing these partnerships by acting as a facilitator and convener, ensuring outreach efforts specifically target communities with limited transportation access. This can provide grant funding and incentives for TNC services in underserved areas, supporting multilingual outreach and education, sharing and analyzing equity-focused data, creating inclusive and supportive policies and regulations, and integrating TNC services with public transit to better serve diverse populations.

ID	Strategy	Description
S8	Developing Pathways to Mobility through Affordable Driving Education 	WisDOT can develop and promote affordable driving education through expanding subsidized driving lessons specifically targeting low-income individuals, with a focus on reaching rural residents. To address equity gaps, these efforts should prioritize outreach and tailored solutions for underrepresented groups, for example Black or African American and Hispanic or Latino communities. This includes collaborating with high schools and universities to develop comprehensive educational programs that inform students about public transit options, ride-sharing services, and affordable driving education, developing accessible online platforms and flexible learning options for driver education. Partnerships with community organizations and culturally relevant outreach will ensure these programs are accessible and inclusive, particularly for non-English speakers and underserved populations.
S9	Enhancing Mobility for Non-Drivers through Strategic Land Use Planning 	WisDOT can assist in developing and implementing land use planning policies and strategies that focus on long-term improvements for non-drivers, including relaxing zoning restrictions to promote higher-density residential and mixed-use developments, which may involve raising density caps and reducing off-street parking requirements; and encouraging new development on underutilized surface parking lots through development incentives. Both strategies will facilitate easier access to essential destinations, making it more convenient for non-drivers to walk or use transit.

5.2. Strategies Based on Non-Driver Adjacent Group Survey Responses

To support the family members and friends of non-drivers who often provide assistance and rides, WisDOT can implement several strategies aimed at alleviating their burdens and enhancing their experience. While many strategies proposed for non-drivers also benefit their support networks, the following three strategies are specifically designed to address the unique challenges faced by families and caregivers of non-drivers. Table 21 provides a brief description of each proposed strategy.

Table 21: Proposed Strategies for Non-Driver Adjacent Group

ID	Strategy	Description
S10	Developing support programs for caregivers: resources and respite for non-driver adjacent group 	Develop comprehensive support programs for family members and friends of non-drivers that provide essential resources and information. These programs should include access to transportation options, details on services available for non-drivers, and educational materials on mobility solutions. Additionally, facilitate support groups or workshops focused on stress relief and caregiving challenges, offering a space for caregivers to share experiences and coping strategies. This holistic approach will empower caregivers and enhance their ability to support non-drivers effectively.

ID	Strategy	Description
S11	Building Community Connections: Local Carpool Networks and Ride-Matching Platforms for Non-Drivers 	WisDOT could explore additional state funding and coordination to expand shuttle services serving institutional locations such as senior living communities, senior centers, and other community hubs for non-drivers. Additionally, WisDOT could support the development of local carpool networks and a digital ride-matching platform to help households share driving responsibilities for non-drivers, such as children and elderly family members. This program would coordinate shared rides to common destinations, including schools, grocery stores, and medical appointments, effectively reducing the number of trips each household needs to make. This integrated approach promotes convenience, alleviates transportation burdens, and enhances accessibility for non-drivers.
S12	Routes to Education: Building a Transportation Network for School-Age Children 	Develop a transportation network specifically designed for school-age children, by enhancing school bus services and creating alternative options. WisDOT may consider more state funding and coordination for school bus services and more state funding and coordination for Safe Routes to Schools. The program aims to reduce the dependency on household members for rides, fostering independence among students and alleviating the transportation burden on families.
S13	Promoting Compact Development to Reduce Travel Burdens for Non-Driver Support Networks 	WisDOT can enhance coordination with MPOs and local agencies to support their efforts in promoting compact and efficient development patterns. This strategy aims to reduce the travel distance required for non-driver adjacent groups to provide rides and assistance to non-drivers. Additionally, it would shorten the distance between homes, shopping centers, appointments, and other destinations, making trips more manageable and increasing the feasibility of using transit or walking for these journeys.

5.3. Strategy Matrix

Table 22 shows the strategy matrix which maps proposed strategies across five key types—Infrastructure, Information & Technology, Operations, Partnership & Policy, and Training & Education—and identifies the primary non-driver or non-driver adjacent groups each strategy supports. The categories include young non-drivers, seniors, low-income individuals, those with disabilities, rural residents, and an "All" group, representing strategies that apply broadly.

Table 22: Strategy Matrix

	Non-Driver						Non-Driver Adjacent
Strategy Type	Young	Senior	Low-income	W/ Disability	Rural	Under-represented Group	All
Infrastructure	S5	S5	S2; S5	S3; S5		S5	
Information & Technology	S2, S6		S6	S2		S6	S10; S11
Operations	S1; S6	S1	S1; S6	S1; S3	S1	S1; S6	S12
Partnership & Policy	S1; S9	S1; S9	S1; S7; S8; S9	S1; S9	S1; S4; S9	S1; S7; S8	S11; S12; S13
Training & Education	S4	S4	S4; S8	S3; S4	S4	S8	

Prioritization

All the strategies have been evaluated based on the level of impact and coordination between WisDOT and other organizations. The level of coordination has a scale of 1 through 4 for *extensive, significant, moderate and minimal coordination*, respectively. The level of impact also has a scale of 1 through four for *low, somewhat, moderate and high impact*, respectively. Figure 39 illustrates the consideration of each strategy in terms of impact and coordination. Based on both metrics, S1, S3, and S7 have been prioritized for the non-driver group, while S11 has been selected for the non-driver adjacent group for further development and detailed implementation planning. For detailed information on each prioritized strategy, please refer to Appendix M for S1, S3, S7 and S11:

- S1: Resilient Mobility Solutions for Non-Drivers: A Community-Based Approach
- S3: Modernizing Paratransit: A Technology-Driven Approach to Inclusive Mobility Goals and Objectives
- S7: Expanding Mobility Options for Low-Income Families Through TNC Partnerships
- S11: Building Community Connections: Local Carpool Networks and Ride-Matching Platforms for Non-Drivers

While S4 and S10 are valuable according to the prioritization results, their objectives can be tied into other prioritized strategies (S4 with S1, S3, and S7; S10 with S11). S4's focus on raising awareness of rural transportation needs is addressed by S1, S3, and S7 through actionable solutions like expanding public transit and paratransit services in rural areas. Similarly, S10 overlaps with S11, but S11 was prioritized for its direct support of non-drivers, enabling them to navigate daily activities independently and indirectly easing caregiver responsibilities. This ensures a more comprehensive impact on both non-drivers and caregivers.

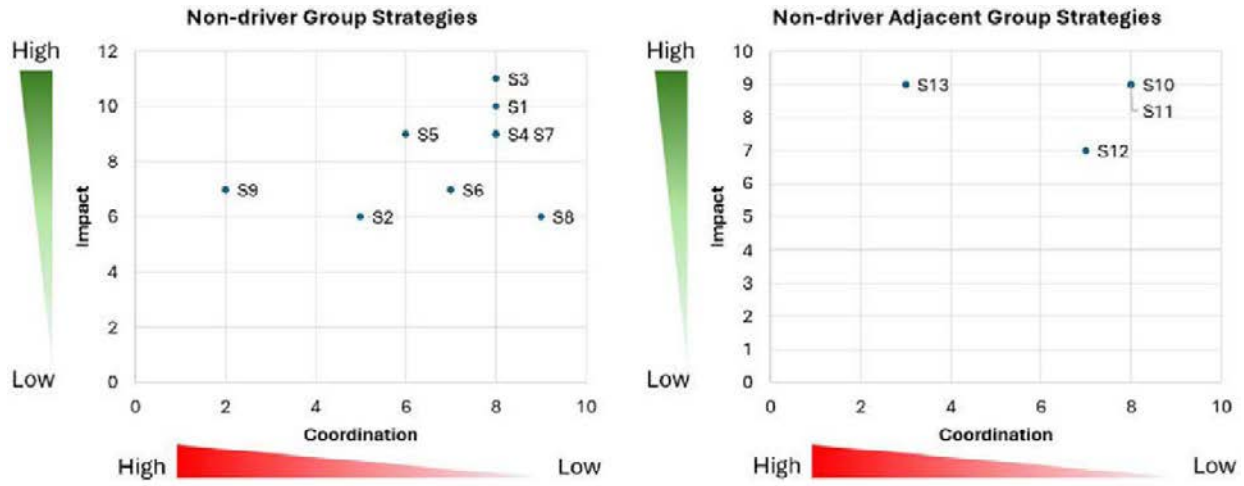


Figure 45: Strateges in terms of impact and coordination requirements

5.4. Summary

This implementation plan aims to improve transportation options for non-drivers, particularly low-income, rural, and tribal communities in Wisconsin, through a combination of innovative solutions, partnerships, and technology integration.

5.4.1. Community-Based Mobility Solutions

A key strategy involves expanding community-based solutions, such as shuttle services to essential destinations like senior living communities and establishing local carpool networks. The integration of a digital ride-matching platform can help households share driving responsibilities, enhancing access to schools, grocery stores, and medical appointments. This approach reduces household transportation burdens and promotes greater accessibility.

5.4.2. Transforming Paratransit Services

The transformation of paratransit services through the adoption of new service models and technology is another priority. By introducing flexible service models that combine fixed routes and on-demand services, along with advanced scheduling and routing software, the aim is to optimize paratransit operations. A focus on expanding these services, especially in underserved rural and tribal areas, addresses the mobility needs of people with disabilities and provides solutions beyond traditional transportation options.

5.4.3. TNC Partnerships for Low-Income Communities

Partnerships with TNCs offer a promising solution for enhancing mobility. By facilitating collaborations between TNCs, local transit agencies, and community organizations, Wisconsin can improve access to transportation for low-income families. This includes offering funding, policy support, and integrating TNC services with public transit systems to make transportation more affordable and accessible.

5.4.4. Leveraging Technology and Data

In all these strategies, leveraging data and technology plays a crucial role. For instance, integrating digital platforms, such as ride-matching services and scheduling software, can increase the efficiency and affordability of transportation options. Additionally, data analysis will be used to identify needs, prioritize service areas, and evaluate pilot programs to ensure continuous improvement and sustainability.

These strategies aim to create a more inclusive and efficient transportation system that addresses the unique mobility challenges faced by non-drivers, particularly those in rural and underserved areas. By piloting new models, expanding shuttle services, and incorporating TNCs and technology, Wisconsin will be able to provide more accessible, affordable, and coordinated transportation options for non-drivers, ultimately improving quality of life and reducing transportation burdens on families and caregivers.

6. CONCLUSIONS

This study intends to address the transportation challenges experienced by non-drivers in Wisconsin, a group that makes up approximately 31% of the state's population. These individuals, including aging adults, people with disabilities, and those with limited financial means, face substantial barriers to mobility, particularly in rural areas. These barriers restrict access to essential services, economic opportunities, and social engagement, underscoring the importance of designing equitable transportation solutions.

Recognizing these challenges, WisDOT initiated this project to gain a comprehensive understanding of the non-driving population's needs and to identify strategies for improving transportation options across the state. A new focus was placed on family members or community volunteers who provide critical transportation support to non-drivers. Through the collection of survey data from 1,268 respondents, including both non-drivers and non-driver-adjacent groups, this approach ensured that the study captured the experiences of both those directly impacted by mobility limitations and those who provide transportation support. The survey included questions about transportation behaviors, barriers to mobility, and satisfaction with current transportation options. The study also integrated qualitative feedback to contextualize the quantitative findings and to gain deeper insights into unmet needs.

The project adopted a structured analysis framework, including an Importance-Performance Analysis (IPA) to evaluate transportation modes and services. Additionally, the study explored the socioeconomic and demographic characteristics of non-drivers to better understand the systemic factors contributing to mobility inequities.

6.1. Summary of Key Findings

The findings reveal significant mobility challenges across the state:

- **Non-drivers** identified high costs of vehicle ownership (28.71%), lack of a driver's license (33.07%), and disabilities (23.71%) as primary barriers to driving. Public transit (32%) was widely used but limited in rural areas, while ride-hailing (5.8%) services were viewed as prohibitively expensive for routine use.
- **Non-driver-adjacent group** reported time constraints and scheduling conflicts as major challenges in providing rides. Many noted the need for better public and community-based transportation options to alleviate their burden.

Respondents expressed mixed satisfaction with existing transportation services. Family-provided (72.5%) rides were highly valued for their flexibility and reliability, but public transit (50.4%) and paratransit services (38.1%) received lower satisfaction ratings due to limited coverage, indirect routes, and insufficient service information.

6.2. Implications and Prioritized Recommendations

The research illuminated critical gaps in Wisconsin's transportation network that hinder the mobility of non-drivers and their support networks. To address these issues, the study recommended a range of strategies, including:

- Expanding public transit coverage and frequency, particularly in underserved areas.
- Enhancing pedestrian and cycling infrastructure to promote active transportation.
- Developing affordable community-driven ride-sharing programs.
- Implementing financial subsidies to reduce the cost burden of transportation for low-income individuals.
- Leveraging technology to improve service delivery, including real-time tracking and optimized scheduling for public and paratransit services.
- These recommendations aim to build a more inclusive transportation system that ensures equitable access to essential services and activities for all residents.

6.3. Broader Impact and Next Steps

This study provides a foundation for improving transportation accessibility in Wisconsin. By addressing the barriers faced by non-drivers and non-driver-adjacent groups, policymakers and service providers can create a more equitable, efficient, and sustainable mobility system.

Looking ahead, continued collaboration with community stakeholders and ongoing research will be essential. Future efforts should include evaluating the implementation of these recommendations, exploring innovative mobility solutions, and integrating emerging technologies to address evolving transportation needs. By doing so, Wisconsin can lead the way in creating a transportation system that truly supports the diverse needs of its residents.

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APPENDIX

Appendix A: Full Literature Review

Background

1. Introduction

Non-driving populations consist of diverse groups, such as aging adults, students, children, low-income individuals, and those with disabilities, as well as individuals who choose not to drive, lack access to a vehicle, or have limited transportation options. All these populations may encounter substantial mobility challenges leading to limited access to economic opportunities, medical and other essential services, healthy food, reduced participation in community activities and resulting in isolation, particularly in the state's rural areas. Regarding the challenge of not driving, especially for seniors, there's a need for alternative transportation options to maintain mobility and ensure access to essential destinations. Non-drivers may rely on alternative modes of transportation such as public transit, walking, cycling, ridesharing with friends or family members and paratransit services. This concept is significant in discussions of transportation equity, particularly for marginalized populations such as older adults, low-income individuals, people with disabilities, and those who live in rural areas. Understanding the needs and challenges of non-drivers is crucial for developing inclusive and accessible transportation systems that meet the diverse mobility needs of all individuals.

2. Importance of Maintaining Mobility

Ensuring mobility for individuals who do not drive is a critical aspect of fostering independence, social engagement, and access to essential services. Regarding senior groups, as populations age and transportation needs evolve, understanding the multifaceted challenges faced by non-drivers becomes paramount. Based on the comprehensive analysis conducted by Dickerson et al. [1], maintaining mobility among older adults who no longer drive requires a multifaceted approach involving various stakeholders. Specific solutions outlined include developing comprehensive models, such as the Assessment of Readiness for Mobility Transition (ARMT), to understand the transition from driving to non-driving mobility. This involves identifying and evaluating programs aimed at facilitating this transition, such as educational and assessment programs for older drivers and infrastructure changes to improve older driver safety, as seen in initiatives like slower-moving vehicle ordinances. Formulate strategies for creating coalitions encompassing a wide array of stakeholders, not just those within the aging network, to improve mobility. Broaden the assessment of factors contributing to livable, age-friendly communities, and smart growth, to provide evidence of benefits linked to healthy aging. These strategies emphasize collaborative efforts to address transportation challenges and promote safe and accessible mobility, ensuring older adults' continued engagement and well-being within their communities.

In terms of various methods of measuring transportation system performance and their implications, Litman [2] highlights three main perspectives: traffic, mobility, and accessibility. Traffic measurement focuses primarily on vehicle traffic volume and speed, which provides a narrow view of transportation problems and solutions. Mobility measurement expands the range to include alternative modes like transit, ridesharing, cycling, and walking, but still emphasizes physical movement over other factors. Accessibility, the most comprehensive but challenging to measure, considers land use, mobility, and mobility substitutes, offering a broader understanding of transportation goals and solutions. Regarding

older adults and non-drivers, the article suggests that an accessibility perspective is particularly relevant, should focusing on approaches that ensure transportation planning considers their needs and safety, promoting inclusive and equitable mobility solutions. For older adults who may have limitations in driving, accessibility becomes crucial as it encompasses factors like walkability, access to public transit, and proximity to essential services. Improving accessibility can enhance their quality of life by providing them with alternative transportation options and reducing their dependency on driving. The article underscores the importance of considering diverse perspectives in transportation planning. By understanding the unique challenges and requirements of older adults and non-drivers, policymakers and planners can develop more inclusive and sustainable transportation systems. This may involve initiatives such as enhancing pedestrian infrastructure, expanding public transit networks, implementing traffic calming measures, and promoting mixed land use developments to improve accessibility for all members of the community.

Beck et al [3] offer valuable insights into the complex relationship between driving behaviors and aging, emphasizing the importance of preserving mobility while addressing challenges faced by older drivers. Latent class analysis (LCA) has been applied to investigate driving avoidance behaviors in older adults, offering insights into their varied approaches to driving decisions for targeted interventions and policy suggestions. Specific demographic factors, such as gender, age, race/ethnicity, education, and income, are shown to influence these groups. This study highlights various challenges associated with driving avoidance among older individuals, delineating patterns influenced by psychological, demographic, and health-related factors. Proposed solutions include the development of specialized education programs targeting alternative transportation options, particularly ride-hailing services, to alleviate driving avoidance. Psychosocial support interventions addressing age identity and stress-coping mechanisms are recommended. Promotion of ride-sharing services through targeted initiatives, along with comprehensive health and medication management programs, emphasizes regular check-ups and education on medication impacts on driving. The study also highlights the role of self-regulation and the potential impact of driving cessation on various aspects of older adults' lives, urging the development of resources to aid individuals in preparing for this transition. All together, these solutions offer a comprehensive framework to enhance older adults' well-being and mobility, promoting an approach that recognizes the diverse challenges within this demographic.

3. Challenges Faced by Non-Drivers

Based on the research conducted by Ritter et al. [4], several key issues were highlighted regarding challenges faced by seniors in transportation, . First, a notable percentage of respondents, especially those aged 75 and above, identified problems related to walking, indicating that distances are perceived as too far, potentially affecting their mobility. Additionally, concerns about poorly lighted areas, weather conditions, and rugged terrain contribute to the challenges faced by seniors when walking. Regarding the use of taxicabs, issues include the difficulty in obtaining a taxi, extended wait times, worries about crime, unhelpful drivers, high costs, poorly maintained vehicles, and communication difficulties. Similar challenges are evident in the utilization of senior or community vans, with difficulties related to information availability, reservations, punctuality, affordability, and concerns about embarrassment or inconvenience. One significant insight is that a substantial proportion of seniors relies on personal vehicles, as indicated by the reliance on driving as the primary mode of transportation. However, as seniors cease driving due to various reasons, the survey reveals a potential impact on their living situation, with a percentage having moved since they stopped driving. Enhancing public transportation services, ensuring accessibility, and

addressing affordability concerns are crucial. Initiatives focused on improving the safety of walking paths and educating communities about senior mobility issues could enhance the walking experience. Moreover, developing user-friendly and accessible information systems for taxi and senior van services could alleviate communication barriers. Collaborative efforts between transportation services, local communities, and senior advocacy groups are essential for tailoring solutions that address the unique needs of elderly individuals, promoting their independence and well-being.Koon et al. [5] focused on understanding the specific challenges and coping strategies of older adults with persistent mobility disabilities. Through in-depth interviews with sixty Respondents aged 60 to 79, who self-identified as having a mobility disability for at least a decade. These challenges span various domains, including physical limitations, accessibility issues, safety concerns, environmental obstacles, and financial strain. In response to these challenges, individuals employ a range of strategies such as utilizing tools or technologies, seeking assistance from others, and adapting their approach to tasks. The study underscores the importance of targeted interventions across multiple domains, particularly in health management, to support physical function and promote independence among older adults aging with mobility disabilities. Furthermore, the findings represent the resilience and creativity of this population in addressing challenges, with potential for sharing response strategies more broadly. Moreover, the research emphasizes the significance of maintaining engagement in everyday activities within the home and community, as it contributes to aging-in-place, functional independence, and overall quality of life for individuals facing long-term mobility disabilities. In summary, the study offers insights into the design of effective supports aimed at promoting aging-in-place and enhancing community engagement for older adults with long-term mobility disabilities.

Many challenges are encountered by individuals who lack the ability to drive, particularly older adults and those with disabilities. Multifaceted barriers faced by non-drivers in accessing transportation and essential services from mobility limitations to inadequate infrastructure and the complexities of transportation systems often lead to exacerbated social isolation and hindered independent living. Owens et al. [6] present a thorough examination of the non-driving mobility challenges faced by individuals with disabilities, highlighting the importance of inclusive transportation systems. While it outlines the diverse needs experienced by different disability groups, such as physical, perceptual, intellectual, and psychiatric disabilities, it primarily emphasizes the need for tailored solutions and inclusive design approaches. Collaborative efforts between researchers, designers, policymakers, and disability advocates are suggested to address transportation barriers effectively. For instance, improvements in physical infrastructure are recommended to make routes less steep, slippery, or narrow, benefiting individuals with physical disabilities like wheelchair users. It also highlighted the importance of considering the specific needs of different disability groups when designing transportation systems and technologies. For example, individuals with physical disabilities often encounter difficulties with physically demanding routes, while those with perceptual disabilities may struggle with understanding public transportation information. Moreover, individuals with intellectual disabilities may face challenges in following directions and knowing when or where it is okay to move. The report also advocates for better signage and directional aids, especially beneficial for individuals with intellectual disabilities who may struggle with complex instructions. Clear, easy-to-understand maps and schedules, developed in collaboration with disability advocates, could greatly enhance the travel experience for this group. Moreover, creating sensory-friendly transportation environments for individuals with sensory disabilities, such as those who are blind, deaf, or sensitive to noise or light, is emphasized. Measures like minimizing unnecessary noises, providing tactile signage, and ensuring adequate lighting in

transportation facilities aim to improve accessibility and comfort for individuals with sensory sensitivities. Overall, these proposed solutions aim to create more accessible and user-friendly transportation systems, ultimately enhancing the mobility and quality of life for individuals with disabilities.

Another study [7] by the National Aging and Disability Transportation Center (NADTC) conducted a comprehensive review of transportation challenges faced by both older adults and younger individuals with disabilities. It highlights diverse barriers including restricted access to cost-effective transportation options, lack of familiarity with available choices, and dependence on caregivers for transportation support. It suggests several findings that could inform potential interventions. One key finding is the emotional and practical impact of giving up driving, which includes feelings of dependence, frustration, and isolation. This highlights the need for initiatives that address the psychological well-being of individuals transitioning from driving to alternative modes of transportation. Additionally, the report underscores the importance of improving access to affordable transportation options, particularly in rural and small-town areas where resources may be scarce. Possible solutions may involve the expansion of public transportation services, subsidies for ridesharing programs, or the establishment of community-based transportation networks tailored to the needs of older adults and individuals with disabilities. Furthermore, the document emphasizes the role of caregivers in facilitating transportation for vulnerable populations, suggesting the need for caregiver support programs and resources that provide assistance with transportation arrangements. Overall, the development of comprehensive transportation solutions aiming at enhancing the quality of life and community participation for older adults and individuals with disabilities should be considered in future studies.

Research by Remillard et al. [8] indicates that persons aging with mobility disability (PAwMD) face significant transportation hurdles encompassing availability, accessibility, safety, advanced planning, and societal attitudes, as revealed by the aging concerns, challenges, and everyday solution strategies. PAwMD relies on personal vehicles due to challenges in utilizing local public transit, paratransit, or taxi and rideshare services, particularly in rural areas where options are limited. These challenges exacerbate as PAwMD encounter barriers in performing everyday activities, influenced by underlying impairments and age-related health conditions. Federal transportation policies, while aimed at supporting older adults and people with disabilities, often contribute to implementation barriers, necessitating integration of end-user and state and local provider input into policy development and program implementation. Recognizing the importance of this integration, the study emphasizes the need for collaborative efforts between end-users and stakeholders at state and local levels to ensure that transportation policies and programs are effectively tailored to meet the unique needs of PAwMD. The research indicates the top ten barriers to coordination of transportation services for PAwMD, including limited awareness of funding sources, program restrictions, and administrative burdens. Additionally, insights from the FAST Act provisions emphasize the need for tailored solutions across public and private transportation modes to address the lived experiences of PAwMD effectively. Overall, the research underscores the complexity of transportation challenges faced by senior individuals with disabilities and advocates for comprehensive policy reforms to enhance accessibility and inclusivity in transportation services.

The Ohio Developmental Disabilities Council (DD Council) commissioned the Ohio Colleges of Medicine Government Resource Center (GRC) to investigate transportation access issues for individuals with disabilities in Ohio [9]. The survey aimed to understand the challenges in both accessing and providing transportation, to collect insights from individuals

using these services, and to gather suggestions for improving the availability, accessibility, and user-friendliness of transportation. The results revealed that Ohioans with disabilities often struggle to find safe, affordable, and suitable transportation options, with services inconsistently operating and not always accommodating the diverse range of disabilities. This leads to scheduling difficulties and extended waiting times, limiting spontaneous travel and community integration. Transportation service providers also face challenges in meeting client needs within financial constraints and navigating regulatory demands. However, the study also identified areas for improvement, such as enhancing communication between providers and clients, improving access to information, and fostering collaboration among government bodies, transportation services, and professionals.

A survey by Northwest Research Group (Oregon Department of Transportation) [10], targeting social service providers in Oregon, aimed to thoroughly understand the transportation needs of low-income, elderly, and disabled individuals. Over 400 agencies from various sectors participated, indicating that nearly all of them served individuals with mobility impairments, with approximately 40% of their clients facing mobility challenges. The survey highlighted that 75% of these agencies offered transportation services, with only a small fraction charging for them. Funding for these services came from diverse sources, often with specific limitations on the types of trips or participant groups, which constrained the available travel options. According to the agencies, their clients had unmet transportation needs beyond what public transportation provided, with more than half estimating a necessity for two or more additional trips per week. Around 18% of agencies identified a need for over six extra trips. Securing transportation for social/recreational activities, work-related purposes, personal errands, and shopping emerged as particularly difficult. Proposed improvements included expanding services, extending operating hours, and enhancing connectivity with other services. These findings echoed those of previous surveys, underscoring a statewide demand for increased transportation services, although the specific enhancements required may differ depending on the location.

According to surveys conducted by the AARP in North Dakota [11] and the Colorado Department of Transportation (CDOT) [12], it is evident that enhanced transit access is of significant importance to a majority of AARP members in North Dakota as they age. They also prioritize improvements in road and sidewalk conditions for pedestrian safety, increased delivery services, and a broader range of transportation options. Common issues with public transportation include inadequate weather protection at stops and inconvenient scheduling, although the duration of travel using public transportation is generally not considered a major concern. Other notable challenges highlighted include difficulties in reaching desired destinations, availability of seating at stops, and access to information regarding fares, routes, and timetables. Similarly, the CDOT survey revealed that approximately half of older adults and adults with disabilities rely on family, friends, aides, or volunteers for transportation, while the other half do not rely on anyone for their transportation needs. Key obstacles to utilizing public transportation and paratransit services include the absence of service and the need for services outside of operating hours.

4. **Socioeconomic and Demographic Factors**

Access to essential services and opportunities is a fundamental aspect of societal equity and inclusivity. However, disparities in access persist, particularly among non-drivers who rely on public transit for mobility, influenced by the income situation of each house. A comprehensive analysis of transit access by Joint Transportation Committee (JTC) Staff [13] focuses on the challenges faced by non-drivers and underscores the imperative for targeted

interventions to address these disparities. The study examined the percentage of the population with access to healthcare, food, job opportunities, educational institutions, and parks via transit within 15, 30, and 60-minute travel times across different counties. The findings reveal significant variations in access levels, with some counties exhibiting higher percentages of the population with transit access to essential services compared to others. In terms of healthcare access, disparities are evident, with certain counties reporting lower percentages of the population with transit access to healthcare facilities within a reasonable travel time. This highlights the need for improved transportation infrastructure to ensure timely access to healthcare services, especially for vulnerable populations. Similarly, access to food and job opportunities varies across counties, underscoring the importance of enhancing transit connectivity to address food deserts and promote economic mobility. Educational institutions and recreational facilities also show disparities in access, indicating potential barriers to educational attainment and quality of life for non-drivers in certain areas. To address these challenges, targeted interventions are crucial. Investing in public transit infrastructure and expanding transit service coverage can improve access to essential services for non-drivers, particularly in underserved communities. Additionally, initiatives such as shuttle services, ridesharing programs, and micro-transit solutions can enhance mobility options and bridge gaps in transit access. Furthermore, collaboration between transportation agencies, local governments, community organizations, and stakeholders is essential for designing and implementing effective solutions tailored to the specific needs of each community. By prioritizing equity and accessibility in transportation planning and policymaking, communities can work towards creating more inclusive and resilient transportation systems that benefit all residents, including non-drivers.

In accordance with the comprehensive exploration conducted by McAndrews et al. [14] on significant safety concerns related to transportation, particularly in the state of Wisconsin. It reveals that certain demographic groups, such as American Indians, Blacks, and Asians, face higher risks of injury and fatality while traveling compared to Whites. This heightened risk is evident across various modes of travel, including motor vehicles, motorcycles, walking, and cycling. While the study acknowledges that factors like race and ethnicity may serve as proxies for socioeconomic status (SES), it emphasizes the disproportionate burden of travel risk borne by these minority populations. Moreover, the research underscores the importance of considering multiple measures of exposure when assessing traffic injury risk, as different demographic groups exhibit varying travel patterns and behaviors. Limitations of the study include the lack of SES data and its geographical focus on Wisconsin, suggesting the need for further research to explore the influence of SES and geographic factors on travel safety.

The study by Blumenberg and Pierce [15], analyzed data from the 2009 National Household Travel Survey (NHTS) to examine how income levels influence automobile ownership and travel patterns in the United States. This study investigated the intricate relationship between household income, car ownership, and travel behavior, offering insights into the dynamics that shape transportation choices among different socioeconomic groups. One of the key findings is the significant correlation between household income and the likelihood of owning a vehicle. As household income increases, so does the probability of automobile ownership, with higher-income households exhibiting higher rates of car ownership compared to their low-income counterparts. Interestingly, the study reveals disparities in automobile ownership across racial and ethnic groups. While African American households tend to have lower rates of car ownership, Hispanic and Asian households show higher rates, which may be attributed to factors such as household size and cultural preferences. Moreover, the presence of children in a household appears to influence automobile ownership differently across income groups, with higher-income households more likely to own multiple vehicles

to accommodate larger family sizes. Beyond mere ownership, the study delves into travel behavior, highlighting how income levels affect the modes of transportation used by households. Unsurprisingly, car usage dominates among higher-income households, while lower-income households rely more on public transit and walking. This discrepancy underscores the role of income in shaping access to transportation options and, consequently, mobility opportunities. Furthermore, the study underscores the impact of residential location on transportation choices. Urban areas with dense populations and extensive public transit networks tend to have lower rates of automobile ownership, reflecting a preference for alternative modes of transportation and the practicalities of urban living. Conversely, suburban and rural areas often exhibit higher rates of car ownership, where access to public transit may be limited. Policy implications emerge from these findings, particularly concerning transportation equity and accessibility. Efforts to improve public transit infrastructure and services in low-income and minority communities can enhance mobility options and reduce reliance on cars, thereby alleviating transportation barriers to economic opportunities. Additionally, targeted interventions such as subsidized transportation programs and financial assistance for vehicle ownership could help address transportation-related disparities and promote social inclusion. The study offers valuable insights into the complex interplay between socioeconomic factors, automobile ownership, and travel behavior. By understanding these dynamics, policymakers can develop more effective strategies to enhance transportation equity, improve access to mobility options, and ultimately foster inclusive and sustainable communities.

According to the research by Pendall et al. [16], several key findings concerning non-drivers and individuals with low incomes were identified. Firstly, it emphasizes the challenges faced by this demographic in accessing economic opportunities, as transportation plays a pivotal role in job accessibility. The spatial and transportation mismatch, particularly in metropolitan areas like Los Angeles, is explored, highlighting disparities that non-drivers may encounter. The research emphasizes the impact of car ownership on welfare-to-work transitions, underscoring the significance of vehicle access in enhancing employment prospects for low-income individuals. Furthermore, the document explores the role of housing vouchers and their effects on welfare families. It clarifies the connection between housing policy, residential outcomes, and economic well-being. Specific studies, such as the evaluation of welfare-to-work voucher programs and the examination of commuting inequalities in the San Francisco Bay Area, provide insights into the experiences of non-drivers and low-income populations. The importance of tailored interventions, exemplified by low-income car ownership programs and innovative solutions like Buffalo Car Share, is highlighted as a means to empower this demographic and improve their quality of life.

Evans [17] conducted a comprehensive analysis of travel behavior among the non-driving population aged 75 and older, based on data from the 1995 National Personal Transportation Survey (NPTS). It highlights various factors influencing mobility among this demographic group, including age, household size, housing density, community context, and transit availability. Key findings suggest that mobility tends to decrease with age, and larger household sizes are associated with reduced trip-making. However, apartment living, higher housing density, and affluence (measured by education and home ownership) positively correlate with trip-making among non-driving seniors. Interestingly, while urban areas may offer transit availability, they may also pose safety concerns that deter mobility. Specific insights indicate that older non-drivers living in affluent, densely settled areas outside urban cores may have better accessibility to alternative transportation options and experience less anxiety regarding crime, thereby increasing their likelihood of trip-making. On the other hand, urban non-driving seniors may rely more on public transit but face safety concerns that

hinder mobility. The document suggests that policies promoting the "gentrification" of major urban centers for the elderly could alleviate mobility issues associated with suburban aging populations. For non-driving seniors, this can mean better access to transportation options but also challenges with affordability and disruption of community ties. This approach could leverage the infrastructure efficiency and proximity advantages of urban density. However, it acknowledges that safety and service quality concerns in urban areas may initially impede acceptance of such policies.

Loukaitou-Sideris and Wachs [18] aimed to explore the travel behaviors, needs, and mobility challenges of a varied group of low-income, elderly residents in Los Angeles's inner city, aiming to identify solutions to their mobility problems. It highlights the critical role of local governments and cities in improving mobility for the elderly, with a review of policies and services across six cities revealing a range of initiatives designed to support older adults' mobility. However, these initiatives are often fragmented, with multiple entities offering similar fixed-route and on-demand services, each with different funding sources and fare systems. Analysis of data from the California Household Travel Survey indicates that older, low-income, minority individuals in inner-city Los Angeles engage in shorter, more frequent journeys compared to their counterparts in more suburban areas. They are more inclined to walk and use public transport and less likely to drive, with significantly lower car ownership rates compared to higher-income older adults living outside the inner city. The "old-old" population (individuals aged 80 and above) undertake fewer car journeys, have lower car ownership rates, and are more likely to travel as passengers than drivers, with gender playing a role in driving habits among this age group. Recommendations include various Streetscape Enhancements, Public Transit Improvements, Point-to-Point Transportation Services, Mobility-Complementary Enhancements, and Safety Enhancements.

In September 2019, the Eastern Nebraska Community Action Partnership (ENCAP) conducted a comprehensive Community Transportation Needs Survey within Douglas and Sarpy County, aiming to understand the impact of transportation barriers on access to opportunities and socio-economic advancement. The survey revealed the challenges faced by various demographic groups within ENCAP's Service Delivery Area. Elderly individuals (aged 65 and older) encountered difficulties with public transportation due to physical disabilities, affordability concerns, and limited healthcare access, while rural and suburban residents struggled with accessing public transit due to distance from bus stops and lack of personal vehicles. Young adults (16 to 24 years old) expressed worries about job security and missed opportunities, particularly due to transportation issues, while those aged 25 to 44 faced significant challenges in reaching destinations, attributed to gas prices and vehicle acquisition difficulties. Respondents with disabilities experienced low mobility rates, relying heavily on relatives for community navigation, and expressing the need for improved transportation options to enhance employment stability and social integration. Common challenges across demographics included the unaffordability of ride-sharing services and gas prices, as well as dissatisfaction with the current public transit system's limited-service hours, inconvenient transfers, and trip planning difficulties. Specific issues with MOBY/Paratransit services included late arrivals, ride cancellations, higher costs, and curb-to-curb service posing challenges for individuals with visual impairments. These findings underscore the urgent need for tailored transportation solutions to address the diverse needs of underserved communities and facilitate equitable access to opportunities for socio-economic advancement [19]. Furthermore, the findings of a research by Stinchcombe et al suggest that income adequacy and social support networks significantly influence individuals' perceptions of driving cessation. Respondents with higher income adequacy were less worried about the financial implications of not driving and had more transportation options available to them.

Conversely, those with lower income levels faced greater challenges, emphasizing the importance of evaluating income adequacy when proposing transit solutions [20]. Overall, Odgers and Adler also demonstrated that in regions with high income inequality, people with the lowest incomes often have worse health and well-being. There is a need for new methods in research and policymaking to understand why this happens and to test how changes in income inequality and resource distribution can improve these outcomes [21].

The study [7] led by the National Aging and Disability Transportation Center (NADTC) makes it clear that from low-income seniors in rural areas to households with individuals with disabilities, each demographic faces unique mobility challenges that necessitate specialized interventions. By examining the travel behaviors, necessities, and barriers encountered by these groups, it is aimed to uncover solutions that promote equity and accessibility in transportation systems. Through these insights, policymakers and transportation planners can develop tailored strategies to address the diverse needs of specific demographics, ultimately fostering inclusive and equitable mobility for all members of society.

The study by Dabelko-Schoeny et al. [22] thoroughly explores the transportation challenges faced by diverse older adults, particularly emphasizing immigrant, and refugee populations within a socio-ecological framework. The findings reveal a spectrum of barriers, from physical limitations to socio-cultural factors, influencing the mobility of older adults. Notably, the study underscores the importance of cultural nuances, emphasizing the need for tailored transportation solutions, especially for immigrant and refugee communities. Community-based participatory planning emerges as a key approach, providing valuable insights directly from diverse older adults. The correlation between transportation barriers and negative health outcomes is highlighted, emphasizing the urgency of accessible and age-friendly transportation. Proposed solutions include the development of diverse, active, and affordable transportation options for different groups of older adults, community-based advocacy for transportation improvements, and culturally sensitive interventions. The document advocates for a holistic evaluation of barriers, emphasizing acceptability, accessibility, adaptability, and affordability. Interdisciplinary collaboration among community members, transportation experts, and policymakers is crucial to ensure a comprehensive and inclusive approach. Strategies promoting active aging, such as enhancing walkability and convenient access to destinations, are encouraged to contribute to the overall well-being of older adults.

Mattson [23] focuses on the travel behavior and mobility patterns of groups facing transportation challenges, specifically targeting older adults, people with disabilities, and those with lower incomes. This research, utilizing data from the NHTS, emphasizes key findings, especially noting differences between urban and rural areas and changes seen from 2001 to 2009. Key findings include the significant increase in disabilities and medical conditions with age, impacting day-to-day travel. Despite a slight increase in travel by older women, there is an overall decline in travel with age. Gender disparities in driving and trips exist, with older men more likely to drive; however, this gap is narrowing, especially among those 85 or older. Individuals with lower household income, particularly in rural areas, are more likely to stay in the same place, highlighting income-related disparities in travel behavior. Despite making fewer trips, individuals with medical conditions or disabilities express a strong desire to get out more often, underscoring the importance of mobility for quality of life. Overall per capita vehicle miles traveled (VMT) decreased from 2001 to 2009, while transit mode shares increased. Concerns about accidents, congestion, and travel costs are more pronounced for people with disabilities, emphasizing their unique challenges. Furthermore, this study employed cluster analysis to identify transportation-disadvantaged

groups inductively, based on socioeconomic characteristics. Special groups identified, comprising low-income older individuals with disabilities, demonstrating the most transportation disadvantage. Some transportation-disadvantaged groups, such as middle-to-higher-income older women with disabilities, offset mobility challenges through Internet deliveries. In general, this study underscores the importance of addressing disparities in mobility based on age, gender, income, and health conditions. Policymakers could consider targeted initiatives to enhance transportation options for identified disadvantaged groups.

The comprehensive study by Zhang et al [24] on elderly activity-travel behavior indicates the intricate dynamics shaping mobility patterns among older adults. Through an analysis of data from the NHTS and HPTS, the study delineates three distinct clusters within the elderly population: Evening Discretionary (ED), More In-Home (MH), and More Mandatory (MM) groups. These clusters exhibit varying degrees of engagement in activities and travel, influenced by socioeconomic and demographic factors. Key findings reveal significant associations between household income, urban residence, household region, vehicle ownership, gender, worker status, education level, and group membership among the elderly. Notably, the study explores distinct preferences for mandatory activities over evening discretionary pursuits. Special attention is warranted for elderly individuals living alone, as they face heightened risks of social isolation due to limited mobility options. Strategies to mitigate this challenge may include community outreach programs, tailored transportation services, and initiatives to foster social connections among older adults. Moreover, the study advocates for future research endeavors to refine modeling techniques, incorporating non-homogeneous Markov models and expanding the characterization of activity-travel behavior to encompass mode and destination choices. Of particular significance are the implications for non-driver elderly individuals who exhibit distinct mobility patterns compared to their driving counterparts. Overall, the study suggests that non-drivers may rely on alternative household members for mobility, highlighting the importance of accessible transportation services and support networks for this demographic.

Loukaitou-Sideris and Wachs [18] investigated the complexities of transportation obstacles faced by aging communities, with an emphasis on the distinctive factors affecting low-income, rural, and elderly adults. Firstly, it highlights the evolving mobility patterns among older adults, emphasizing the need to understand their travel behaviors comprehensively. The role of urban design and safety measures, including age-friendly environments and safe sidewalks, is underscored. Public transit is identified as a critical aspect, with a focus on addressing challenges and improving services for seniors. The document highlights particular groups within the aging population. It specifically examines the travel behavior of low-income seniors and suggests an accessibility calculator as a tailored solution. It also notes the unique transportation challenges of rural communities and underlines the need for customized solutions for rural seniors, detailing various plans and solutions.

5. **Technological Impacts**

There is a suggestion to develop assistive technologies aimed at helping individuals in circumventing challenging or impassable sections of routes, addressing various disabilities. For instance, mobile applications could provide real-time information regarding accessible routes or alternative transportation possibilities for individuals with mobility constraints. Respondents from the disability group mentioned using various navigation applications, such as Google Maps, Waze, and Apple Maps, for general orientation purposes. While these apps are helpful for individuals without visual impairments by offering essential navigational information, they typically lack features tailored for people with disabilities (PWD), like

alerts on unsuitable sidewalks. However, apps like *Be My Eyes* are specifically designed for people with disabilities [6]. Additionally, the need for resources providing information on emotional support services and local driving regulations, such as the online platform "Plan for the Road Ahead" was underscored by many Respondents expressing apprehensions about pre-booking transportation and uncertainty regarding available services in their communities [20]. The integration of technology, like ride-sharing apps and electric vehicle car-sharing, offers the potential to expand transportation choices for older adults, with electric vehicle car-sharing highlighted as a particularly promising option [6][18].

Alexander et al [25] employed a modeling approach to simulate various ridesharing adoption scenarios and assess their impacts on urban congestion. This modeling framework incorporates detailed data derived from mobile phone records, allowing for the analysis of real-world travel patterns and behaviors. Through the simulation, the study evaluates changes in key metrics such as vehicle miles traveled, vehicle hours traveled, and congested travel time under different adoption scenarios, providing quantitative insights into the potential effects of ridesharing on traffic dynamics. Additionally, the research conducted a comprehensive survey of ridesharing adoption rates among both drivers and non-drivers, enabling the investigation of how these adoption patterns influence overall vehicle usage and traffic conditions. By integrating modeling techniques with data from mobile phone records and surveys, they offered a robust analysis of the impacts of ridesharing on urban congestion, providing valuable insights for policymakers and transportation planners.

Regarding the significance of ridesharing services in urban transportation, several points were emphasized by Shaheen et al [26], recognizing their substantial impact while addressing both benefits and challenges. Ridesharing is valued for its provision of convenient, on-demand transportation within urban areas, yet concerns arise regarding potential exclusion of certain demographic groups, particularly non-drivers, low-income individuals, and those with limited English proficiency. Equity considerations are thoroughly examined, exploring disparities related to ethnicity, age, income, and gender among ridesharing users compared to the broader population. Access challenges are identified, including obstacles faced by the unbanked, visually impaired individuals, and those with limited English proficiency, notably in business models reliant on app-only approaches and credit/debit card payments. The study examines the difficulties faced by rural areas, pointing out that these communities have limited access to shared transportation options. It underscores the importance of public-private partnerships to enhance equitable access, alongside government involvement, statutory provisions, policies, and public support to ensure fairness in ridesharing services. Developing comprehensive strategies involves adopting inclusive business models accommodating diverse payment methods and ensuring accessibility features, alongside implementing affordable pricing structures and subsidy programs to address economic disparities. Geographic expansion into underserved rural areas, along with optimized routes and technology, is highlighted to enhance accessibility. Incorporating multilingual support caters to users with limited English proficiency, complemented by community outreach and education initiatives to dispel misconceptions and encourage adoption. Collaboration with disability advocacy groups is essential to make sure services meet the needs of individuals facing mobility challenges. Data-driven decision-making, public-private partnerships, and continuous feedback loops contribute to targeted improvements and regulatory frameworks prioritizing equity. Investments in technological innovations, such as advanced navigation systems and safety features, aim to enhance overall user experiences. These strategies collectively strive to make ridesharing more inclusive, equitable, and responsive to the diverse needs of communities, creating a transportation system that benefits everyone in society.

Mattson and Molina [27] explore how transportation choices and smartphone use are related, looking into how the types of transportation people use, how often they access the internet on smartphones, and factors like income, location, and age influence their transportation preferences. Drawing upon data from the 2017 NHTS, the study reveals important findings about these trends. Findings indicated that auto usage remains dominant across all income levels and geographic regions, particularly in rural and suburban areas. However, public transportation use increases in urban areas and among lower-income groups. Over the years, while auto usage remains prevalent, a slight decline is noted in urban areas, possibly signaling a shift towards alternative transportation modes like transit and biking. Smartphone usage for internet access varies across age groups and regions, with younger demographics and urban areas exhibiting higher daily usage rates. Policymakers are encouraged to focus on improving public transportation, including the implementation of extensive bus rapid transit systems in cities, while also promoting active transportation initiatives such as pedestrian-friendly infrastructure and interconnected bike lanes. Bridging the digital divide is emphasized, particularly in rural and low-income communities, through initiatives like subsidized smartphone plans. Special attention is warranted for vulnerable groups, like low-income communities and the elderly, necessitating tailored interventions such as fare subsidies and community-based transportation services to address their specific mobility challenges.

The Portland Smart Cities UB Mobile PDX initiative is committed to developing mobility solutions tailored to support underserved populations, including low-income groups, communities of color, and residents facing mobility challenges. Focusing particularly on East Portland, the research aims to address transportation obstacles encountered by these traditionally underserved groups within the Mobile PDX framework. This entails conducting a community-focused needs assessment through the evaluation of existing data, along with new surveys and focus group discussions with community members. The findings indicate that low-income individuals and people of color are more likely to own smartphones and utilize existing smart mobility tools, such as transit apps and rideshare services, more frequently than their counterparts. Smart mobility technologies hold significant potential in addressing the transportation demands of disadvantaged communities by reducing costs and enhancing services for public transit, ridesharing, and active transportation. However, several barriers hinder the universal benefit of these technologies. Lower-income individuals and people of color reported limited access to essential items like drivers' licenses, bank accounts, and credit cards, often preferring cash payments for public transit. Concerns were also raised by older Respondents and focus group members regarding the security of linking personal financial information to online mobility apps, citing fears of identity theft and financial loss, particularly for financially vulnerable households. Moreover, limited internet access and constraints on data usage due to financial limitations were commonly reported among these groups. To address these disparities, recommendations include enhancing public transit information and navigation through smartphone apps, improving access to public data, such as through free Wi-Fi, implementing policies to reduce obstacles to acquiring or utilizing electric vehicles, and providing translations for essential smart mobility applications in multiple languages. These suggestions aim to bridge the gap in access to smart mobility technologies and ensure equitable transportation solutions for underserved communities in Portland [28].

6. Potential Solutions and Strategies

Older adults who don't drive tend to avoid using alternative transportation for similar reasons they don't drive, such as limited acceptability, affordability, adaptability, and accessibility.

This trend is supported by a decrease in older adults using alternative transportation options. Those without personal vehicles predominantly rely on being passengers with family or friends, underscoring the critical need for accessible alternative modes of transportation to maintain mobility, essential for health and social engagement. Embracing alternative transportation methods can indeed foster community engagement and enhance cognitive well-being. It involves ensuring safety, accessibility, and tailoring to individual transportation needs, which can lead to a more inclusive and equitable transportation ecosystem. This approach supports the well-being of all community members by providing diverse and accessible transportation options, promoting active lifestyles, and encouraging social interactions. Involving older adults in creating transportation solutions shows a commitment to social justice and self-determination, a key principle in social work. This is often achieved using community-based participatory research (CBPR) methods. An example of this is a study by Dabelko-Schoeny, conducted in a large Midwestern U.S. metropolitan county, which resulted in four new transportation initiatives for seniors: the Senior Circulator, Lyfting Villages, Travel Training, and Safe Routes to Age in Place. These initiatives were developed following CBPR principles, tapping into community resources and involving older adults as experts and partners in the design process. The project showed how CBPR can help achieve transportation equity for marginalized groups and emphasized the need for sustainability studies in future projects. It underlines the creation of inclusive, community-driven transportation alternatives that cater to the specific needs and contributions of older adults, enhancing fairness and participation in transportation planning and use [29].

In response to the challenges faced by non-drivers in accessing transportation and essential services, various solutions and strategies have emerged to promote inclusive mobility. Various approaches aimed at enhancing transportation accessibility for older adults, individuals with disabilities, and other non-drivers. Fraade-blanar et al [30] suggested various strategies to address transportation barriers faced by older adults. One proposed solution involves leveraging rideshare services and automated vehicles, which offer potential benefits such as convenience and accessibility. For instance, rideshare platforms like Uber and Lyft could provide older adults with on-demand transportation options, reducing reliance on personal vehicles and overcoming mobility limitations. Additionally, the introduction of automated vehicles holds promise for older adults who may no longer be able to drive safely. These vehicles could offer a safer and more reliable mode of transportation, particularly for older adults with cognitive or physical impairments. Community-based initiatives also play a crucial role in improving transportation access for older adults, especially in rural areas with limited public transportation infrastructure. For example, local aging agencies or nonprofit organizations could establish volunteer driver programs (VDPs), where community members provide transportation assistance to older adults for medical appointments, grocery shopping, or social outings. These programs not only address transportation needs but also help build social connections and reduce isolation among older adults. Furthermore, incorporating universal design principles into transportation infrastructure and vehicles is essential for ensuring accessibility for older adults with disabilities or mobility challenges. This includes features such as wheelchair ramps, tactile paving, and audible pedestrian signals at intersections, making streets and public spaces more navigable for older adults with diverse needs. By integrating universal design into transportation planning and development, communities can create inclusive environments that accommodate the needs of older adults and promote active aging.

Volunteer transportation services play a crucial role in fulfilling the mobility needs of elderly individuals and those with disabilities throughout the United States. Wisconsin has a network comprising over 60 volunteer driver programs, covering almost every county in the state.

These programs represent a cost-effective use of private resources for the public benefit, though they are not free. Volunteer drivers deliver a high level of service, often providing door-through-door assistance, to some of Wisconsin's most vulnerable residents. This includes people who are unable to navigate standard transportation systems, individuals with dementia, and dialysis patients requiring treatment early in the morning or on Saturdays [31]. Previous research tackles the widely recognized issue of insufficient transportation options for seniors who cannot drive. Developing and implementing volunteer driving programs for seniors represents one solution to this challenge [32]. Additionally, Hanson and Goudreau suggested that VDPs bridge the gaps left by other transportation services by operating in areas with limited bus access (such as rural and low-density area), accommodating long-distance travel that would be prohibitively expensive by other means, and offering rides outside of typical business hours [33]. Previous research investigated a scoring system method to analyze and compare demographic metrics related to the use and delivery of VDPs alongside census attributes. This was done to assess the capacity and need of communities for VDPs in Georgia [34]. Chester and W. P. R. Wisconsin [35] presented several solutions and examples aimed at addressing the transportation challenges faced by non-drivers, particularly seniors and individuals with disabilities. One notable solution highlighted is the provision of specialized transportation services by organizations like Curative Connections, which offers affordable rides for medical appointments and other essential stops. Volunteer drivers exemplify the community-driven efforts to fill transportation gaps, demonstrating the importance of grassroots initiatives in supporting vulnerable populations. Additionally, the implementation of on-demand services by Green Bay Metro represents an innovative approach to address the evolving transportation needs, although it faces limitations in coverage and accessibility, especially in rural areas. Despite these efforts, funding shortages and declining volunteer numbers pose significant challenges, underscoring the need for sustained investment and support to ensure equitable access to transportation for all individuals, regardless of mobility status.

According to the Community Transportation Association of America, an estimated 3.6 million Americans annually miss medical appointments due to unreliable transportation, underscoring the critical need for dependable transit options nationwide. In response to this pressing issue, the Patient Access Network (PAN) Foundation conducted a transportation assistance survey [36] in the fall of 2019, aiming to investigate the transportation challenges faced by individuals with severe illnesses that hinder their ability to visit doctors or obtain prescriptions. The survey had two primary objectives: firstly, to understand patient perspectives on ride-sharing services and identify obstacles preventing their utilization, such as costs and physical mobility issues, and secondly, to explore ways PAN could enhance its services to better support its patients. Accessibility issues pose significant challenges for seniors seeking healthcare, limiting their transportation options for medical appointments. The demand for assistance with medical appointments exceeds that for pharmacy visits. Key findings from the survey include the identification of physical and financial constraints as barriers to accessing transportation for medical visits, the reliance of many patients on others for transportation despite being physically capable, and the lack of familiarity among seniors with ride-sharing applications. Moreover, patients, including those living considerable distances from their doctors, are hesitant to bear transportation costs themselves. In response to these findings, PAN planned to introduce a new transportation aid program for Medicare beneficiaries in 2020, applicable to all disease conditions covered by PAN. Qualified patients would receive a prepaid card, affording them the flexibility to choose any transportation mode suitable for traveling to and from doctor's appointments.

Stinchcombe et al [20] identified several key themes and solutions regarding driving

cessation among older adults, drawn from interviews and analysis. Firstly, it emphasizes the importance of planning ahead for mobility changes, with most Respondents expressing a desire to delay giving up their license for as long as possible. However, some individuals actively plan for this transition, highlighting the need for interventions and support services that assist in this process. For example, the article highlights the significance of awareness and access to alternative transportation services. Additionally, the study suggests that eligibility criteria for specialized transportation services may prevent older adults with cognitive decline, pointing out the need for more inclusive criteria. Special examples include the negative impact of driving cessation on individuals living in rural areas, who often rely heavily on driving due to limited public transportation options. This group may experience greater isolation and dependency on others upon cessation of driving. Additionally, the study highlights the role of family members in facilitating the transition and supporting older adults through this process.

Case [37] focused on developing a performance measurement technique for evaluating government efforts in coordinating land use and transportation to improve accessibility for non-drivers in American municipalities, particularly those relying on public transportation. The author proposes a method utilizing Travel Odds Factors (TOFs) calculated based on survey data from the Hampton Roads metropolitan region to assess the success of government initiatives in aligning activity locations, bus stops, and residences conducive to non-driver travel. The model considers variables such as age, household composition, crime rates, and the proximity of activity locations and bus stops. The outcomes reveal that the odds of a better walking non-driver leaving home increase with the presence of Activity Location Units (ALUs) within a half-mile and the proximity of a bus stop within 1 mile. The author demonstrates the practical application of this method by calculating performance scores for local governments in the Hampton Roads area, visualizing accessibility-based TOFs for better-walking non-drivers across different Virginia localities. The findings highlight disparities in accessibility among regions, showcasing that localities with extensive bus networks and well-placed activity locations provide higher travel odds for non-drivers.

Public transportation, except for paratransit or similar services, was not seen as beneficial or useful for people with disabilities (PWD). Common issues associated with public transit included inaccessible stops, limited schedules, timing, and available information, as well as drivers' constraints, such as their inability to assist passengers with disabilities or handle medical emergencies. Moreover, regional disparities in service provision were noted. On the other hand, paratransit received more favorable views; however, it also encountered challenges, including the need for advance planning, potentially longer travel times, restricted schedules or availability, and service inaccuracies affecting timing or quality. While rideshare services were considered as an alternative, they too presented limitations for PWD, including difficulties with physical access, particularly for wheelchair users, and the availability of information, such as route options and costs, for individuals with visual impairments [6].

Regarding recommendations for policymakers, it is suggested to display bus schedule information at places frequently visited by older adults, advertise methods for accessing real-time bus arrival information prominently, and make changes to bus design to enhance mobility for seniors. Additionally, there's a call to motivate ride-hailing companies to explore the market potential among low-income, elderly residents and expand the availability of taxi vouchers for low-income, elderly adults. Encouragement is given to leverage existing transportation solutions through partnerships with ride-hailing companies for more efficient on-demand car dispatch services. Other suggestions include motivating supermarkets to offer grocery delivery services at reasonable costs, advocating for the creation of telehealth stations

in frequently visited places, and enhancing internet connectivity in residential communities housing a large number of low-income elderly individuals. These recommendations aim to enhance the mobility and quality of life for older adults residing in inner-city areas [18].

Tables A1, Table A2, and Table A3 show the challenges and solutions related to non-driving populations, focusing on senior, disability, and low-income groups respectively. Table A4 also outlines comprehensive policy strategies to enhance transportation equity and accessibility. Overall, by leveraging these insights and implementing targeted solutions, policymakers can strive towards building more inclusive, efficient, and sustainable transportation systems that cater to the diverse needs of communities.

Table A1 – Challenges and solutions related to “senior groups”

Challenge	Solution
	• Promote and expand volunteer driving programs and peer-to-peer ride-sharing initiatives. • Develop community-based transportation services that cater to seniors' needs, providing door-to-door assistance for essential
Inconveniences in using public transit	• Improve public transit systems by adjusting schedules, enhancing accessibility to stops, and optimizing overall travel time. • Design and implement exclusive real-time information programs to inform seniors of bus arrival times and service updates, reducing wait times and uncertainty.
Participating in social and recreational activities	• Create specialized transportation services and community programs to facilitate seniors' access to social and recreational activities. • Establish senior centers and community hubs equipped with transportation services to connect seniors with local events and gatherings.
Access to healthcare	• Implement dedicated healthcare transportation services for seniors, ensuring timely access to medical appointments and treatment facilities. • Collaborate with healthcare providers and organizations to coordinate transportation for seniors requiring specialized medical care.
Safety concerns	• Improve sidewalks, install more crosswalks, and increase the visibility of safety signs to enhance pedestrian safety for seniors.
Difficulties with getting onto and exiting buses	• Implement low-floor buses with ramps and deploy adequate training for drivers to assist seniors in boarding and disembarking safely. • Provide priority seating and designated areas for seniors on buses, making it easier for them to access and navigate public transit vehicles.
Frequency and wait times for buses	• Increase the frequency of bus services, especially during peak hours for seniors, and decrease wait times. • Implement demand-responsive transit services that allow seniors to request rides on-demand, reducing the reliance on fixed bus schedules.

Challenge	Solution
Reducing mobility for older adults	• Offer a range of transportation alternatives tailored to senior needs, including on-demand ride services, wheelchair-accessible vehicles, and specialized transportation options. • Provide subsidies for transportation services and fare discounts for seniors, making transportation more affordable and accessible for older adults with limited mobility.
Transitioning to non-driving mobility	• Develop and promote programs that support seniors in transitioning from driving to alternative modes of transportation, offering education, training, and assistance as needed. • Facilitate access to mobility aids (e.g., on-demand transportation options) and assistive devices (e.g., mobility walkers and wheelchairs) to empower seniors with non-driving mobility options.

Table A2 – Challenges and solutions related to "disability groups"

Challenge	Solution
Struggle with physically demanding routes (steep, slippery).	• Upgrade infrastructure to ensure accessibility, including the maintenance of sidewalks, ramps, and pedestrian crossings.
The lack of alternative transportation options	• Develop more transportation alternatives tailored to the needs of individuals with disabilities, such as community shuttles, paratransit services, and accessible rideshare programs. • Subsidize transportation costs for individuals with disabilities to make alternative options more affordable and accessible.
Despite the existence of discounted rides or vouchers, many individuals do not use them.	• Increase awareness of available discounts and voucher programs through targeted outreach campaigns and community partnerships. • Simplify the application process for discounted rides and vouchers to reduce barriers to participation and ensure that eligible individuals can access these benefits easily.

Challenge	Solution
	• Enhance community and volunteer-driven transportation programs that provide door-to-door assistance for individuals with disabilities, reducing • Collaborate with local organizations and non-profits to expand transportation support networks and provide more options for individuals who need
Paratransit service issues like restricted scheduling and cost	• Optimize paratransit operations through the implementation of better scheduling technology, allowing for more flexible and efficient service delivery. • Increase the capacity of paratransit services to meet growing demand by investing in additional vehicles, hiring more drivers, and expanding service coverage areas.
Technology use	• Invest in smart technology solutions such as mobile apps and real-time tracking systems to improve accessibility and convenience for individuals with disabilities. • Provide training and support to ensure that individuals with disabilities can effectively use and benefit from assistive technologies and transportation apps.
Significant scheduling challenges (Access to healthcare and pharmacy)	• Introduce more on-demand transportation services to address scheduling challenges, particularly for accessing essential healthcare services and pharmacies. • Collaborate with healthcare providers and pharmacies to coordinate transportation services and offer extended hours or late-night transportation options for individuals with disabilities.

Table A3 – Challenges and solutions related to “low-income groups”

Challenge	Solution
	• Enhance public transit systems by increasing the frequency of services, expanding coverage areas. • Invest in pedestrian infrastructure enhancements, including the construction of sidewalks, crosswalks, and pedestrian bridges, to create safer and more accessible walking routes
Limited access to drivers' licenses	• Implement programs that provide financial assistance or subsidies to cover the costs associated with obtaining a driver's license, including application fees, driver education courses, and license testing fees. • Offer support services that guide individuals through the process of obtaining a driver's license, including assistance with paperwork, transportation to testing centers, and access to educational resources on driving regulations and safety.
Social isolation	• Develop community transportation services such as shuttle services to community centers, recreational facilities, or social events, providing low-income individuals with opportunities for social interaction and engagement.
Struggle to access educational institutions and related activities	• Introduce or expand school bus services and public transit routes to ensure that low-income students have reliable transportation options to access educational institutions and participate in extracurricular activities. • Provide subsidies or financial assistance programs for transportation costs related to education, including school bus passes, public transit tickets, or vouchers for ride-sharing services, to alleviate the financial burden on low-income families.
High cost of alternative transportation	• Offer financial assistance programs, such as vouchers or discounts, for ride-sharing services, taxis, or other alternative transportation modes, to make them more affordable and accessible for low-income individuals.
Dependency on others	• Increase the availability and awareness of affordable, reliable transportation options such as VDPs, which provide door-to-door assistance for low-income individuals who may otherwise rely on family or friends for transportation.
Transportation challenges can limit job opportunities	

Challenge	Solution
	• Expand transportation services to rural and underserved areas through the introduction of on-demand transit solutions, community shuttles, or partnerships with local transportation providers to ensure equitable access to • Advocate for increased investment in rural transportation infrastructure, including road maintenance, public transit services, and ride-sharing programs, to address transportation disparities and improve mobility options for individuals living in rural or underserved communities.
Inflexible transportation schedules	• Adjust and increase the frequency of transportation services during early morning, late evening, and weekends to accommodate the diverse schedules and needs of low-income individuals, including those working non-traditional hours or accessing essential services outside of typical operating times. • Implement flexible routing or on-demand transit services that allow users to request transportation on short notice, providing greater flexibility and convenience for low-income individuals with varying transportation needs and schedules.

Table A4 – Integrated policy approaches to enhance transportation equity and accessibility

Category	Description	Hurdles/Barriers
Infrastructure	Public transportation; pedestrian pathways and cycling infrastructure; paratransit for individuals with disabilities, rideshare programs	Funding and prioritization; Coordination among multiple agencies
Information	Offering details on routes, schedules, fares, and accessibility features; public transportation information	Access to technology; Timeliness and accuracy; Availability of physical materials
Technology	Using apps for real-time public transit updates, online ride-sharing platforms, services for booking paratransit, and navigation aids for pedestrians	Economic factors; Cultural and language barriers; Accessibility for disability groups

Category	Description	Hurdles/Barriers
Policy	Improved public transportation services, infrastructure development for safer walking and cycling, funding for paratransit services, and incentives for community car-sharing programs.	Funding; Monitoring and evaluation; Coordination among agencies
Program	Community transportation services, paratransit, travel training, and other supportive services (transit options for seniors, individuals with disabilities, and low-income commuters)	Coordination; Awareness; Funding
Funding	Funding for public transit, paratransit, walking and biking infrastructure, and other mobility services.	Obtaining long-term commitment for funding

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Appendix B: Survey Detail

Project ID: 0092-24-10

WISCONSIN NON-DRIVER TRANSPORTATION BEHAVIOR STUDY

Non-Driver Sm·vey Questionnaire

Prepared for
Wisconsin Department of Transp01tation

We invite you to participate in a survey for the Wisconsin Non-Driver Tl3IlSJ)ortation Behavior Study. This study is led by the Institute for Physical. hmastructure and Transportation (IPIT) at the University of Wisconsin-Milwaukee (UWM) and the University of Tennessee, Knoxville (UTK). All of your answers will be completely anonymous and c.onfidenlial. and your answers will not be able to be linked back to you. Your participation in this research study is voluntary, and you may stop at any point or choose not to answer specific questions.

Your responses will help researchers who aim to better understand the transportation needs, options and challenges of non-drivers in Wiscons in, incl11ding agi.og adults, children, low-income individ1!31s, i:b.ose with disabilities, and anyone who chooses not to drive,. or does not own or .lacks access to a vehicle. Insights fiom your household are vital., particularly if you or someone in your home relies on alternative transportation services. If you are filling out this survey for a household member who cannot do it by themselves because ofa disability or another reason, please make sure the amwers re.fleet their travel experiences, not yours.

For yom convenience, you can also access this survey online using the following link or by scanning the accompanying QR code. https:fftiny.utk.edu/WisDOT

I} SCAN ME

lfyou prefer the convenience ofan online survey for potential follow-up, you may shp the printed version and complete ii online instead.

Jfyou have any questions regarding this study, please review the fu.11 consent on the next page.

You should feel free to 1eacb out to one of the resea;rcb investigators. Principle Investigator (Pl): Xiao Qin, Ph_D_ E-mail and Phone: qinx@uwm.edu, (414)251-8866; Co-PI: Cluistopher Cheny, Ph_D_E-mail and Phone: cherry@utkedu, (865)684-8106

Survey Details:

- Eligibility: Participants must be at least **18** years old and currently reside in th.e State of Wiscoos.in.
- Dliralion: Approximately 12-15 minutes
- Confidentiality: Your responses will be strictly kept anonymous, confidential and used exclusively for resear,ch study pu!poses.

l have read the conditions of this study and have had all my questio.ns answered. I hereby acknowledge the above and give my voluntary consent io participate in this study.

Consent Form for Paiiicipants in the Research Project

Study Title: **Wisconsin Non-D1iver Transportation Beha,ior Study**

P1inriple Inn.�tigaro1·(PI): Xiao Qin, Phn.

Email and Phone: qinx@uwm.edu"(4]4!)251-8866

Co-Principle Investigator (Co-PI): Cluistopher Chen"}', Ph.D.

Email and Phone: cherry@utk.edu, (865)684-8106

I. Purpose of the Research

We want to understand the transportation need sc, hoices, and challenges faced by people in the state of Wisconsin who do not dr.ive- This includes older adults, children, people with low income, those with disabilities, and anyone who chooses not to drive, does not own a car or cannot access one. Yow- input is important, especially if you or someoue in. yolll home uses different ways to get around. We aim to gather information from 500 people aged 18 and otder who do not drive and are living .in the state of Wisconsin.

II. What You Will Do

You will be asked to answer about 28 questions in a survey about how you travel and any difficulties you or other non-driving household members encounter while getting aroll.lld. It should take about 15 minutes to complete the survey.

Ill. Risks

Parlicipatiug in this study poses very little risk to you. You might feel a bit uncomfortable sharing your opinions, but you can skip any question you do not want to answer.

IV. Benefits

You will not get personal benefits from taking part, but yolll answers will help us .make transportation.better for people who do n.ot drive. No benefits ;u-e promised for your participation.

V. P1ivacy Det11ils

All parucipant data will be aggregated to ensure privacy.

VI. Compe11saiioD

There is no reward for raking part in this stllldy.

VIL Your Choice to Pa11icipate

You can stop being part of the study whenever you want without any problems. You do not have to answer any questions you do not want to.

VIII. Your Respo11sibilitil'S

Yow- task is to fill out tlle survey based on. your own experiences and transportation nee.ds.

IX. **Han Questiom?**

lfyou have any questions about tbe study or yolll rights, please reach out to the researchers using the contact details provided. You can. also get io touch with the UWJ.i Review Board for the Proteotion of Human Subjects. Phone: 414!-662-354!4; Email: irbimo@uwm.edu

X. Giving Yow·Con�ent

1 have read the Conseut Form aud understand what this project involves. I agree to take part in this study vollllllarily.

Screening Questions

1. Are you 18 years old m: older?

- ☐ Yes
- ☐ No_,. [You have Feached the end of the survey questions. Thank you!]

2. Are you a cwn:at resident of the State ofWiscm1sin?

- ☐ Yes
- D No_,. [You have reached the end of the survey questions. Thank yon!)

3. How often did you drive a motor vemcle :in the last year?

- ☐ Never - I :have not driven at all in the past year
- D Rarely - Several times over the past yea£
- ☐ Sometimes - Several times per month
- D Often - 1-4 times per week
- ☐ Daily - 5 times per week 01 more

4. Within your household, is a vehicle available for yow use?

- D Yes, and I am the primary driver of that vehicle. ---+ [You have reaclied the end of the survey questions. Thank you'1]
- D Yes. but I 1IIII not the primruy driver; another household member provides me with rides most of the time_-,. [Please proceed to Questions 5-34)
- D No ---+ [Please pmceed to Questions 5-34]

Demographic Questions

S. What is the zip code of your primary residence?

- ☐ _____
- ☐ P:refe1 not to answer.

6. What is your age?

- ☐ _____
- D Pl"efer not to say.

7. How do you identify your gender?

- ☐ Man
- ☐ Woman
- D Non-Binary
- D Other

8_ How would you describe yom race or ethnicity? (Select all that apply)

- □ Asi11!ll
- D Black or African American
- □ Hispanic or Latino
- □ American Indian or Alaska Native
- D Native Hawaiian or other Pacific ls.lander
- □ White
- □ Other.-----
- □ Prefer not to say_

9_ Whatis your native language?

- □ !English
- □ Spanish
- □ Hmong
- D Other(Pleasespecify): _____ _

HJ_ What is your current employment status?

- □ Empfoyed
  - -If empfoyed, seleot type:
    - □ Mostly on-site: I report to a work site for the majority ofmy workweek (3 or more days if working a 5-day week)_
      Mostly remote: I work from home for the majority of my workweek (3 or more days if wo.i:king a 5□day week:)_
- D Unemployed/Looking for a job_
- □ Unemployed/Not looking for a Job/Unable to work
- □ Student (for example, college)
- D Homemaker
- □ Retired

11_Provide the nwnber of people in your household, categorized as follows:

- Less than 15 yeais old: _____
- -15-18 year.. oU _____
- -19 to 44 years old: _____
- -45 to 64 years old: _____
- -65 years or older: _____

12- What is your current living situation?

- □ Rent
- □ Own
- □ Other. _____

13_What is the total ammal income of your household before taxes?

D Less than $l0,000
□ $10,000 to $14,999
□ $15,000 to $24.999
□ $25.000 to $34.999
□ $35,000 to $49.999
□ $50,000 to $74.999
□ $75,000 to $99,999
□ $100,000 or more
□ Pi-efeir not to say_

14_ Do you currently hold a valid driver's license?

□ Yes
□ No

Sm-vey Questions

15_ What are the reasons that you do not drive (or rarely drive)? (select all that app]y)

Disability impacts: I hav-e a disability that prevents me from driving or significantly limits: my driving capabilities_

- If applicable. please specify the disability that affects your driving ability (select all that apply):

D Vision impairment (blindness, low vision)
□ Developmental or cognitive disability
Mental health condition or new:odivergence making driving challenging (PTSD, anxiety, autism, dyslexia)
□ Physical disability
□ Another disability: Please ◆pocify _____
D Prefer not to disclose_

Optional: Please feel free to describe your disability in more detail, including how it HD1Jacts vour abilitv to ,drive a v-ehicle

No driver's license

D Vd:Jide,"related expenses (for example, pmchasing, operating, and maintaining)
D Costs for registration and insmance

D Car-free preference (for example, my daily needs and lifestyle do not require driving) Dependence on rides from others

D Availabili:ty of public transit, im--demand (for example, taxis. Uber and Lyft, etc..), 1111d shared tnwsportatjon (for example, bike-sharing, caipooling, etc.) options in my area/where I live.

D Other: [Please specify]

1,6_For each of the travel purposes listed below. please indicate how frequently you traveled for that pmpose m the last year. Check the boi. i:n the column that corresponds with your typical frequency of travel.

Tn1vel Pm·pose	**Neve,·-** I have not traveled at **all** in the past vear	**Rarely-** Several times ovei **the past** year	**Someti:m.es** -Several times pei **month**	**Often-** l-4 times peiweek	**Daily-** 5 times or more pei **week**
Personal education	0	0	0	0	0
Work	0	0	0	0	0
Personal business (Banking, legal services etc..)	0	0	0	0	0
MedicalJhealth care (Induding mental and dental health)	0	0	0	0	0
Food/groceries	0	0	0	0	0
Ch:ildldepemdent care or sc:liool	0	0	0	0	0
Social/recreational ,1.clivities	0	0	0	0	0
Religious/spiritual ,1.ctivities	0	u	0	0	0
Otl!ei (Please specrfy) _____	0	0	0	0	0

17. How do you usually travel to access the activities listed below? Please select the primary mode of transportation you use for each activity in the last year. If you did not engage in an activity, please choose N/A.

Activity	Walk or Roll (walk on feet, mobility scooter, wheelchair, cane/crutch)	Pedal or scoot (bicycle, standing scooter, skateboard, tricycle)	Shared micromobility (bike sharing, scooter sharing)	Bus	Train	Paratransit	Volunteer/ community transportation service	Taxis and ride hail (e.g., Uber)	Motorcycle	Car as driver	Car driven by family member, friends, or neighbors	Other (e.g., rental car/car share)	N/A
Personal education	○	○	○	○	○	○	○	○	○	○	○	○	○
Work	○	○	○	○	○	○	○	○	○	○	○	○	○
Personal business (Banking, legal services etc.)	○	○	○	○	○	○	○	○	○	○	○	○	○
Medical/health care (including mental and dental health)	○	○	○	○	○	○	○	○	○	○	○	○	○
Food/groceries	○	○	○	○	○	○	○	○	○	○	○	○	○
Child/dependent care or school	○	○	○	○	○	○	○	○	○	○	○	○	○
Social/recreational activities	○	○	○	○	○	○	○	○	○	○	○	○	○
Religious/spiritual activities	○	○	○	○	○	○	○	○	○	○	○	○	○
Other (Please specify) ----------	○	○	○	○	○	○	○	○	○	○	○	○	○

18_ Apprnx:imatcly how many miles do you live &om the following activities?

Activity	Less than 0-5miles	Between 0-5 and 1 miles	Between land 2 miles	Between 2 and 5 miles	More than 5 miles	rm not sure
Personal education	0	G	0	0	0	0
Work	0	0	0	0	0	0
Personal business (Banking, legal services etc.)	0	0	0	0	0	0
Medical/health care (including mental and dental heallih)	0	0	0	0	0	0
Food/groceries	0	0	0	0	0	0
Clriklldependent care or school	0	(_)	0	0	0	0
Social/recreational activities	0	0	0	0	0	0
Religious/spir:itual activities	0	0	0	0	0	0
Other (Please specify) _____	0	0	0	0	0	0

19 _How wm.ild you rate the ease of access to each of the following activities? Please select the option that best reflects your experience_ If an activity is not relevant to you because you do not wish to access it, can access it without needing to travel, please skip that.activity_

Activity	Not possible to aocess	Very difficult to access	Somewhat difficult to acoess	Somewhat easy to access	Very easy to access
Personal education	0	C	0	0	0
Work	0	G	0	0	C
Personal business (Banking, legal. services, etc-)	0	C	0	C	0
Medical/health care (including mental and dental health)	C:	C	C	0	0
Food!groceries		G	0	0	C
Child/dependent care or school	0	C	0	0	C
Social/recreational. activities	0	c,	0	0	0
Religious/spiritual activities	0	0	0	0	C
Other (Please specrfy) ----------	0	G	0	0	u
Other (ple.ase specify}	0	C	0	0	0
Other (Please specrfy)	0	Ci	0	0	C
Other (Please specify)	0	C	0	C	0
Other (Please specify)	0	0	0	0	C
Other (Please specify)		C	0	C	C

20 _ Please rate how impo.11ant each transportation option is to you_ If you do not use a servioe, please choose N/A

Transportation Option	Not important at all	Slightly important	Moderately importllllt	Very important	Extremely important	*N/A*
Walk or Roll (walk on feet, mobility scooter, wiheelcliair, ,cane/crutch)	0	0	0	:)	0	_)
Pedal or scoot (bicycle. standing scooter. skateboard, tricycle)	0	u	0	:J	0	:::::;
Shared inicromobility (bike sharing, scooter sharing)	0	*0*	0	:J	0	:,,
Bus	0	u	0	:J	0	:,,
Train	0	0	0	:)	0	')
Paratr.msit	0	*0*	0	:J	0	:::::;
Vohwteeu'community transportation service	0	u	0	:J	0	-,
Taxis and ride hail (for example, Uber, Lyft)	:J	*J*	0	:J	0	◆-
Motorcycle	:J	0	0		0	C,
Car as driver	◆	0	0	◆	0	C,
Car driven by household members	:)	8	0	*:J*	0	◆-
Other (Please specify) _____	=)	8	0	- ◆	0	_'

8

21_Please rate your current level of satisfaction with earn mansportation option_ If you do not use a service. please choose NIA

Transportation Option	Very llllsatisfied	Unsatisfied	Neutral	Satisfied	Very satisfied	*NIA*
Walk or Roll (walk on feet, mobility scooter, wheelchir, ,cane/crutch)	0	0		J	0	
Pedal or scoot (bicycle. standing soooter. skateboard, tricycle)	0	0		)	0	
Shared m.icromobility (bike slraring, scooter sharing)	*0*	0	J	0	:)	0
Bus	0	0	:)		:)	
Train	*O*	0		0	:)	
Paratransit	*0*	0		0	:)	
Volunteer/commllility transportation service	0	0	')	0	:)	
Tax.is and ride hail (for example, Uber, Lyft)	0	0			:)	
Motorcycle	*0*	0	:)		:)	
Car as dnver	0	0	.J	J	J	
Car driven by household members	*0*	0		J	J	
Other (Please specify)	0	0		=1	*J*	

9

22_Considering all the !ravel that you did in the past yeru:, what was youi- primary mode of transportation? Please, seJlect one_

- D Walle or Roll (walk nn feet, mobility scool:ef, wheelchair, cane/crutch)---+ [Please skip to Question 25]i
- □ Pedal or scoot (bicycle, standing scooter, skateboaid, tricycle)---+ [Please skip to Question 25)
- D Shared micrnmobility (bike sharing, swoter sharing)
- D Bus
- □ Train
- □ Paratransit
- □ Volunteer/community transportation service_
- D Taxis and ride hail (for =ample. Uber)
- □ Motorcycle
- D Car as driveE
- □ Car driven by household members.
- □ Other (Please specify)

23_ Please rate the importa=e of each of the following aspects considering your selection **at Question 22** as your primary mode of t:ransportatiOll_ lf you db not l!Se a serviGe, please choose N/A

Aspects of Transportation Service	Not important at all	Slightly important	Moderately important	Very important	Extremely important	N/A
Availability of service in your airea	0	J	0	J	0	J
Accessibility of paths and lanes for bikes and se-ooters	J	:)	0	J	0	0
Gonvellience of re<1clung destinations	0	l)	0	J	0	)
Direct transit route **(fewer** traru.fers)	0	J	0	J	0	J
Availability of real-time servioe information	J	O	0	J	0	J
Service operating hours	J	)	0	J	0	)
Service frequency	)	_)	0	J	0	)
Integration/connection with other transport modes	0	)	0	J	0	)
Special services **for** elderly and disabled passengers	0	':)	0	J	0	J
Accessing infonnation 011 fares, schedules, and routes	J	)	0	J	0	J
Gostoff.u:es	0	)	0	J	0	0
Travel time to destinations	J	□	0	□	-J	□
Safety (low risk of involving in a crash)	J	□	()	□	0	0
Personal security (against crime)	0	:J	0	J	0	J
Reliability of the service	J	0	0	J	0	J

11

24_ Please rate your satisfaction (performance) with eacl:i of the follmvmg aspects ofyouc selection **at Question 22 as** your primary mode of t:ransportatiOll_ lf you db not l!Se an aspect, please choose *NJA*

Aspects of Transportation Sen,ice	Very unsatisfied	Unsatisfied	Neutral	Satisfied	Very satisfied	*NIA*
Availability ofservke inyoUl area	0	0				
Accessibility of paths and lanes for bikes and scooters	0	0	'J	0		0
Convenience of reaching destinations	0	0	*0*	0		0
Direct transit route (fewer transfers)	0	0				
Availability of real-time servtce information	0	0		0		0
Service operating hours	0	0		0		J
Service frequency	0	0	'J			
Integration/connection with other transport modes	0	0		0		‖
Special services fo1 eldedy and disabled passengers	0	0		:)		J
Accessing inf01D1ation on fares, sd1edule:.s, and routes	0	0	J	J		'J
Cost of fares	0	0				
Travel time to destinations	0	0		0		‖
Safety (low risk of involving in a crash)	0	0		1J		( )
Personal security (against crime)	0	0		0		0
Reliability ,of the service	0	0		:)		J

*25_* As someone who primarily uses **walking/rolling** 01· **pedaliug/scootmg** to get a:rmmd1, please rate the impact of each ofthe following factors on your ability to use fhese modes of t,ansportation effectively_

Factors	Not at all impactfut	Slightly impactful	Moderately impactful	Very impactful	Extremely unpactful	***N/A***
Qu,ality of sidewalks mdpathways	)	*0*	0	)	0	
Availability of scooter-md bicycl e-friendly lanes	1)	0	0	*J*	0	
Traffic safe.ty for pedestriam, cyclists, mdscooters	0	*0*	0	)	0	0
Street lighting fo1 walking, bicyding, md scootering at night	*0*	*0*	0	)	0	")
St.orage and pa;1king options for bicycles mdscooters	)	*0*	0	)	0	0
Weathei conditions affecting travel	)	0	0	:)	0	
Aocessibility of paths md lanes (inclines, maintenance)	)	0	0	*0*	0	*C,*
Safety from crim.e while walking, bicycling, 01 scootering	)	0	0	:-)	0	*0*
Distance to common destinations	()	')	0	)	0	-
Othei (please specify): ----------	*O*	*O*	0	)	0	u

26_Over the last year, how often have you avoided go.mg somewhern because of challenges with yo1t1r primary transportation mode?

- D Daily (Every day or almost every day)
- D Often (A few times each week)
- D Sometimes (A few times each month)
- □ RMely (A few times over the past year)
- □ Never (I have not had challenges in the past year)

27_Please tell us more abow: any challenges you experience:

28_Over the last year, how often have challenges with your primary transportation mode made you late to somewhere?

- D Daily (Every day or almost every day)
- □ Often (A few times each week)
- □ Sometimes (A few times each month)
- D RMely (A few times over the past year)
- D Never (I harve not bad challenges in the past year)

29_Please tell us more about 11t1y challenges you experience:

30_ Do you handle transportation arrangements for others, such as children, dependents, or non-drivers within yo= household?

- □ Yes - If Yes, please specify who you are arranging transportation for:
  - □ Chilmen
  - □ Dependents with disabilities---+ [Please skip to Question 32]
  - D Elderly family members--+ [Please skip to Question 32]
  - □ Other non-drivers in the household (Please specify): _____
- □ No ---+ [Please skip to Question 32]
- □ Pi-efeJ not to say_

31_If you .ne arrangjng transportation for **child.-en** please indicate then primary mode of transportation:

- □ School bus
- D Public transport (Bus, train, subway)
- □ We&
- □ Car as. drive.£
- □ Car driven by household members_
- D Cil.1p001 (driven by another parent or guardian)
- □ Taxis and ride hail (for example, Uber, Lyft for older children)
- D Pacatransit
- □ Volunteer/community transportation service_
- □ Other(Pleasespecify): _____

32_ *AB* someone who never or rarely drives, please describe any concerns you have related t.o traveling or participating in activities_

33_ Please describe any suggestions you have for strategies to imprnve your transportation options_

34_ Do you think accessible apps or smartphones could help miprove your transportation needs? If so. please describe how_

Appendix C: Detailed Survey Results – Travel Frequency

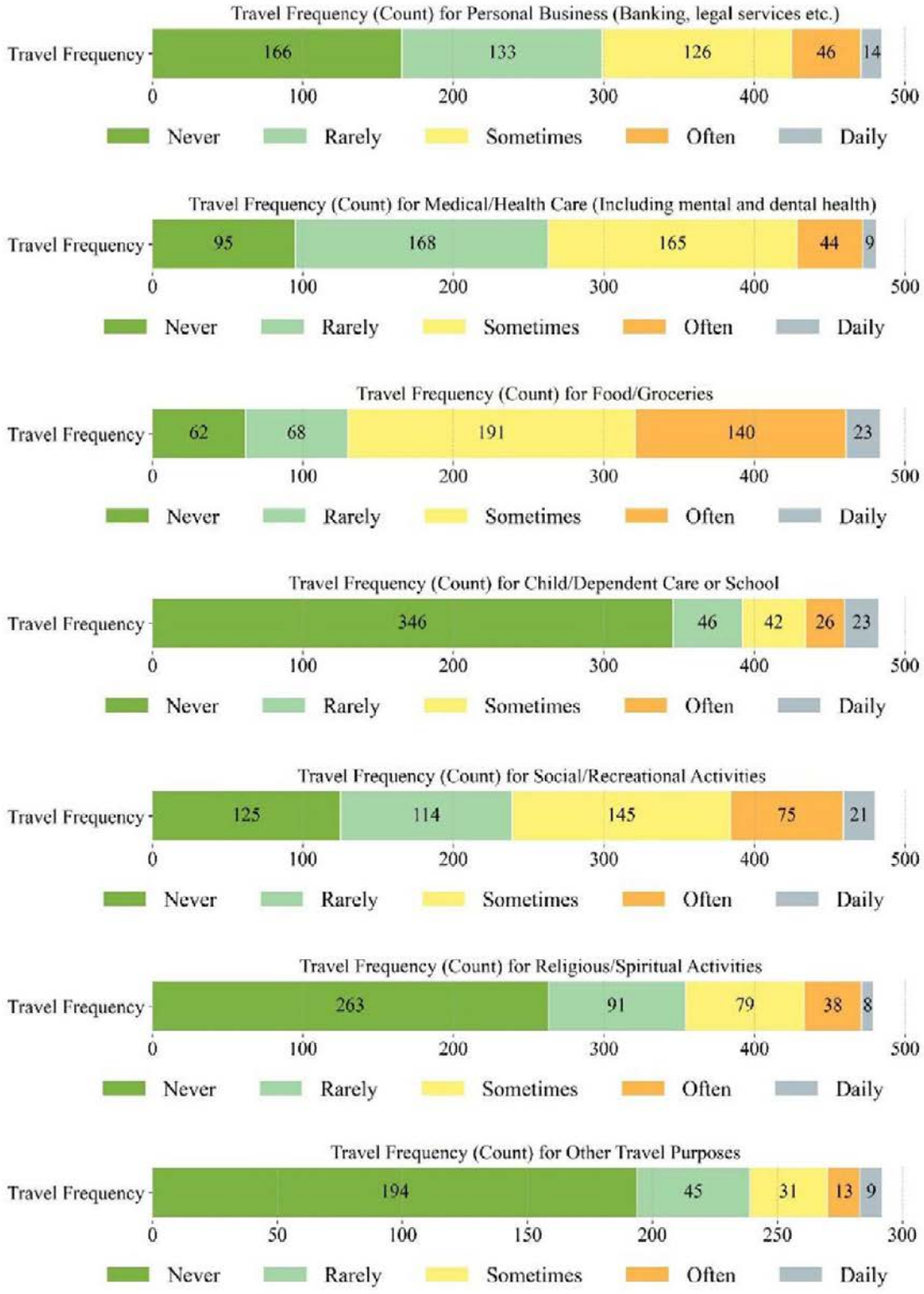

Figure C1: Compiled Travel Frequency Purposes

Appendix D: Detailed Survey Results – Assessing Key Aspect of Transportation Services

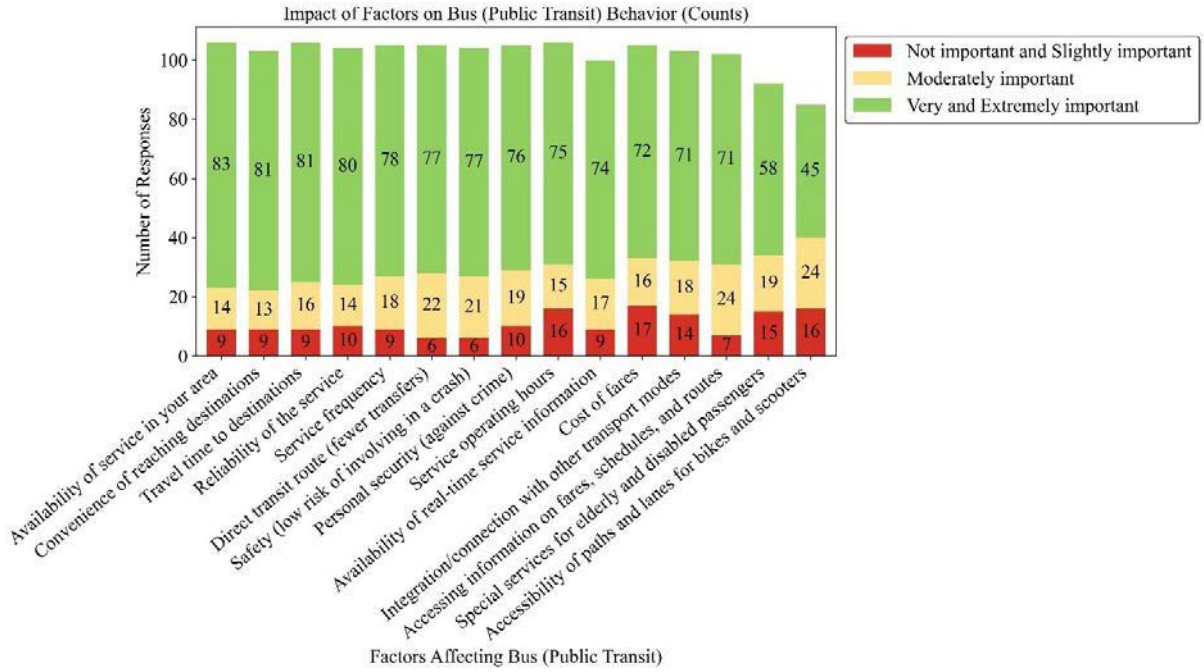

Figure D1: Transportation Option Importance – Bus

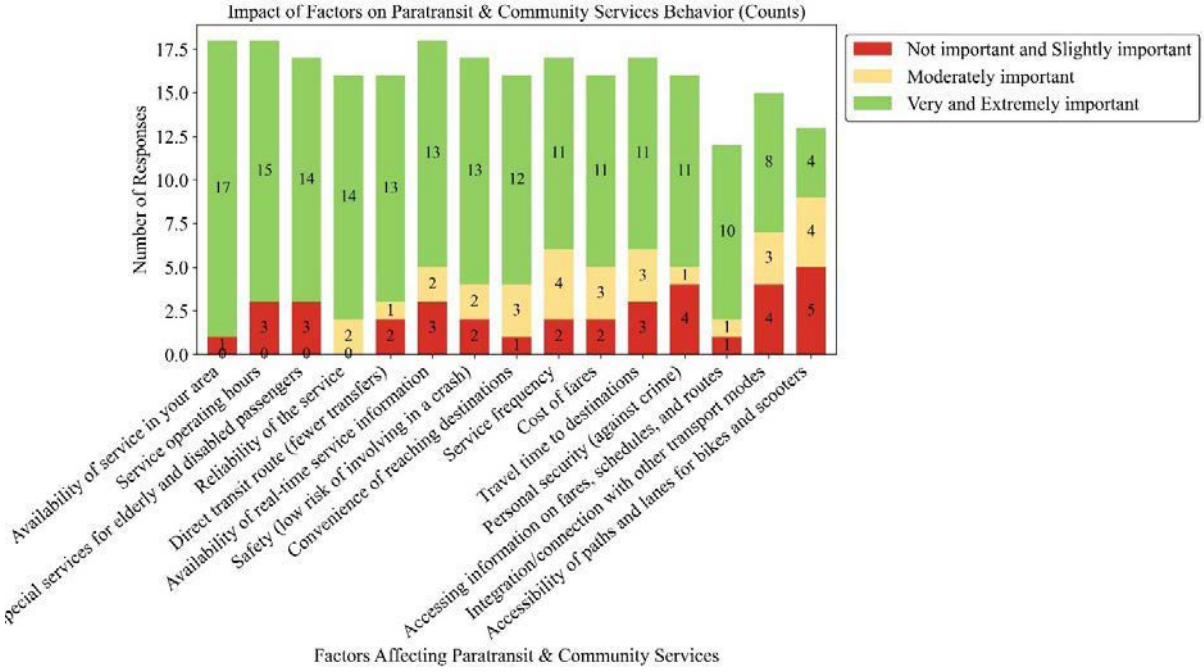

Figure D2: Transportation Option Importance – Paratransit

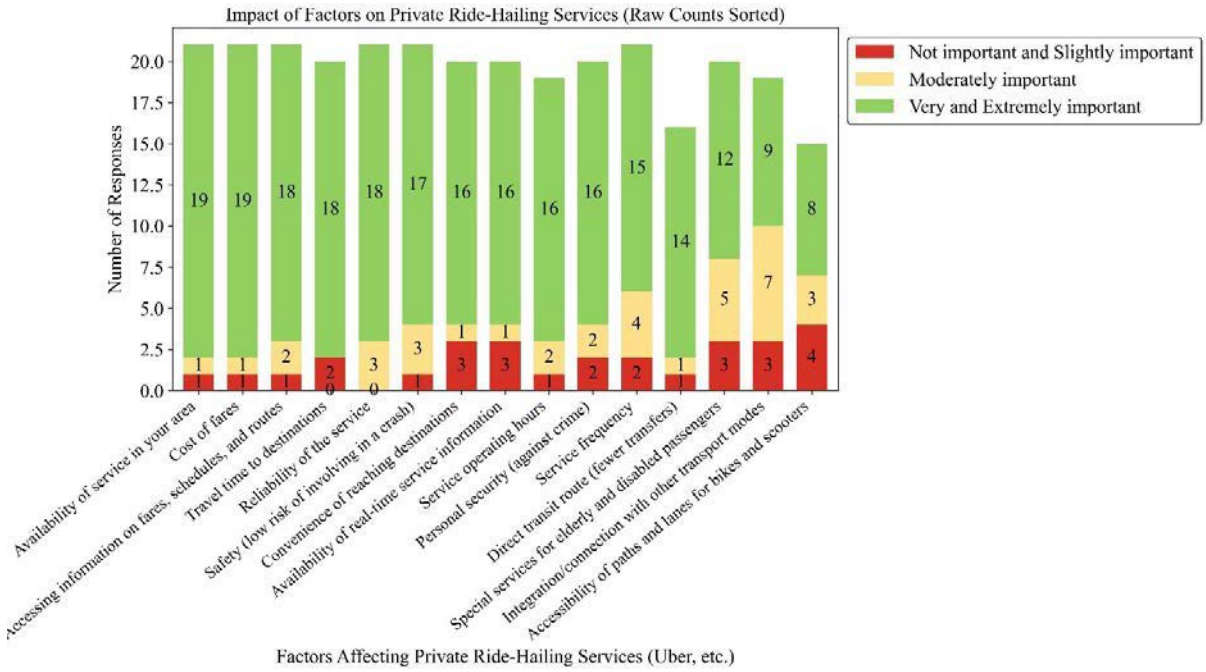

Figure D3: Transportation Option Importance – Private Ride-Hailing

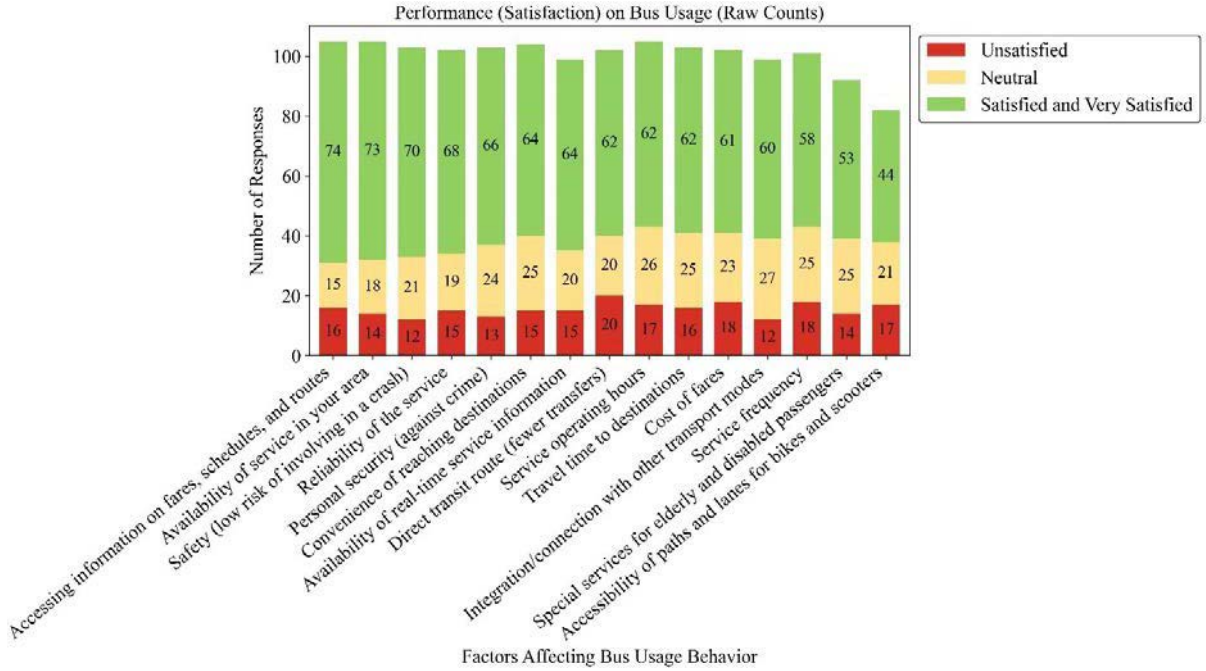

Figure D4: Transportation Option Satisfaction – Bus

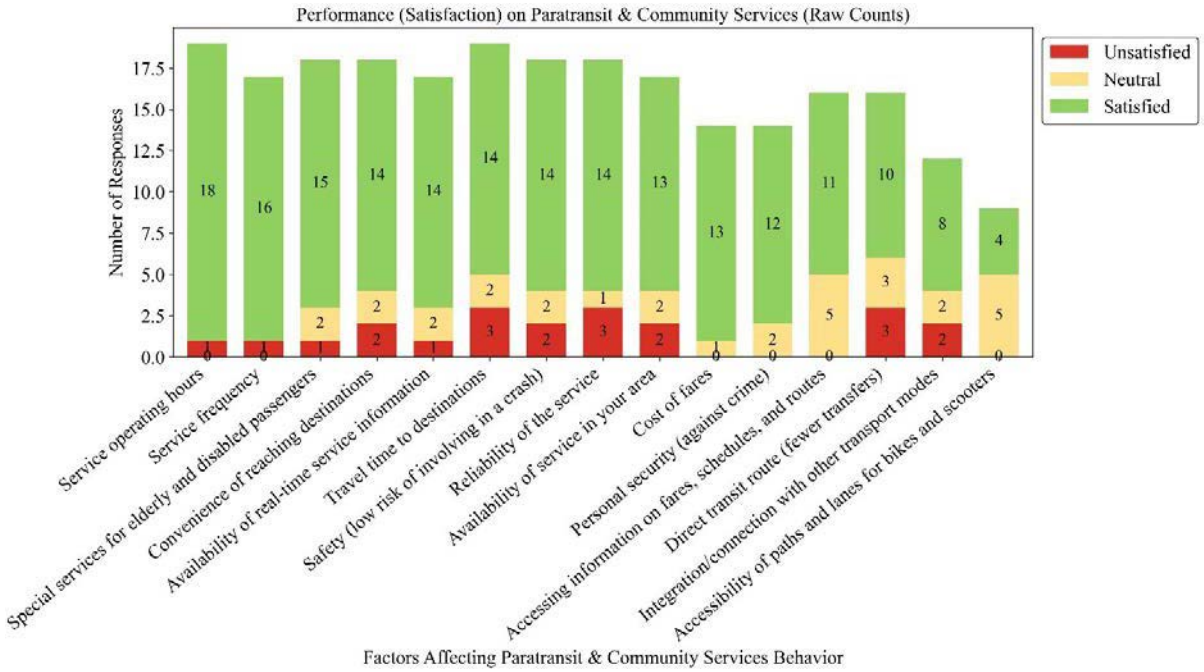

Figure D5: Transportation Option Satisfaction – Paratransit

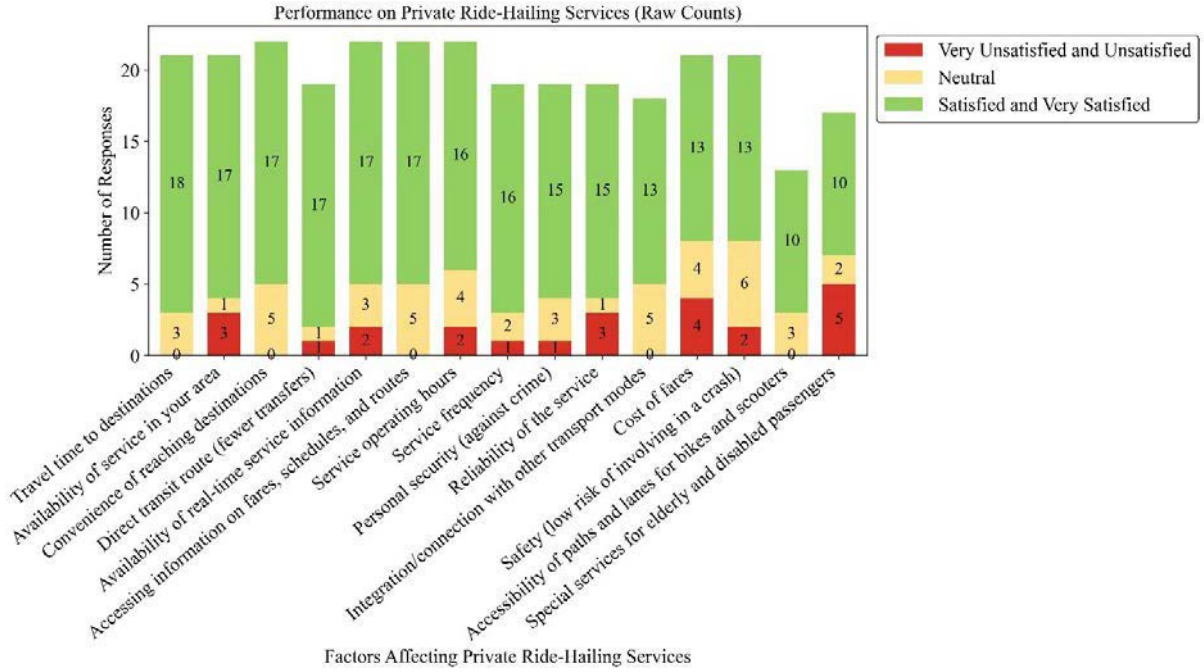

Figure D6: Transportation Option Satisfaction – Private Ride-Hailing

Appendix E: Detailed Survey Results – Non-Drivers Open-Ended Questions

OPEN-ENDED QUESTIONS

Q34. As someone who never or rarely drives, please describe any concerns you have related to traveling or participating in activities.
(The survey responses have been categorized based on the subjects (suggestions and challenges) most frequently mentioned by the respondents. Some examples are indicated in each category)

1 Detailed Challenges Identified:
1.1. Health-Related Issues (Physical and Mental):
Physical Disabilities (Responses):
- *"Veryyy hard to drive sometimes my feet don't work sometimes."*
- *"I'm blind in one eye the other low vision. Gas is a big problem in this family. Thus we have to stay in our town to go to places."*
- *"I have Rheumatoid arthritis, moving scares me."*
- *"I just have mobility issues and cannot walk far. I always have a family member to drive me around."*

Overall, respondents with physical limitations, such as vision problems or mobility issues, struggle to get in and out of vehicles or navigate transportation independently.

Mental Health Challenges (Responses):
- *"Mental health challenges. I don't feel safe or calm in a car."*
- *"I have anxiety in cars."*
- *"I have PTSD from a car accident."*

Overall, Anxiety, PTSD from car accidents, and general fear of driving are significant barriers to mobility.

1.2. Lack of Accessible Transportation:
Rural and Suburban Accessibility:
- *"I live in a small village where we don't have taxis, bus, train etc., and to call an Uber or Lyft to do my shopping 30 miles away is too costly."*
- *"I live in the middle of nowhere in an extremely rural area, so I do not have access to any kind of public transportation nor are there paid ride share services."*
- *"It's very difficult to go anywhere outside of town. We are limited in social activities."*
- *"I do not enjoy traveling, so I never miss out there, but I would probably go more places if I was around public transportation."*

Overall, many respondents in rural areas reported a lack of public transportation, forcing them to rely on costly services like Uber or to depend on others.

Urban Infrastructure Challenges:

- *“I prefer to walk, but we don't have sidewalks.”*
- *“It's difficult because of the safety issues and lack of walkways.”*
- *“The infrastructure is terrible to allow for other methods of transport such as walking and biking.”*

Overall, in urban areas, respondents noted the difficulty in finding accessible sidewalks and safe walking paths.

1.3. Financial Constraints:

High Costs of Transportation:

- *“It’s expensive to get a ride and sometimes you can’t find a ride.”*
- *“The cost involved.”*
- *“I had to choose whether to Uber to get my insulin or order food. I almost never go out just for fun anymore.”*

Overall, the cost of maintaining a vehicle, using rideshare services, or even affording public transportation was a significant concern, particularly for those on fixed incomes.

Affordability of Car Ownership:

- *“We cannot afford a new car.”*
- *“If registration and insurance wasn't so expensive, I'd have more access to drive myself.”*

Overall, respondents mentioned the financial burden of owning a car, including costs for insurance, gas, and maintenance, as major barriers.

1.4. Social Isolation and Dependency:

Isolation Due to Mobility Issues:

- *“I’m becoming more and more housebound.”*
- *“I have basically no social life. I feel stranded and isolated, like I am in solitary confinement.”*
- *“Sometimes I decline to participate in activities if it would take too long to arrive at the destination.”*

Overall, many respondents feel isolated because they cannot drive themselves, leading to missed social events and a reduced ability to maintain relationships.

Dependence on Others:

- *“Just having to rely on family too much, I hate bothering them.”*
- *“If I don't beg for a ride I'm pretty much stuck and can't go anywhere.”*

Overall, reliance on family, friends, or community members for transportation was commonly seen as a challenge, with respondents feeling like a burden or constrained by others' availability.

1.5. Safety Concerns:

Fear of Accidents:

- *“I am afraid of accidents.”*
- *“Car accidents, being late, security risks.”*
- *“My main concern is with the recklessness of some drivers and a fear of having to deal with an accident if something were to happen.”*
- *“My concerns are when the younger generation drives reckless.”*
- *“People that drive fast and reckless.”*

Overall, concerns about reckless driving and general safety while using private transportation.

1.6. Time Constraints and Inconvenience:

Inconsistent and Lengthy Public Transport:

- *“Buses take too long.”*
- *“It’s hard to do due to bus time it leaves.”*
- *“It’s very time-consuming, and the faster options leave you dependent on someone else.”*
- *“Worried about the infrequent public transportation schedules, which might affect travel arrangements, possibly causing lateness or missing out on activities.”*
- *“Riding the bus can take a long time to go a short distance sometimes.”*

Overall, Long travel times and the unpredictability of public transport schedules made it difficult for respondents to plan their activities or ensure timely arrival at their destinations.

2. Enhanced Solutions Proposed by Respondents:

2.1. Family and Community Support:

Relying on Family and Friends:

- *“I have to rely on others and try not to inconvenience them and make their time worthwhile.”*
- *“I usually get family or friends to take me.”*
- *“I always have a family member to drive me around.”*
- *“I have a family member take anywhere I need to go.”*
- *“My family is good at making sure I get to my destinations on time.”*

Overall, many respondents rely on their personal networks for transportation, although this comes with challenges of coordination and perceived burden.

Use of Volunteer Networks:

- *“Consider implementing volunteer driving programs for non-drivers.”*
- *“Explore community-based solutions like neighborhood driving co-ops or ride-sharing.”*

Overall, some respondents mentioned the potential for more organized community support, such as volunteer drivers or ride-sharing groups.

Q35. Please describe any suggestions you have for strategies to improve your transportation options. (The survey responses have been categorized based on the subjects most frequently mentioned by the respondents. Some examples are indicated in each category)

1. Detailed Suggestions Identified:

1.1. Health-Related Suggestions:

Physical and Mental Health Considerations:

- *"Better resources and accessibility for disabled people."*
- *"Create more, and more easily accessible, modes of paratransit."*

- *"Make personal care assistance drivers for people with severe anxiety."*

1.2. Enhancing Public Transit and Infrastructure:

Expanding and Improving Public Transit:

- *"Public transportation such as the bus needs to really do better with scheduled arrival times because it is generally not very dependable."*
- *“More information regarding scheduling and cost.”*
- *“Develop alternative transportation options in small town and rural area.”*
- *"Possibly more public transit to counties outside of the one that I live in."*

Urban Infrastructure Improvements:

- *"More sidewalks and crosswalks."*
- *"Increase hiking trails and rest areas between towns."*
- *"Create designated walking paths everywhere alongside roads."*

1.3. Financial Assistance and Affordability:

- *"Cheaper gas and cheaper bus fare."*
- *"Create programs to help with vehicle costs, such as easier vehicle loans for low-income people."*
- *"The government and relevant agencies can implement discounted policies for non-drivers, such as discounted bus fares, reduced parking fees, etc."*

1.4. Enhancing Safety:

- *"People need to be retested every decade or so to see if they know how to drive."*
- *"Make drivers more aware of bike lanes and ensure vehicles cannot enter bike lanes."*

1.5. Technological Solutions and Innovations:

- *"Utilizing technological advancements and smart transportation systems to enhance the efficiency and accuracy of traffic management."*
- *"Buses should be tracked in real-time, and it should be possible for connecting buses to be aware of delays."*
- *"Implementing smart traffic planning and design to optimize road networks and public transportation routes."*

1.6. Expanding and Improving Volunteer and Community Support:

- *"Set up volunteer driver organizations and funding for car repair, etc., for the elderly or disabled."*
- *"Promoting and supporting ride-sharing options to expand people's transportation choices."*
- *"We need more volunteer drivers recruited, and their insurance covered."*

Q36. Do you think accessible apps or smartphones could help improve your transportation needs? If so, please describe how.

(Note: No (n=114), Yes (n=131), Maybe(n=23)
The survey responses have been categorized based on the subjects most frequently mentioned by the respondents. Some examples are indicated in each category)

1. Detailed Suggestions Identified:

1.1. Real-Time Tracking and Navigation:

- "Yes, because you could track where your bus is and how far it is so you can have your coat on or whatever you need ready and be at the door when they get there."
- "Yes. I can book a ride and see what the driver and vehicle information is and when it's arriving."
- "Yes, the bus system has an app but honestly would be easier to use if they just laid it out more like Google Maps."
- "The bus app is nice, maybe one for community or volunteer transportation."

1.2. Ride-Hailing and Ride-Sharing Apps:

- "Yes. Uber and Lyft are very useful, but they can get expensive."
- "Yes, apps like Uber or Lyft are very helpful for setting up rides."
- "Yes, being able to call a ride through an app makes things more convenient."

1.3. Accessibility Features for People with Disabilities:

- "Yes, the accessibility features on smartphones can help visually impaired individuals and other people with disabilities to easily use mobile apps, such as accessing navigation apps, finding directions, and booking rideshares."
- "Yes, accessible public transportation navigation apps can provide information on accessible features of buses, subways, and other transportation options."
- "Smartphone applications can provide accessible navigation features to help users walk, bike, or take public transportation to their destination."

1.4. General Skepticism and Technological Barriers:

- "No, I don't think apps would be helpful for my situation."
- "No, I would not use these services."
- "No, I can't see how this type of technology would be useful."
- "No, I don't understand technology well."
- "No, I don't use a cell phone due to difficulty following how to use phones."
- "Probably not. I live in a rural area."

Appendix F: Non-Drivers Latent Class Analysis – Class 0

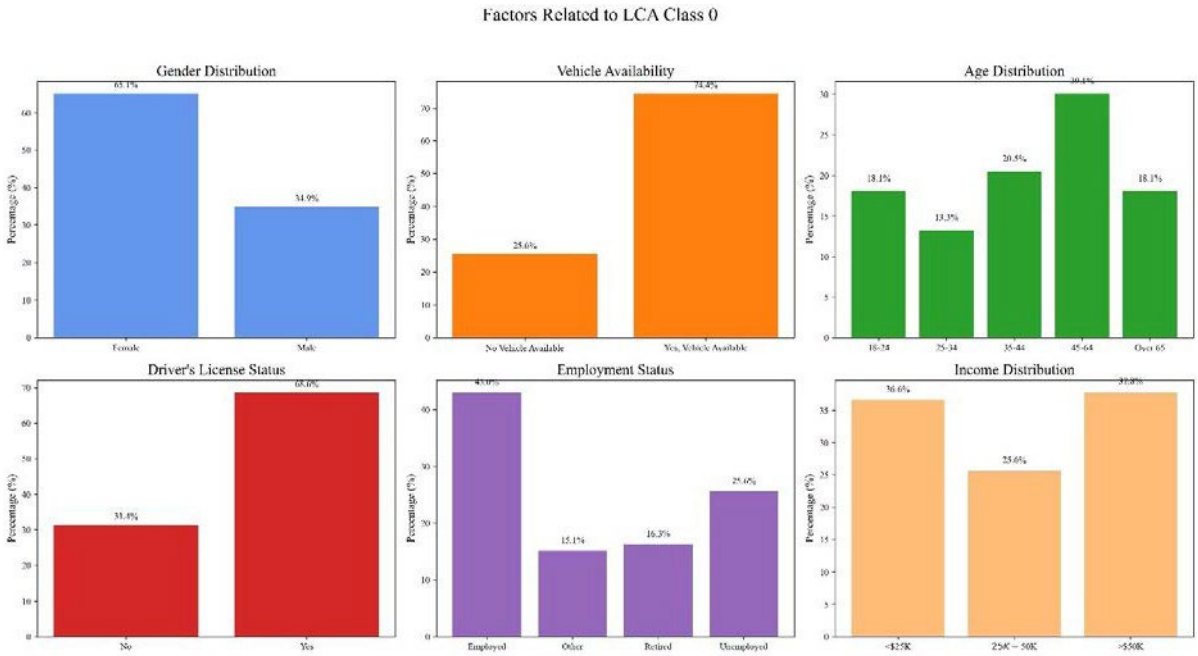

Figure F1: Compilation of Socio-Demographic Factors

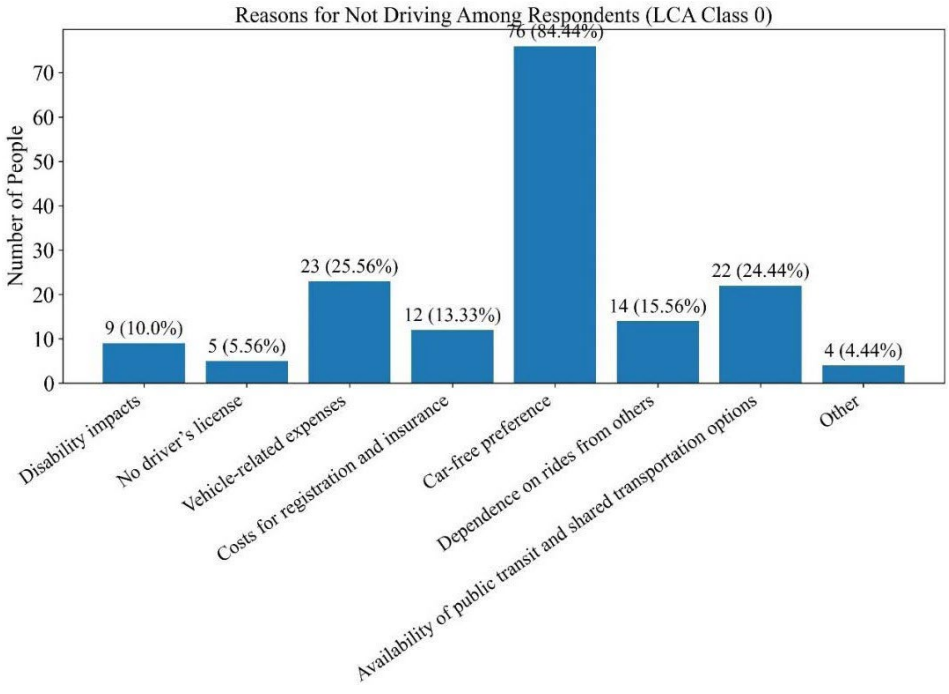

Figure F2: Non-Drivers Reason for Not Driving

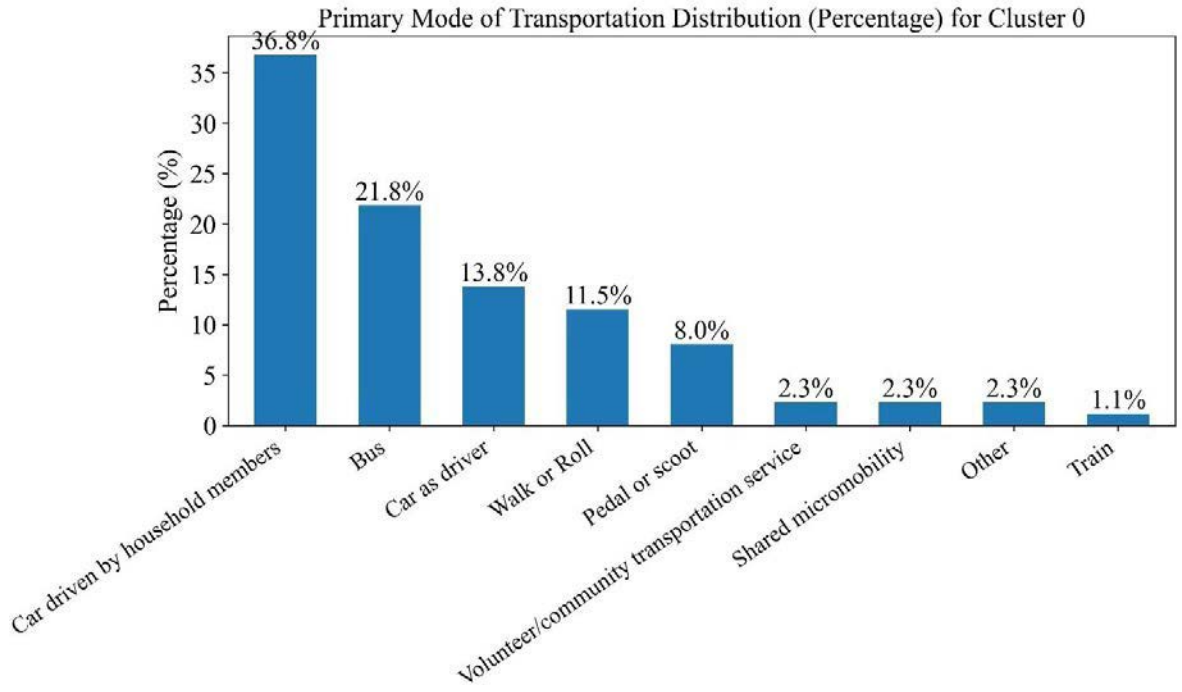

Figure F3: Non-Driver Mode of Transportation

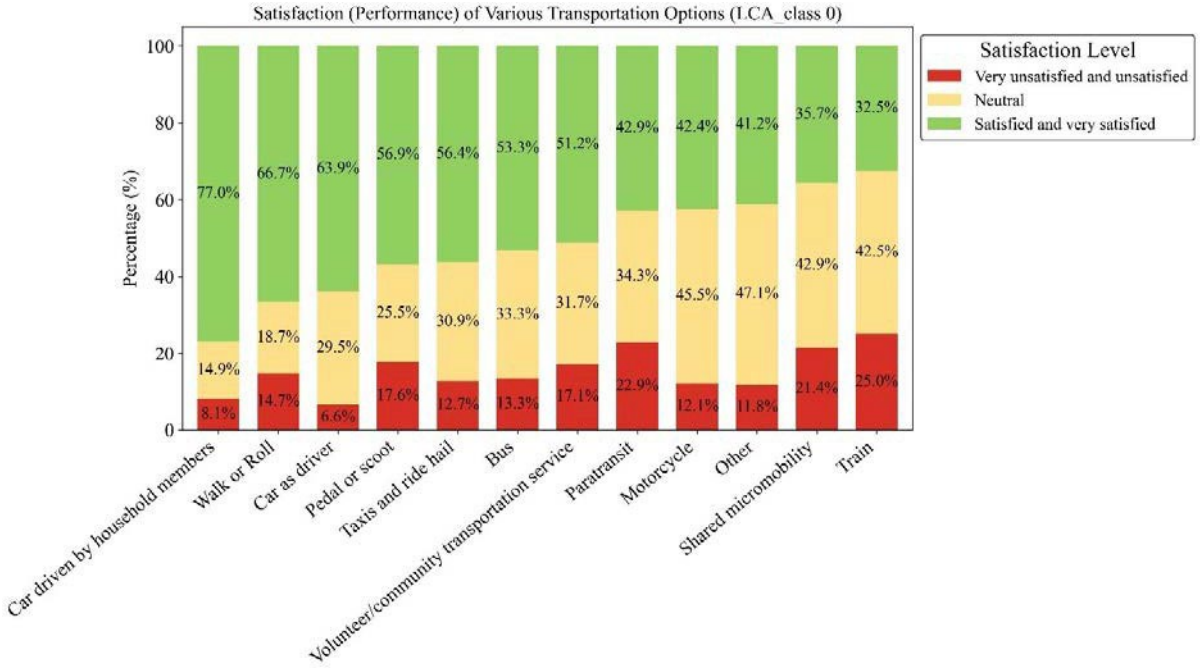

Figure F4: Transportation Options Satisfaction

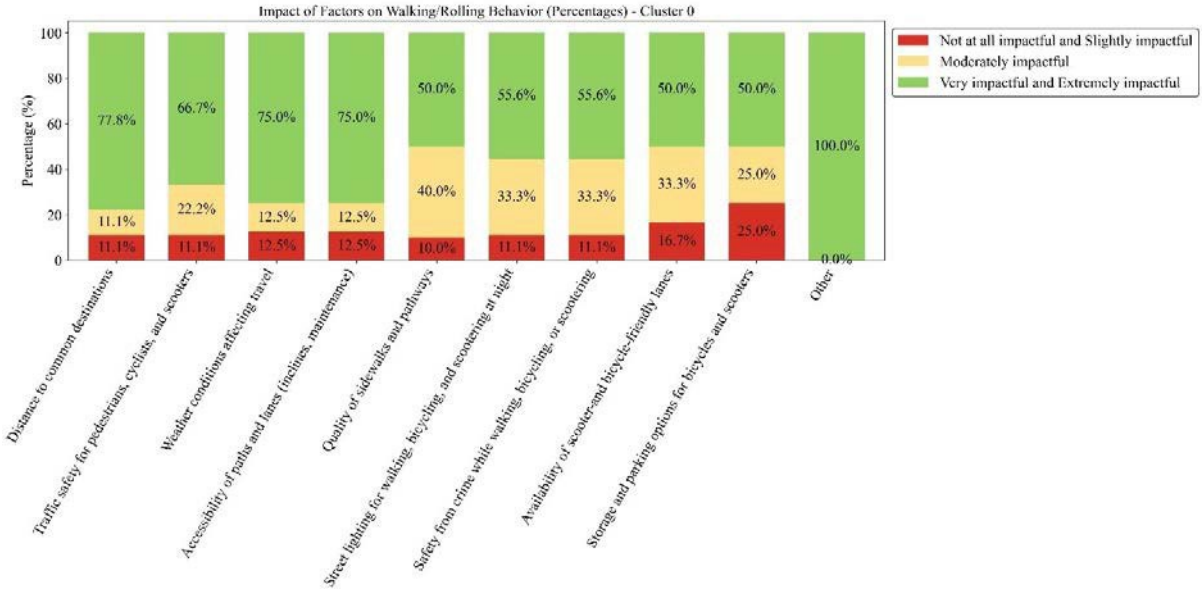

Figure F5: Impact of Walking or Rolling

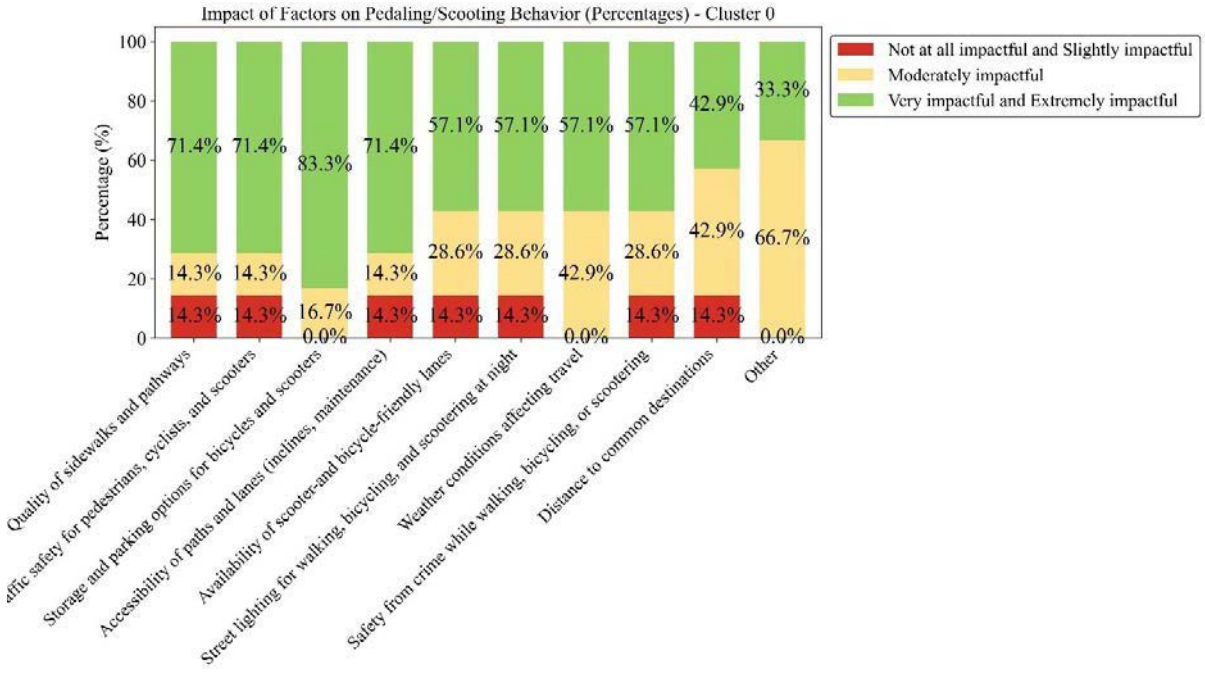

Figure F6: Impact of Pedaling and Scooting

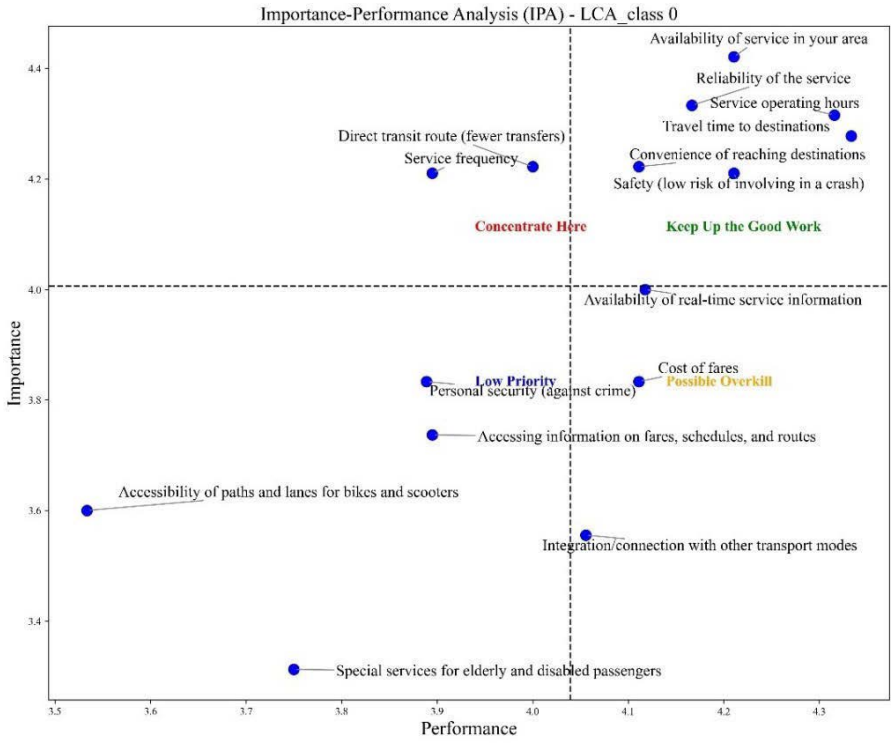

Figure F7: Importance Performance Analysis – Bus

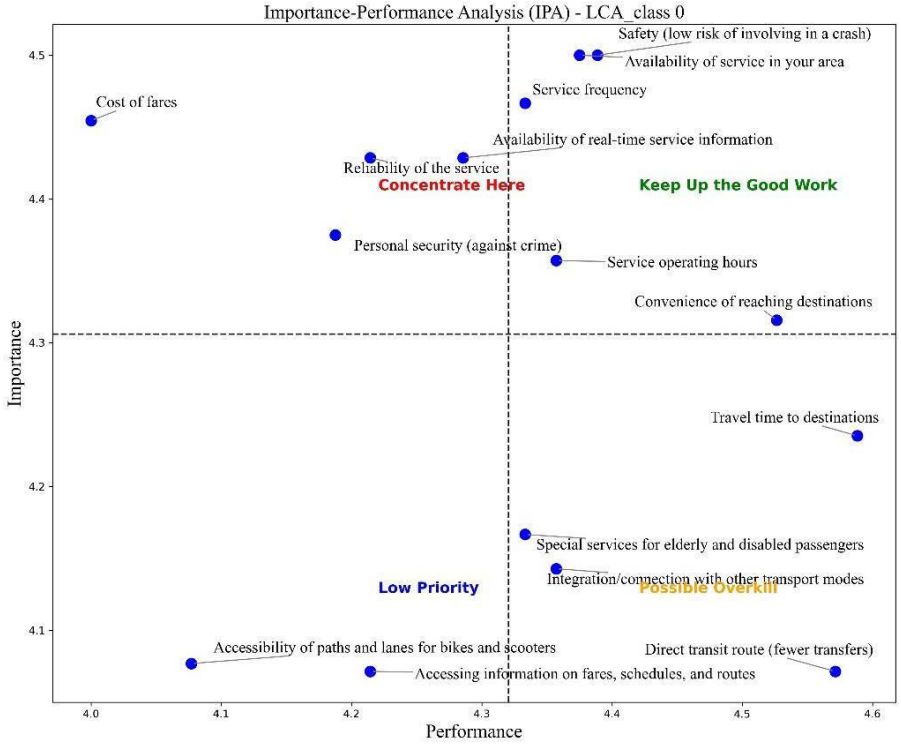

Figure F8: Importance Performance Analysis – Cars driven by household members

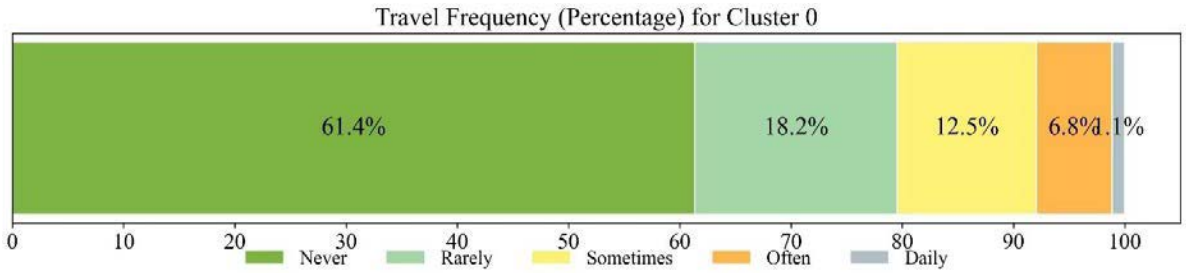

Figure F9: Travel Frequency Purpose – Personal Education

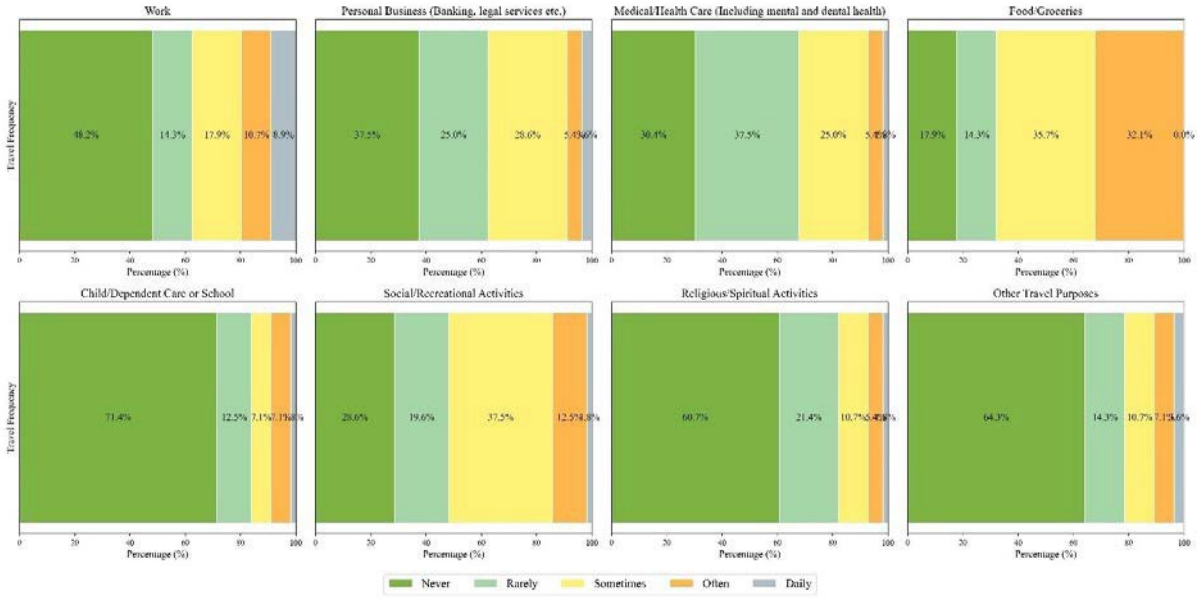

Figure F10: Compilation of Travel Frequency Purposes

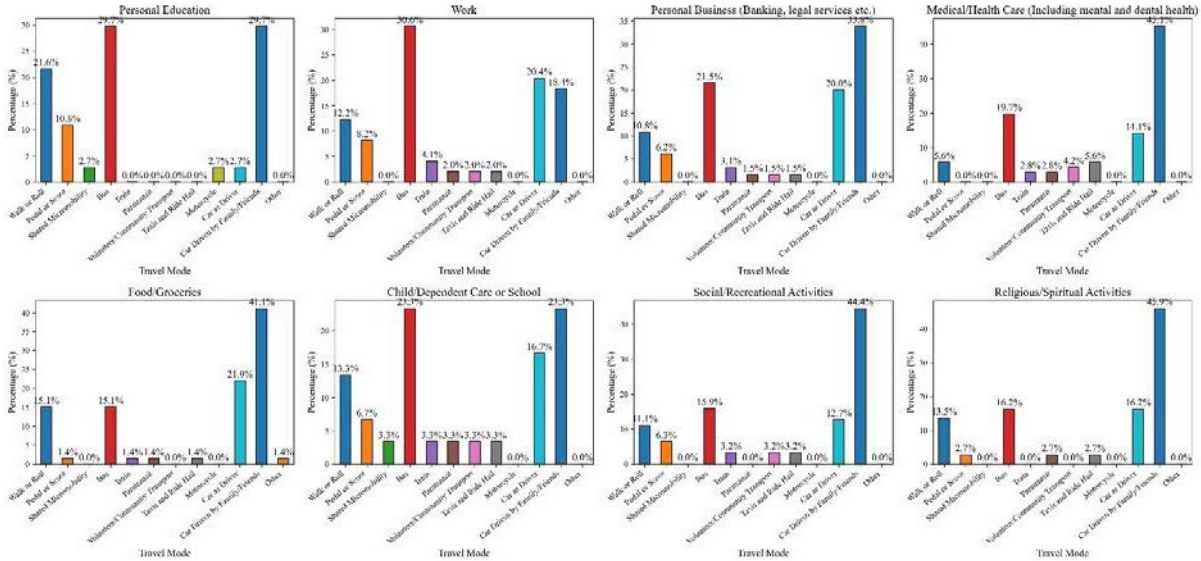

Figure F11: Compilation of Travel Purposes

Appendix G: Non-Drivers Latent Class Analysis – Class 1

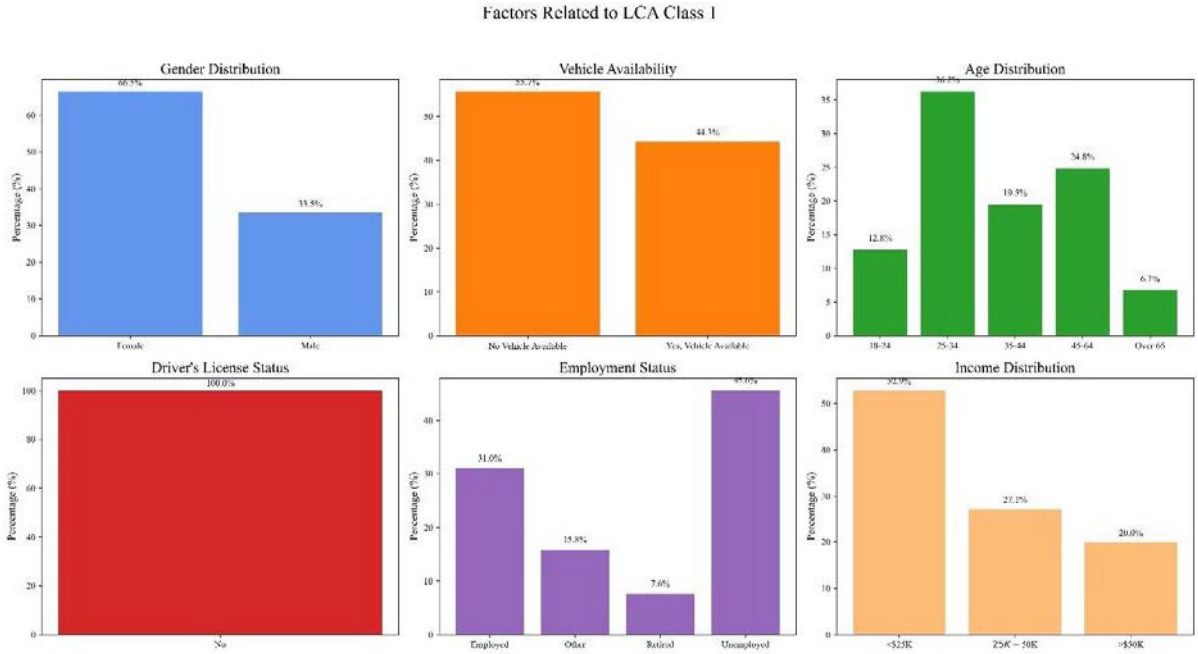

Figure G1: Compilation of Socio-Demographic Factors

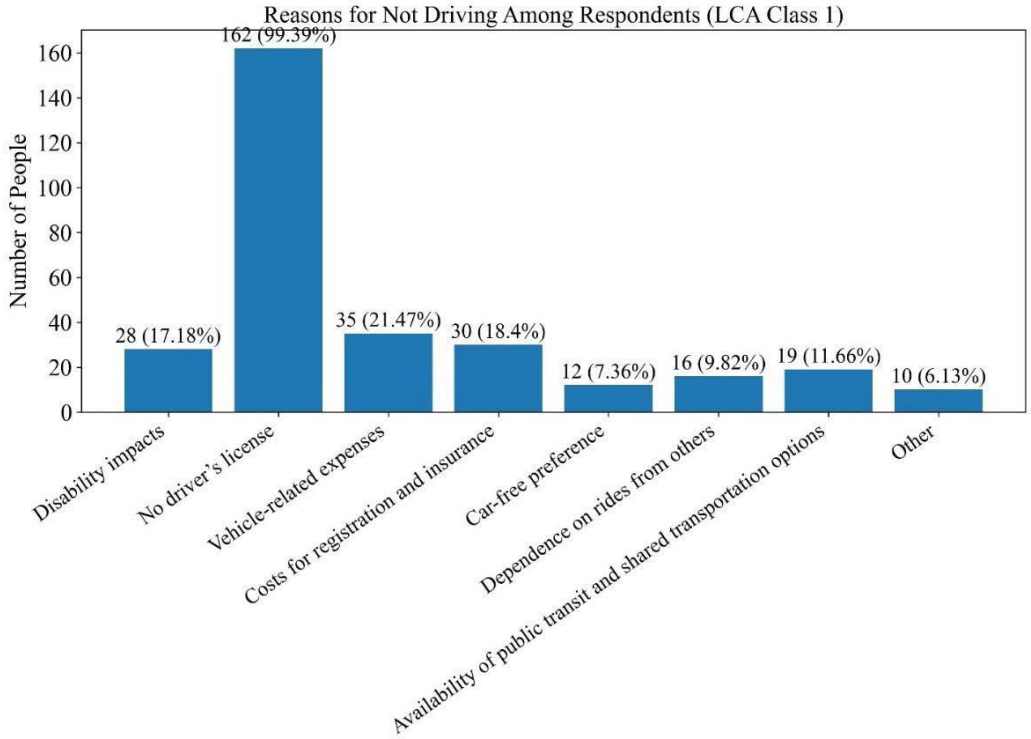

Figure G2: Non-Drivers Reason for Not Driving

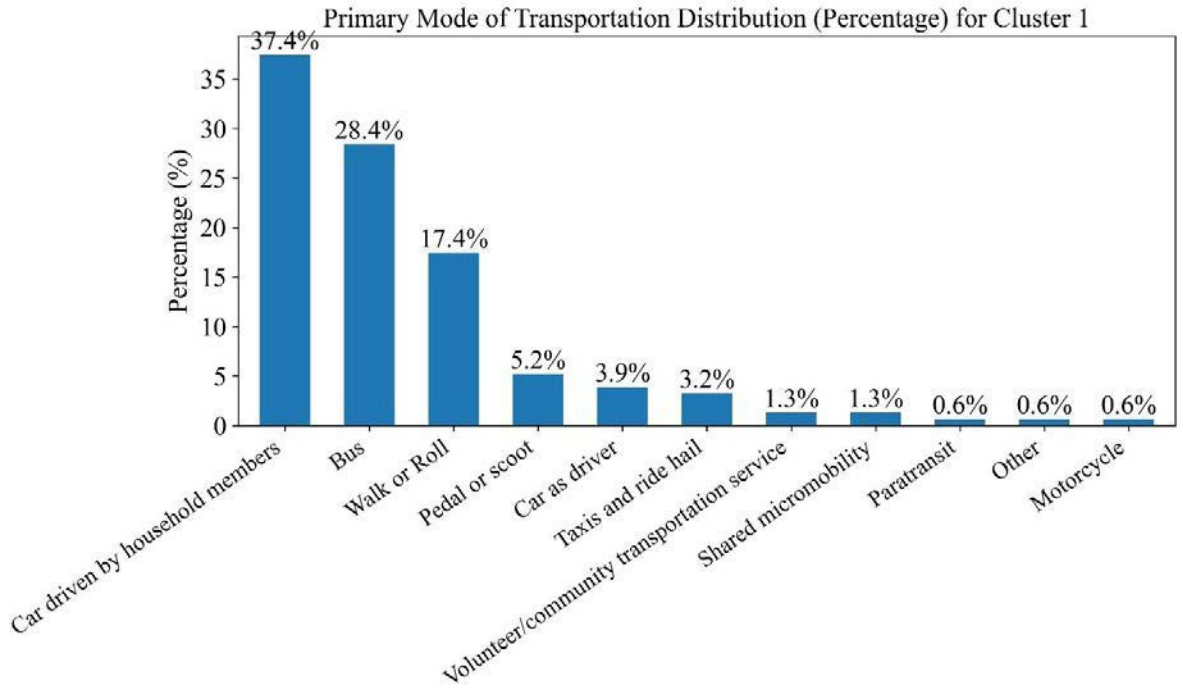

Figure G3: Non-Driver Mode of Transportation

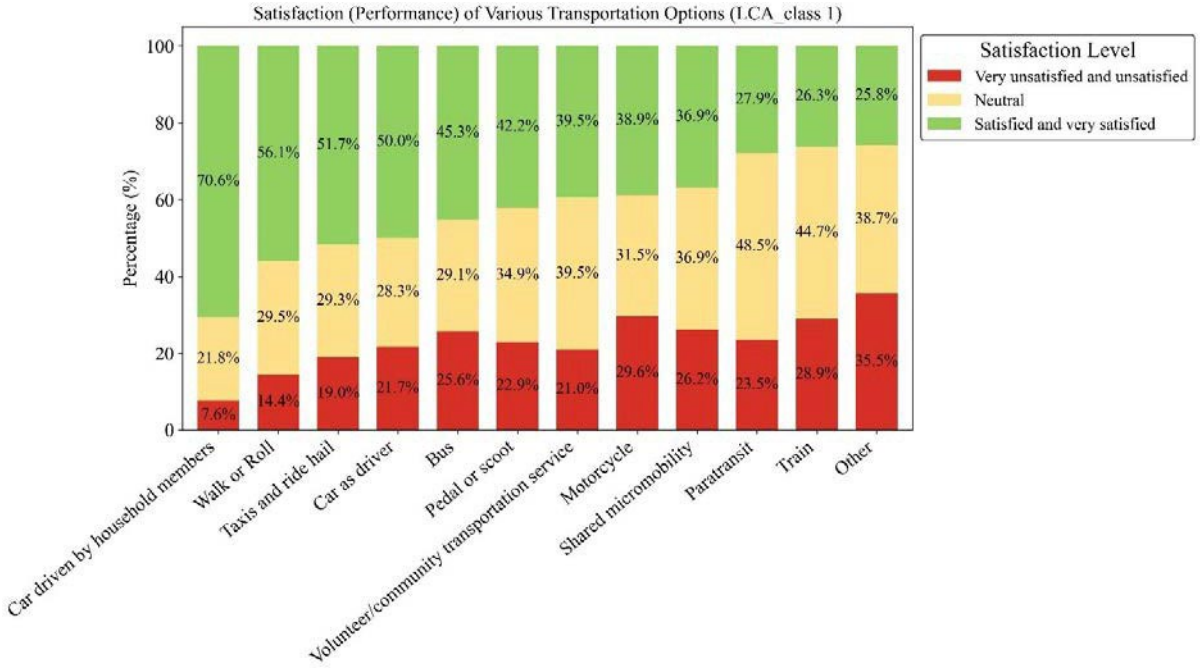

Figure G4: Transportation Options Satisfaction

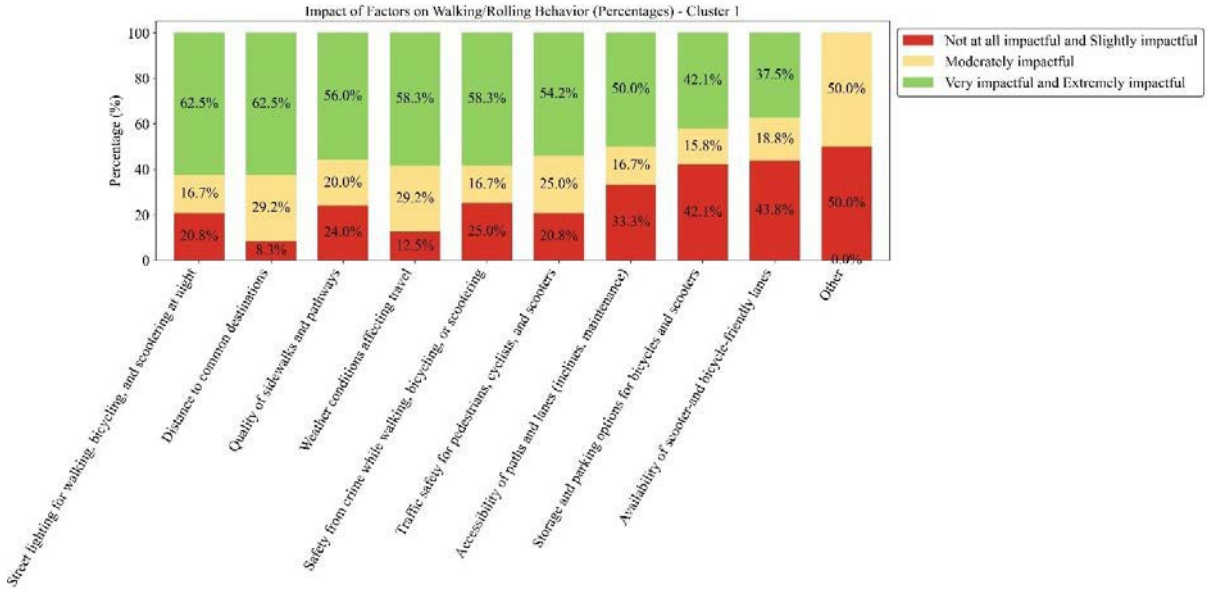

Figure G5: Impact of Walking or Rolling

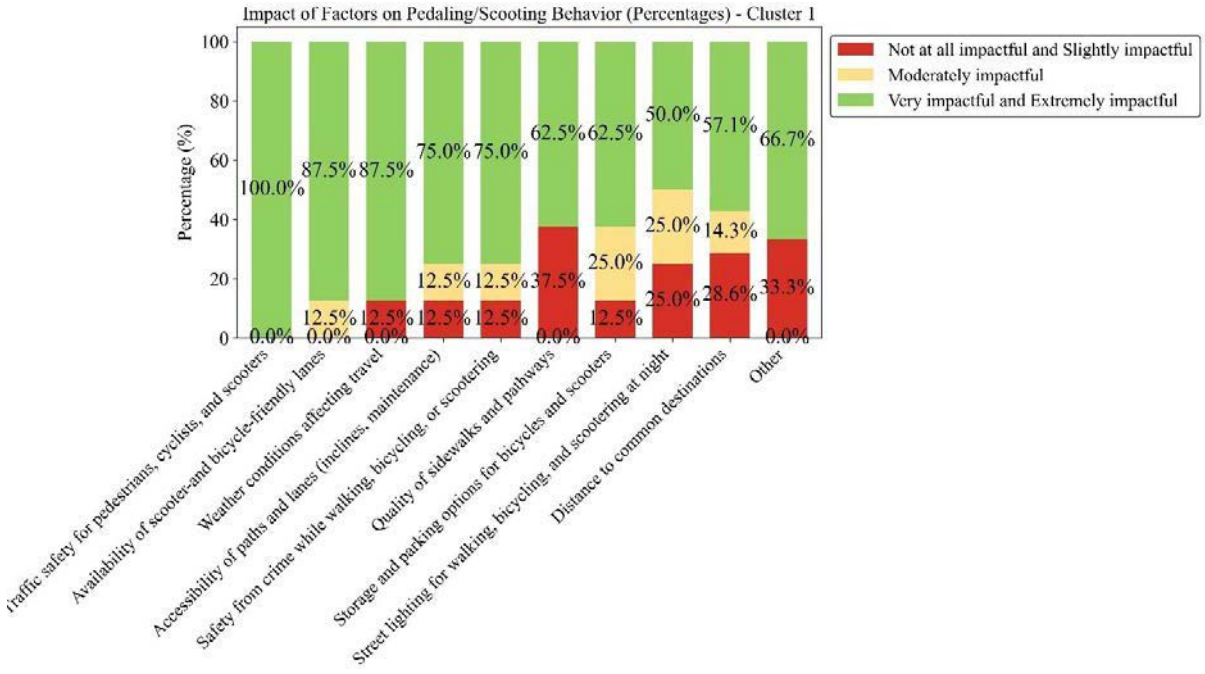

Figure G6: Impact of Pedaling and Scooting

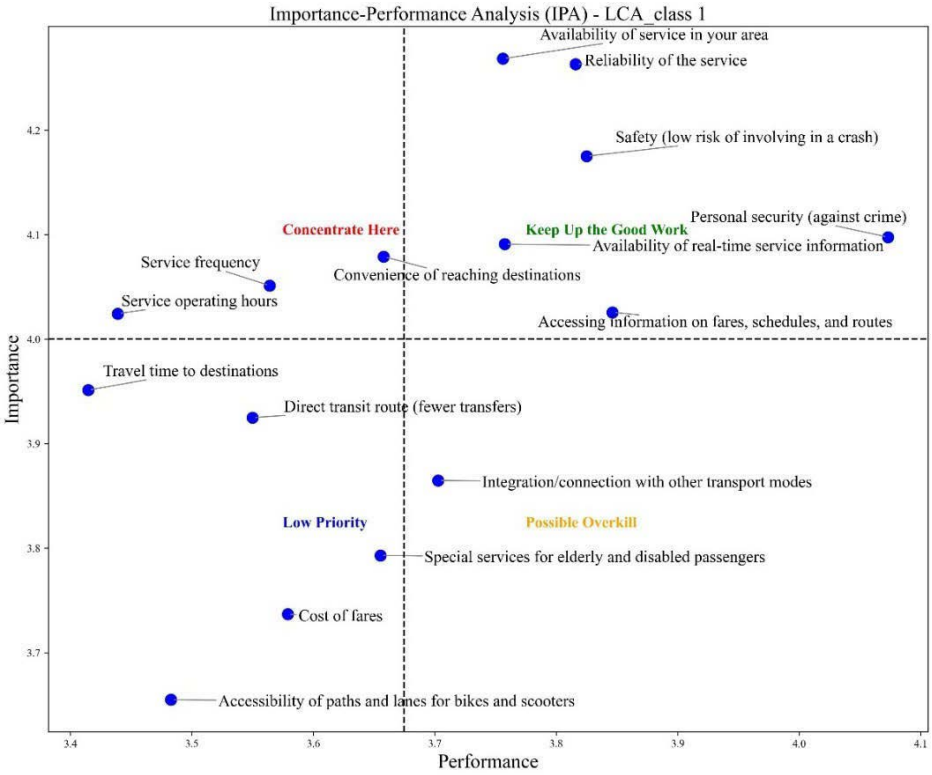

Figure G7: Importance Performance Analysis – Bus

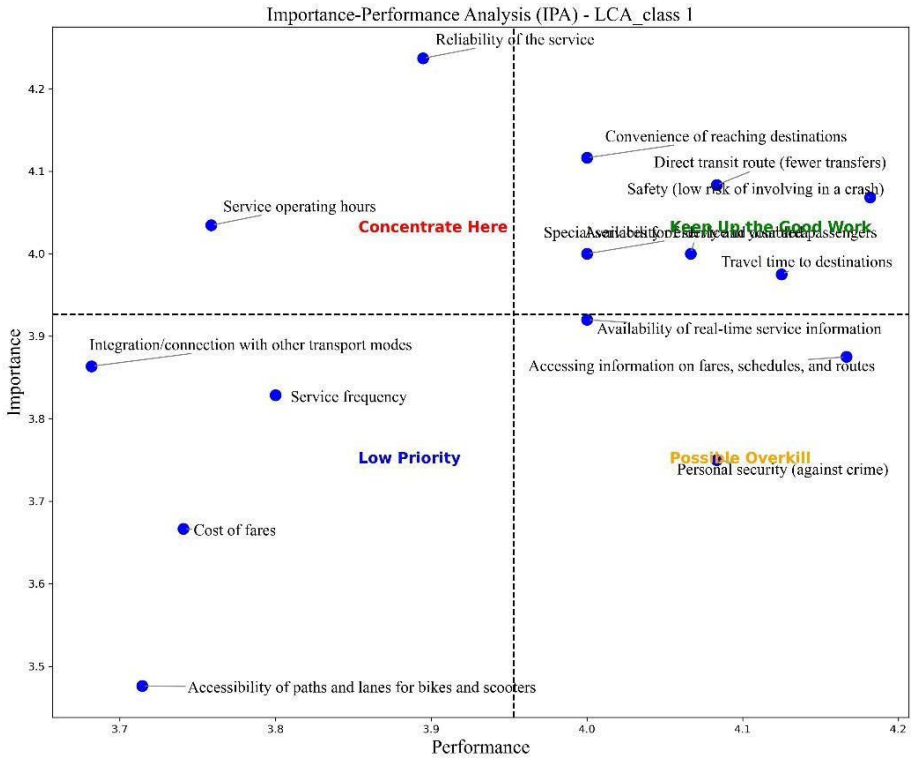

Figure G8: Importance Performance Analysis – Cars driven by household members

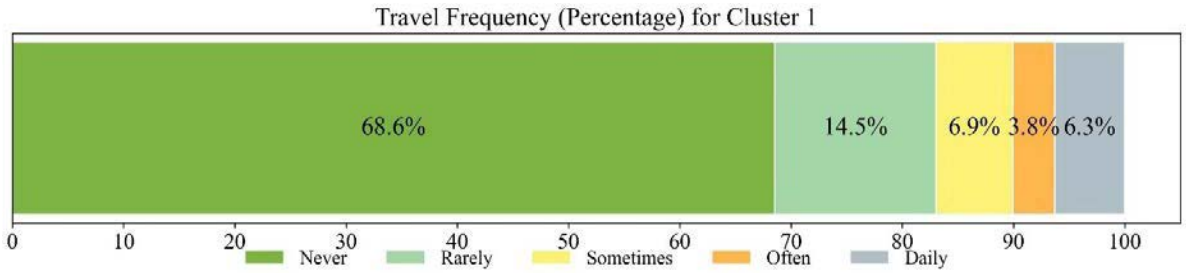

Figure G9: Travel Frequency Purpose – Personal Education

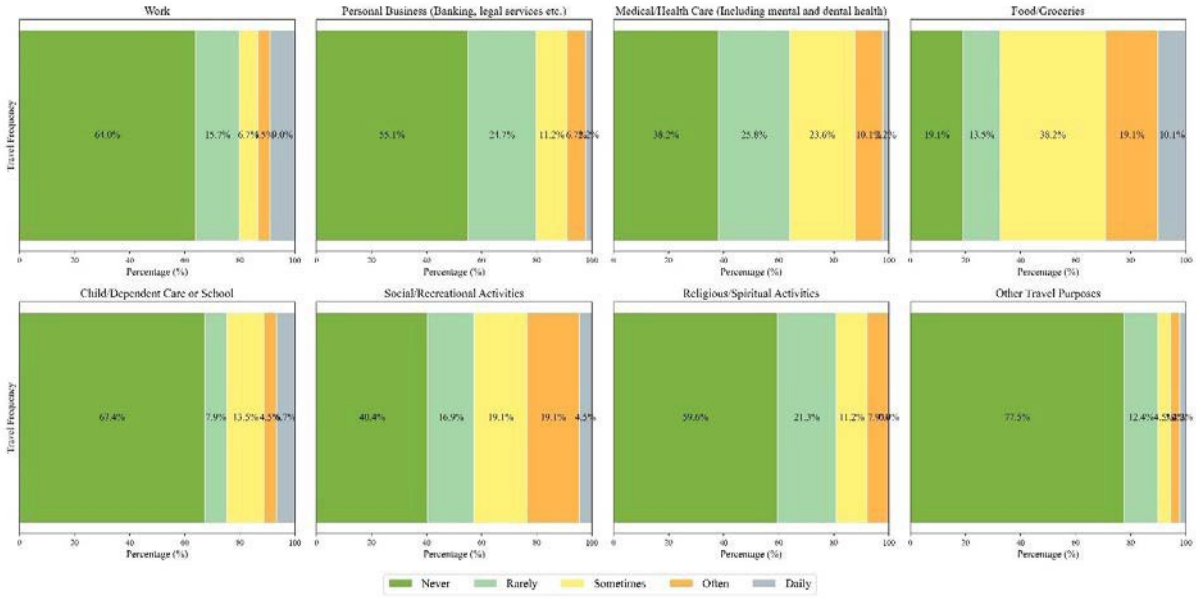

Figure G10: Compilation of Travel Frequency Purposes

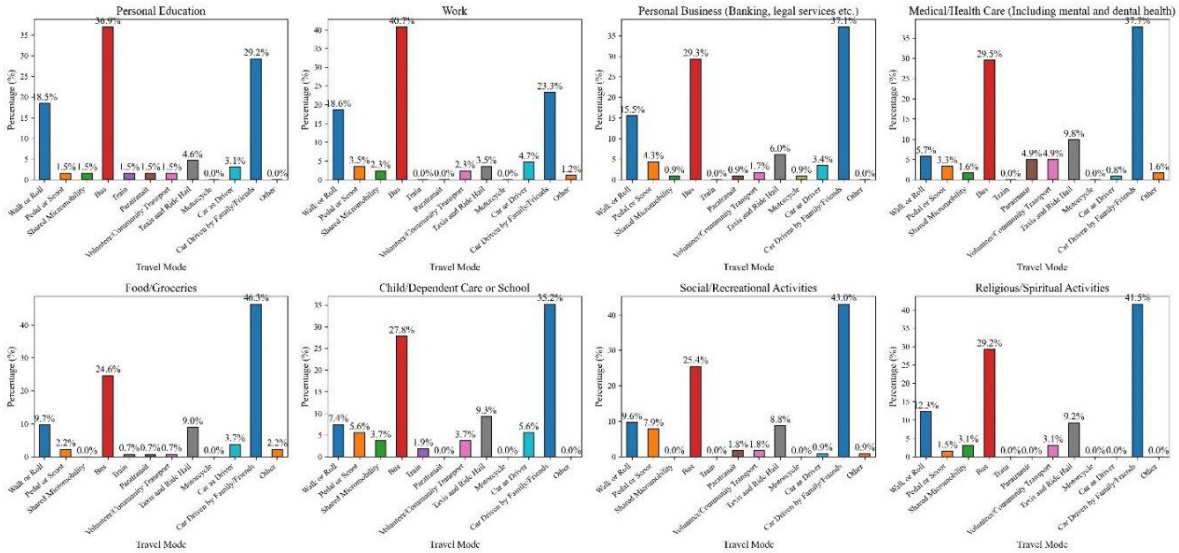

Figure G11: Compilation of Travel Purposes

Appendix H: Non-Drivers Latent Class Analysis – Class 2

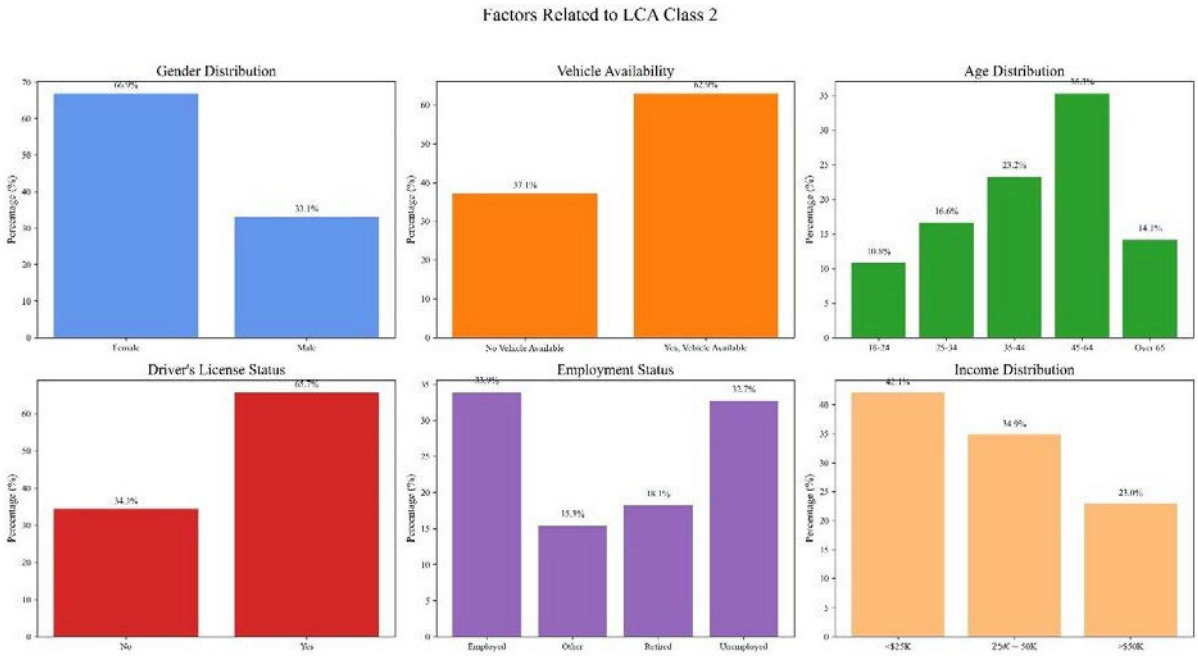

Figure H1: Compilation of Socio-Demographic Factors

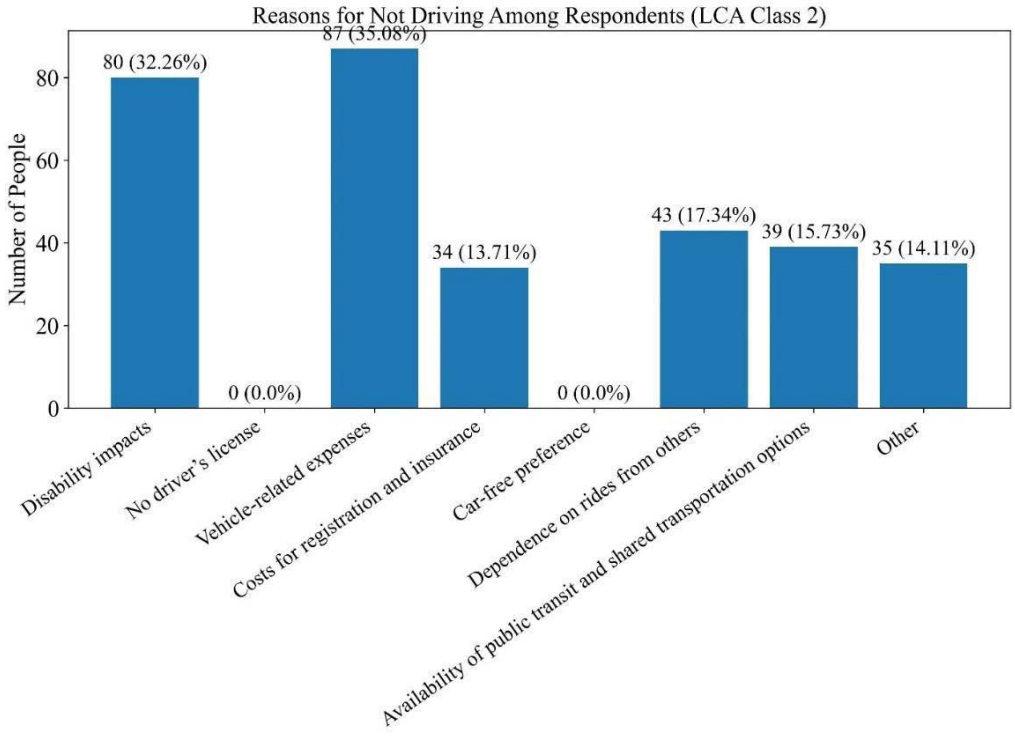

Figure H2: Non-Drivers Reason for Not Driving

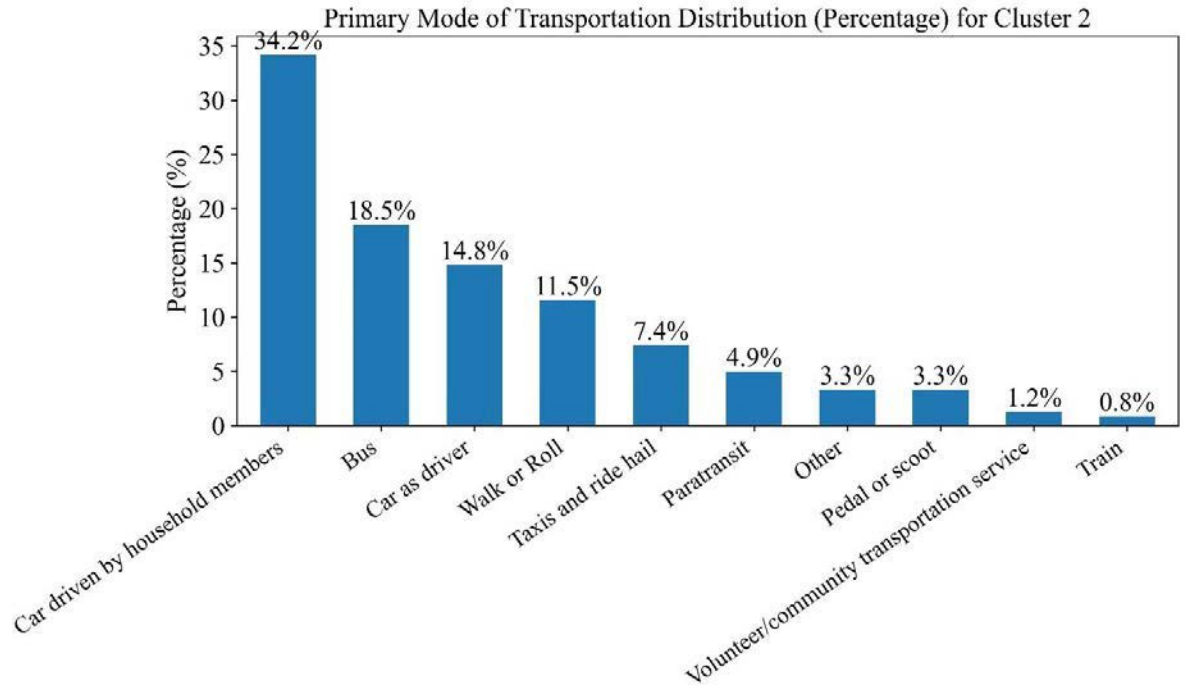

Figure H3: Non-Driver Mode of Transportation

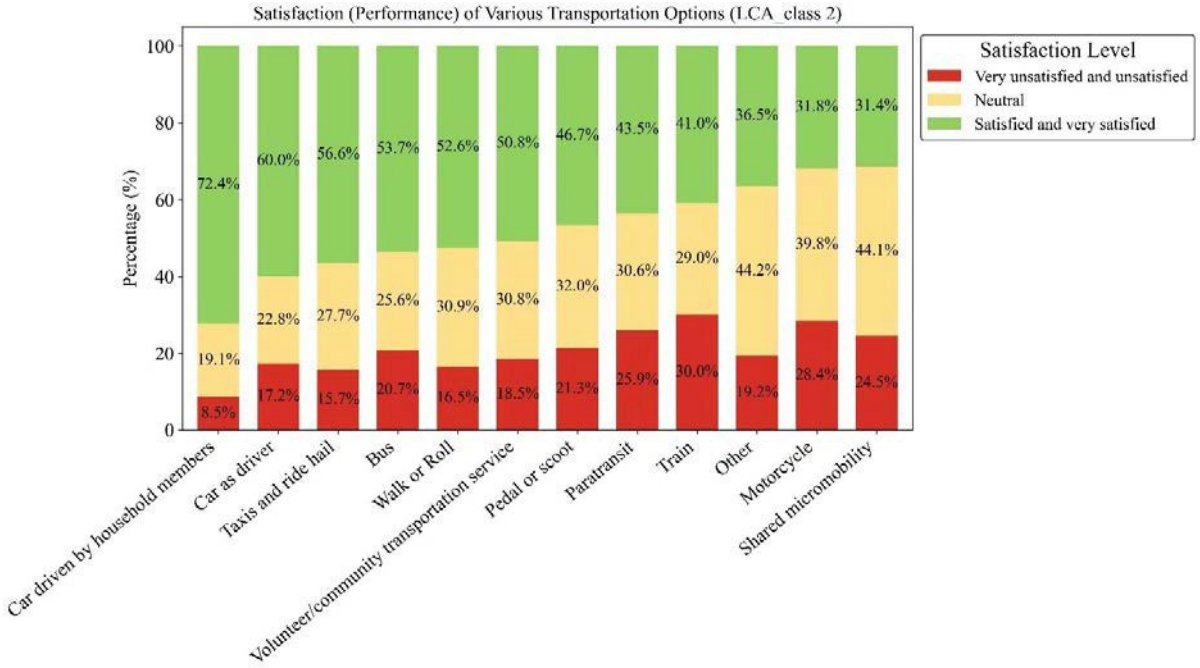

Figure H4: Transportation Options Satisfaction

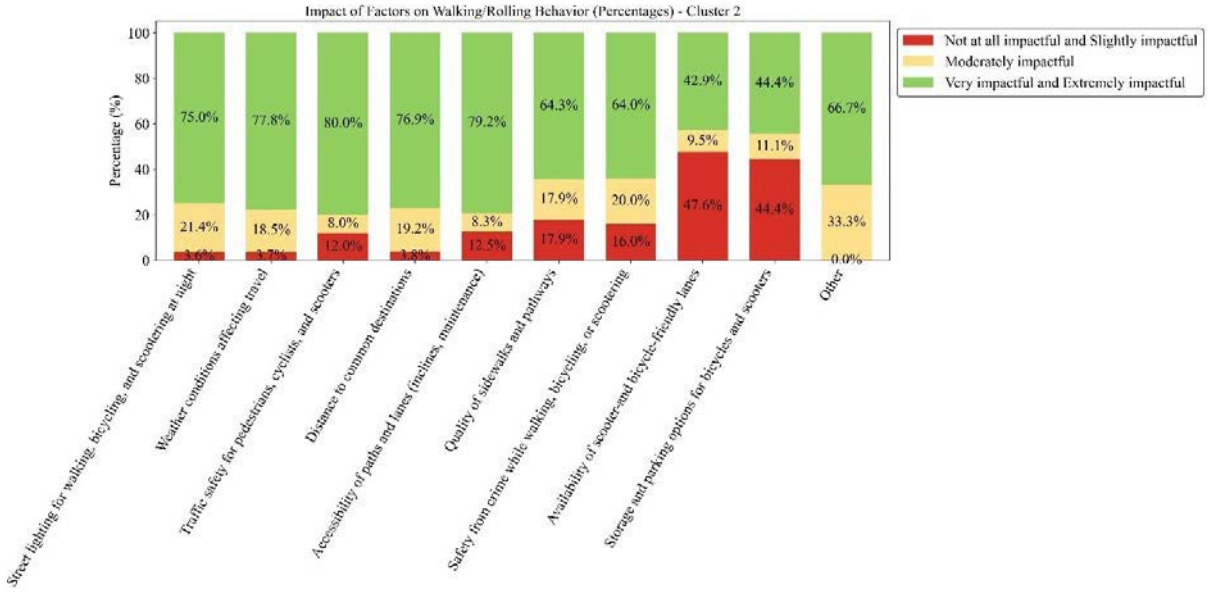

Figure H5: Impact of Walking or Rolling

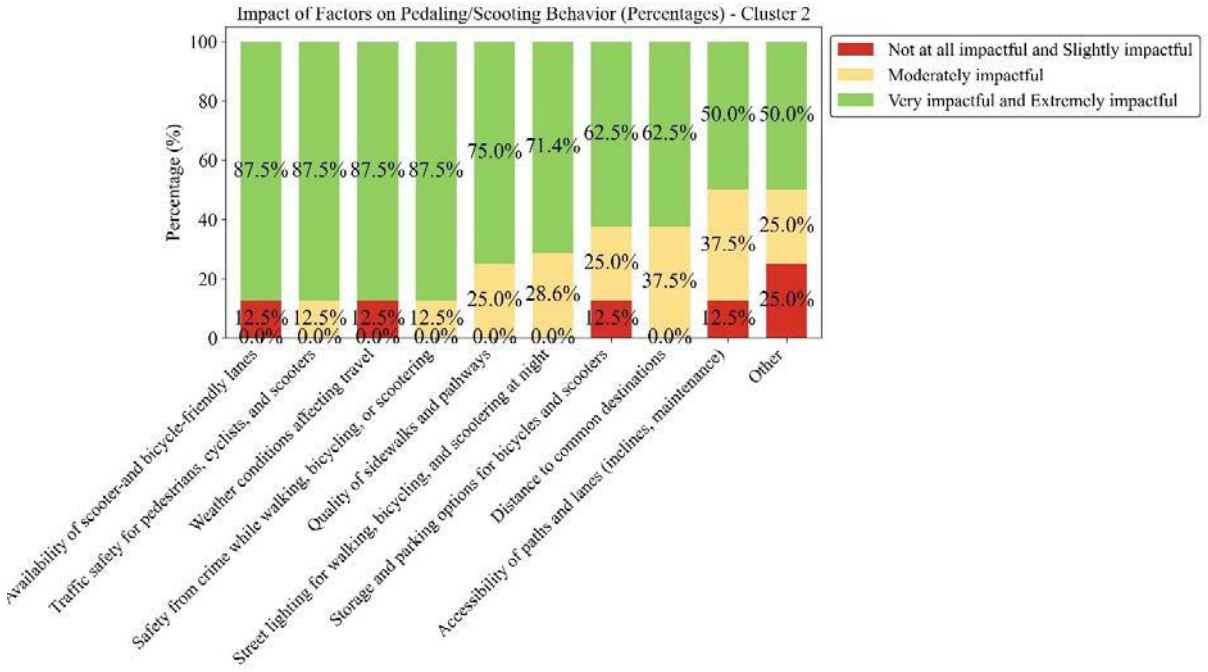

Figure H6: Impact of Pedaling and Scooting

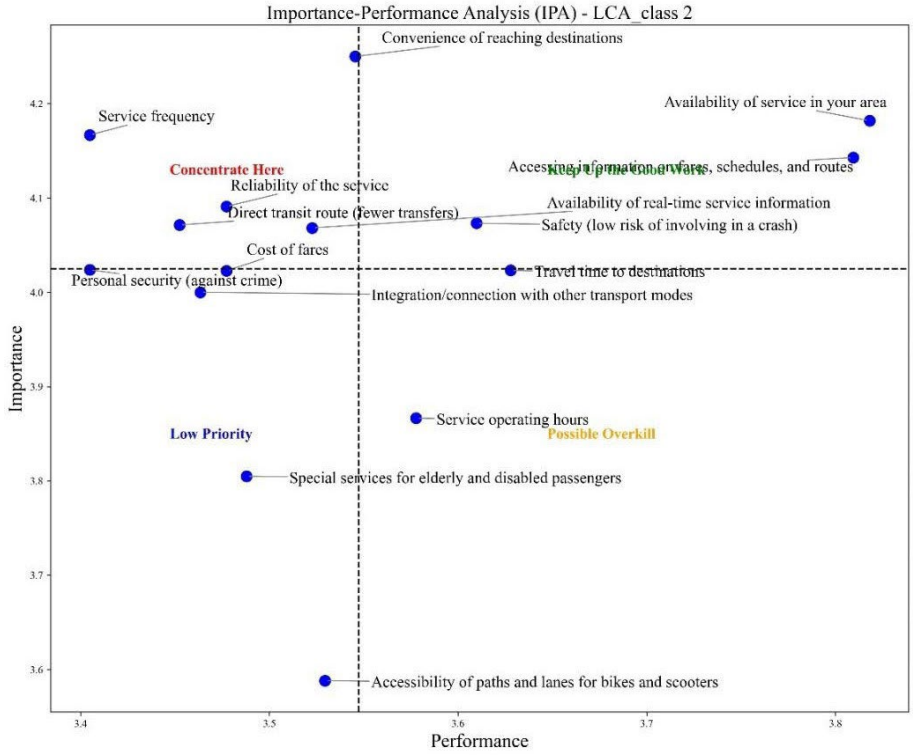

Figure H7: Importance Performance Analysis – Bus

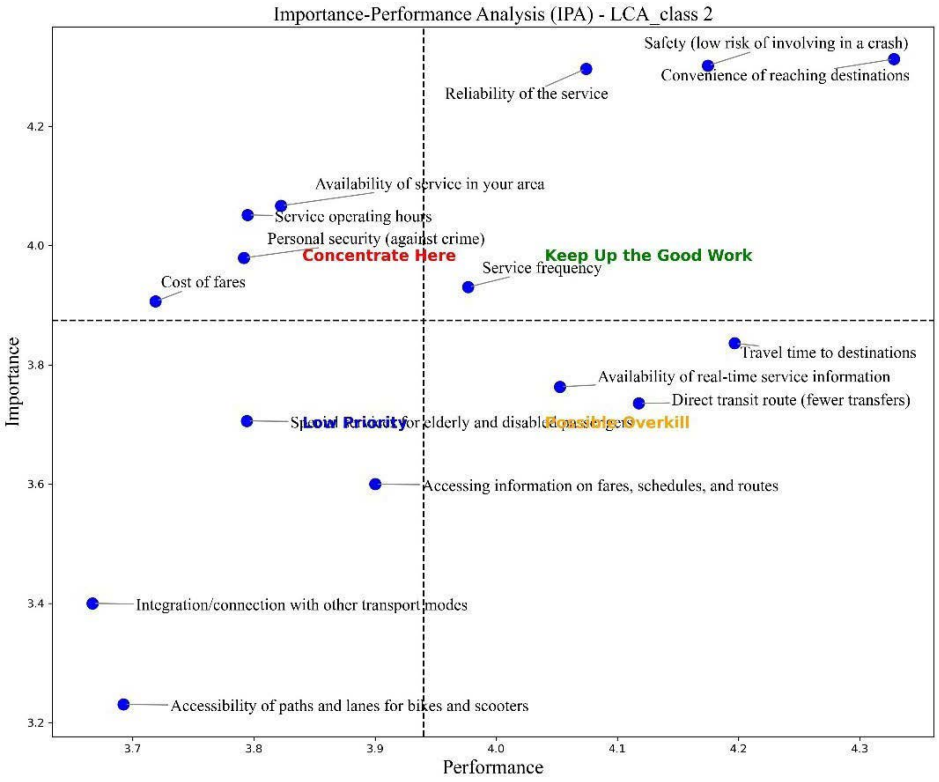

Figure H8: Importance Performance Analysis – Cars driven by household members

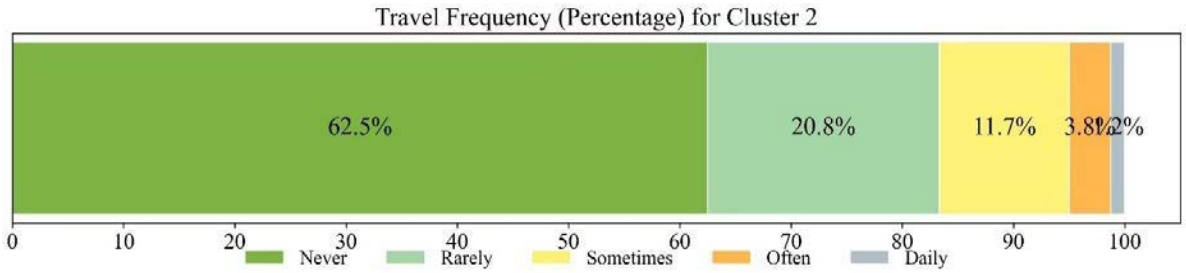

Figure H9: Travel Frequency Purpose – Personal Education

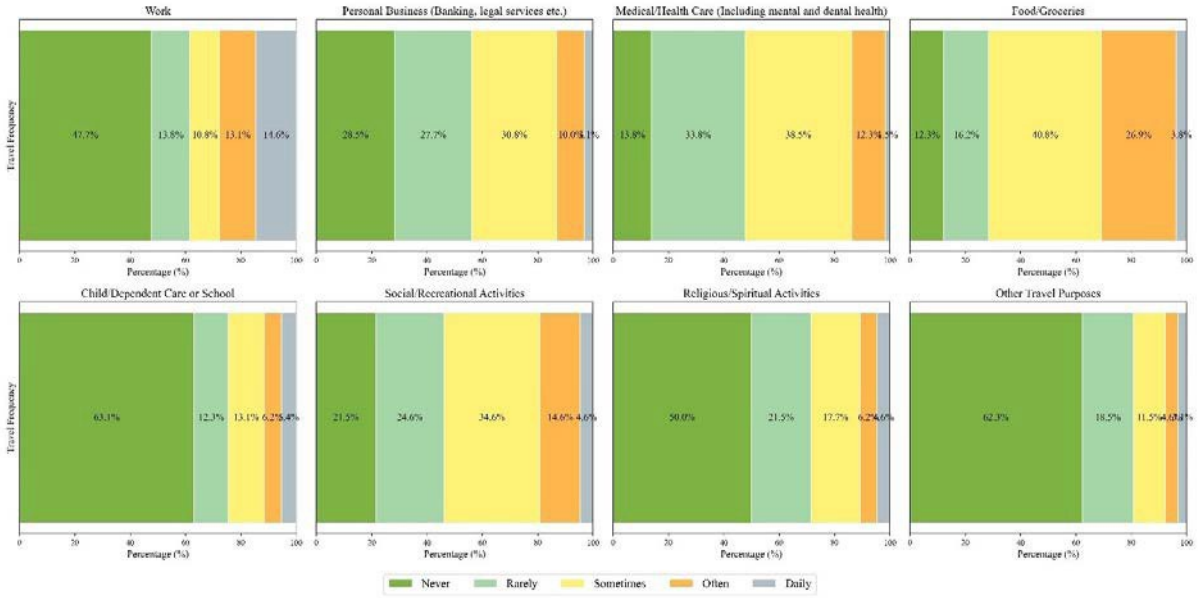

Figure H10: Compilation of Travel Frequency Purposes

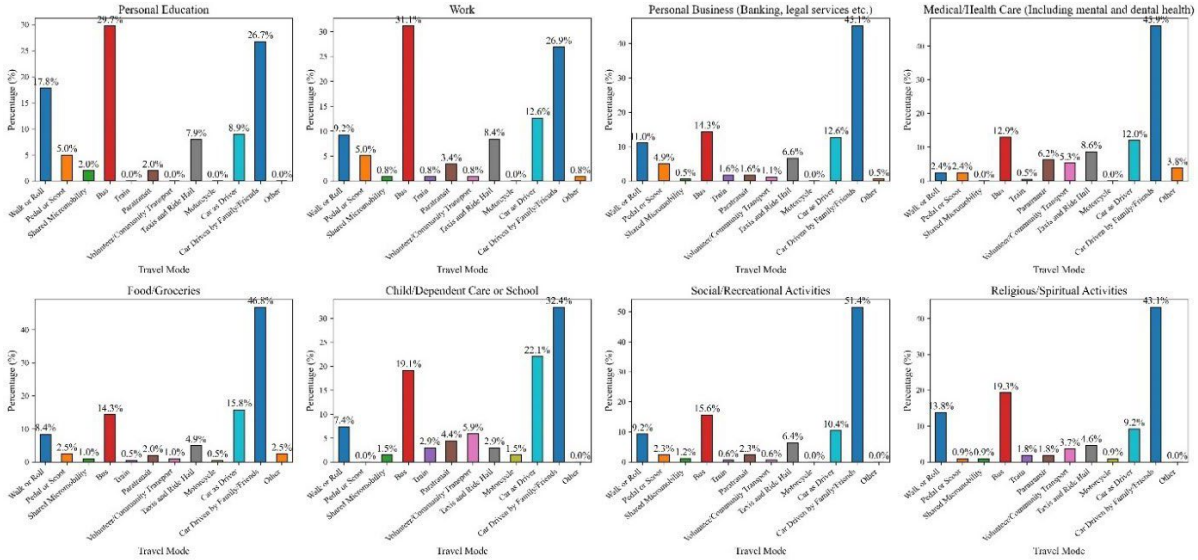

Figure H11: Compilation of Travel Purposes

Appendix I: Detailed Survey Results – Non-Driver Adjacent Open-Ended Questions

OPEN-ENDED QUESTIONS

Q53-Concerns About How Transportation Affects Non-Driving Household Members' Participation in Activities

1. Logistics & Scheduling

Key Concerns:

Conflicting Schedules: Many respondents reported that managing multiple schedules led to missed appointments and delayed participation in activities.

Example Feedback:

"They have to do it on my schedule."

"Since I only have one car there are times that schedules conflict with each other."

Dependence on One Driver: When the primary driver is unavailable, non-drivers are unable to attend activities.

Example Feedback:

"If I'm not available to drive them, they cannot go."

"It's hard to try to balance my work and person schedule with the needs of my nondriving partner"

Overlapping Activities: Caregivers face difficulty managing transportation when several household members have activities at the same time.

Example Feedback:

"It makes it harder for me to do some of the things I need to do."

"The kids have activities at the same time in different places; it's impossible to handle."

2. Dependence & Loss of Independence

Key Concerns:

Feeling of Being a Burden: Non-drivers often feel that they are imposing on caregivers, which reduces their willingness to ask for rides.

Example Feedback:

"They feel like they're putting the driver out."

"I hate asking for help all the time. It makes me feel like a burden."

Restricted Social Engagement: The lack of independent transportation prevents non-drivers, especially elderly or disabled members, from attending social activities.

Example Feedback:

"They wouldn't be able to participate."

"Without a ride, they miss important social activities."

Lack of Flexibility: Non-drivers are unable to participate in spontaneous or unscheduled activities due to their reliance on caregivers.

Example Feedback:

" They rely on me. If I'm unavailable or ill, they can't go."

"They miss opportunities because I'm not available."

3. Safety Concerns

Key Concerns:

Anxiety About Public Transportation: Some non-drivers feel unsafe using public transport due to mental health or physical disability concerns.

Example Feedback:

"They suffer from PTSD and cannot take public transportation."

"Public transport is overwhelming for them, and they feel unsafe."

Fear for Passengers: Caregivers are worried about keeping non-drivers safe while traveling.

Example Feedback:

"I just feel responsible for the safety of everyone in my vehicle."

" Safety when they are the passenger."

4. Costs & Financial Impact

Key Concerns:

Gas Prices: The rising cost of gas makes it difficult for caregivers to provide regular transportation.

Example Feedback:

"Gas prices make it difficult to drive them everywhere."

"I'm happy to give rides, gas is hard to afford."

Vehicle Maintenance: Frequent driving results in high maintenance costs for caregivers.

Example Feedback:

"Cost of fuel and insurance."

"Cost of repairing from wear and tear"

Affordability of Alternative Transportation: Services like Uber or Lyft are considered too expensive for frequent use.

Example Feedback:

"Uber is cost prohibitive."

"I can't afford taxis all the time."

5. Lack of Accessible Alternatives

Key Concerns:

No Public Transportation: Many respondents, especially in rural areas, reported no available public transportation.

Example Feedback:

"There's absolutely no public transportation here."

" The public transportation here is non-existent. "

"There is not enough public transportation available around our communities. "

Inaccessible Public Transportation: Some public transportation options are not accessible for individuals with disabilities.

Example Feedback:

"There are no bus stops close to us."

"My elderly parent is afraid to use available public transportation due to physical disabilities."

6. Time Constraints & Flexibility Issues

Key Concerns:

Limited Availability of Driver: Caregivers' work or personal schedules often limit their ability to provide rides.

Example Feedback:

"My child has to miss out on certain things if I have to work."

"Because if I am working than they have to miss what they have planned."

Inconvenient Scheduling: Non-drivers often have to adjust their plans around the caregiver's availability.

Example Feedback:

"They are dependent on my availability due to my work schedule."

" They have to do it on my schedule."

Q54-Concerns About How Needing to Give Rides to Non-Driving Household Members Affects Your Own Life

1. Time Management

Key Concerns:

Time Taken Away from Personal Activities: Many respondents expressed that providing rides takes away time from their personal activities, work, or relaxation.

Example Feedback:

"It takes up a lot of my time that could be used for other things."

"I have to juggle several schedules to make the rides work."

Rescheduling Personal Plans: Caregivers mentioned that they often have to rearrange or cancel their plans to provide rides.

Example Feedback:

"I have to take time out of my schedule to drive them."

"It's hard to work around my schedule when they need a ride."

Challenges:

- Balancing personal commitments with transportation needs.
- Inability to have personal downtime due to constant transportation duties.

2. Financial Impact

Key Concerns:

Gas Prices: Many caregivers highlighted the financial strain of constantly paying for gas.

Example Feedback:

"Gas prices, I don't get paid enough for the week to put gas in my vehicle.."

"My concern is that I won't be able to afford the fuel"

Vehicle Maintenance: Frequent use of their vehicle to provide rides increases maintenance costs, such as repairs and servicing.

Example Feedback:

" The potential increase in vehicle wear and tear."

"I pay more in gas, and car repairs."

Challenges:

- Rising fuel costs.

- Increased maintenance and repair expenses due to frequent use of the vehicle.

3. Emotional and Psychological Strain

Key Concerns:

Burnout and Exhaustion: Caregivers expressed feelings of exhaustion from the constant need to provide transportation.

Example Feedback:

"It's exhausting to keep driving them around."

"Sometimes it is exhausting and takes away from my down time."

Stress from Being on Call: Some caregivers feel like they are always "on call" and have to be available whenever someone needs a ride.

Example Feedback:

"I feel a little stress that I am always expected to be on call."

"I never have any free time or time to relax from my own stress."

Challenges:

- Constant pressure to be available for driving.
- Lack of time to recharge emotionally and physically.

4. Conflicting Schedules

Key Concerns:

Inability to Align Schedules: Caregivers reported difficulty in managing multiple schedules for their household members.

Example Feedback:

"It's a pain sometimes and makes me rearrange my schedule."

"Being in someone else's schedule makes it harder for my schedule"

Last-Minute Requests: Some caregivers mentioned the stress caused by last-minute ride requests.

Example Feedback:

"Time management and having to be ready when they need a ride at last minute is stressful"

"I have to drop everything to be there in some situations."

5. Physical Strain

Key Concerns:

Physical Exhaustion from Driving: Respondents mentioned feeling physically tired from driving long distances or multiple times a day.

Example Feedback:

"It is time consuming and a lot of drive time can be exhausting"

"Extended periods of driving and waiting can make me feel fatigued and stressed, impacting my overall physical and mental well-being."

Health Concerns: Some caregivers have health issues that make driving difficult, yet they still need to provide rides.

Example Feedback:

" I'm quite ill with medical issues, so I often don't feel like driving at all."

"I have health issues, and driving is hard for me."

Q58-Suggestions for Improving Transportation Options for Non-Driving Household Members

1. Enhancing Public Transportation Services

- **Key Suggestion:** Expand the availability, routes, and timing of public transportation, especially in rural and suburban areas.
- ***Challenges:***
  - Limited access to public transport in rural areas.
  - Existing routes are not comprehensive, leading to long waiting times or lack of service.
- ***Participant Responses:***
  - *"There isn't a bus here, the cab company has two cars and usually a 2+ hour wait, and no Uber in town."*
  - *"It would be nice if public transportation was always available."*
  - *"More public transportation available."*
  - *"Better public transport in Appleton is needed."*

2. Carpooling and Ridesharing Options

- **Key Suggestion:** Encourage carpooling and ride-sharing solutions like Uber or Lyft.
- ***Challenges:***
  - High costs of ride-sharing services, particularly in rural areas.
  - Lack of awareness of carpooling options.
- ***Participant Responses:***
  - *"I suggest that they use a taxi or uber."*
  - *" They need Lyft and Uber."*
  - *" They should take Uber and Lyft to get them from one place to another."*

3. Driver’s License and Training Programs

- **Key Suggestion:** Provide resources and opportunities for non-drivers to obtain driver’s licenses.
- ***Challenges:***
  - Difficulty in obtaining a driver's license without access to a vehicle or training.
  - Financial barriers preventing non-drivers from taking the driving test.
- ***Participant Responses:***
  - *"It’s difficult to get a driver's license when you do not have a vehicle to use for the test."*
  - *" Get a driver’s license, learn to drive."*
  - *"Driver’s education in school so they can more easily become driving household members."*

4. Financial Assistance for Transportation

Key Suggestion: Offer financial support for transportation costs, including fuel, vehicle maintenance, and alternative transport.

Challenges:

- Rising gas prices and vehicle maintenance costs make regular transportation unaffordable for some.
- Alternatives like taxis and ride-sharing services are often too expensive.

Participant Responses:

- *"The only option would be to raise the minimum wage, so that my non-driver could afford their own car and insurance."*
- *"We live in a very small town, and it would be much more convenient if Lyft/Uber didn't cost so much to come all the way out here."*
- *" If it wasn't so pricey Uber and Lyft could be options that get used more."*
- *" I wish Lyft and Uber was cheaper and easier to use."*

5. Community-Based Transportation Solutions

Key Suggestion: Encourage the development of community-based transportation initiatives like volunteer driver programs or small-town taxi services.

Challenges:

- Lack of organized transportation in small towns where public transit is absent.
- Difficulty in coordinating transportation for non-drivers without the means to pay for a service.

Participant Responses:

"I would love to see more community carpool options."

"Offering a senior-targeted ride share program would be beneficial because often elderly people don't want to use taxi services."

"There needs to be some service available for people with disabilities or the elderly so they can get out and around Milwaukee."

"Carpool is always great but we haven't done that in several years. "

"Non-driving family members can consider joining carpooling services to share travel costs with other passengers."

6. Technology and Infrastructure Improvements

Key Suggestion: Improve transportation infrastructure by adding bike lanes, sidewalks, and pedestrian-friendly routes.

Challenges:

Lack of sidewalks and bike lanes makes it difficult for non-drivers to travel safely.

Participant Responses:

"More sidewalks and bike paths would make it easier to get around."

"Separated bike lanes."

7. Medical and Specialized Transportation

Key Suggestion: Provide more transportation options specifically for medical appointments.

Challenges:

Difficulty in accessing reliable and affordable transportation for medical purposes.

Participant Responses:

"We need more transportation options for medical appointments."

"Medical transportation should give them rides for the important things."

"Insurance rides for medical appointments should be easier to access."

Q59-Potential Benefits of Accessible Apps or Smartphones for Improving Transportation Needs

1. Ride-Sharing and Public Transportation Apps

Concerns: Lack of ride-sharing options and public transit apps in certain areas, particularly rural ones.
Examples:
- *'Sometimes Uber and Lyft will do, but we do not have a public transit app.'*
- *'If we had Uber or Lyft, yes.'*
- *'Yes, they can call an Uber.'*
-*'Yes. But we have looked, and they would be too expensive. '*
-*'Not too much as they are expensive to use '*
- *'No Uber and Lyft aren't good here.'*
-*'Possibly but everything is still too expensive these days for that alone also. Uber and taxis are outrageous in price and public transportation is getting less and less. '*

Challenges: High cost of ride-sharing services in rural areas. Absence of reliable public transit apps in smaller towns.

2. Navigation and Scheduling Apps

Concerns: Respondents highlighted the utility of navigation apps like Google Maps and the desire for better scheduling apps for public transport.
Examples:
- *'Google Maps is very helpful if I can not figure out where an address or location is.'*
- *'Yes, for navigation and scheduling.'*
- *'We use navigation for real-time updates, but more options are needed.'*
- *'Yes, because we can see how the bus runs and which route to take.'*

Challenges: Lack of real-time scheduling information for public transportation. Difficulty navigating without consistent public transit apps or maps in rural areas.

3. Accessibility and Usability for Elderly and Disabled Users

Concerns: Many elderly and disabled users find it difficult to use smartphones or apps to organize transportation.
Examples:
- *'My mother doesn't understand them. Even her flip-phone.'*
- *'No- the elderly aren't ready for that.'*
- *'I don't use apps or a smartphone for this.'*

Challenges: Limited understanding of technology, especially among the elderly. Lack of accessible, user-friendly apps for disabled individuals.

4. Lack of Infrastructure and Services in Rural Areas

Concerns: Respondents in rural areas expressed frustration with the lack of available public transportation services.
Examples:
- *'We live in a rural community. '*
- *'Not in my area. Out of my area, I have in-car navigation to help. '*
- *'No, we are okay, but we live in a rural area. '*
- *'No public transportation available. '*

Challenges: Lack of transportation infrastructure in rural areas, including public transit and ride-sharing services.

5. Support for Coordination and Communication

Concerns: Some Respondents discussed how apps and smartphones help them coordinate and communicate for transportation needs.

Examples:

'- Yes, I use Google Maps to figure out where I'm going. '

'- We text to arrange rides. '

'- Yes, it makes it easier to stay in touch. '

'-Yes he could arrange a ride with a ride share app'

Challenges: Lack of apps that support family communication or ride coordination, especially for elderly or disabled members.

Appendix J: Non-Driver Adjacent Latent Class Analysis – Class 0

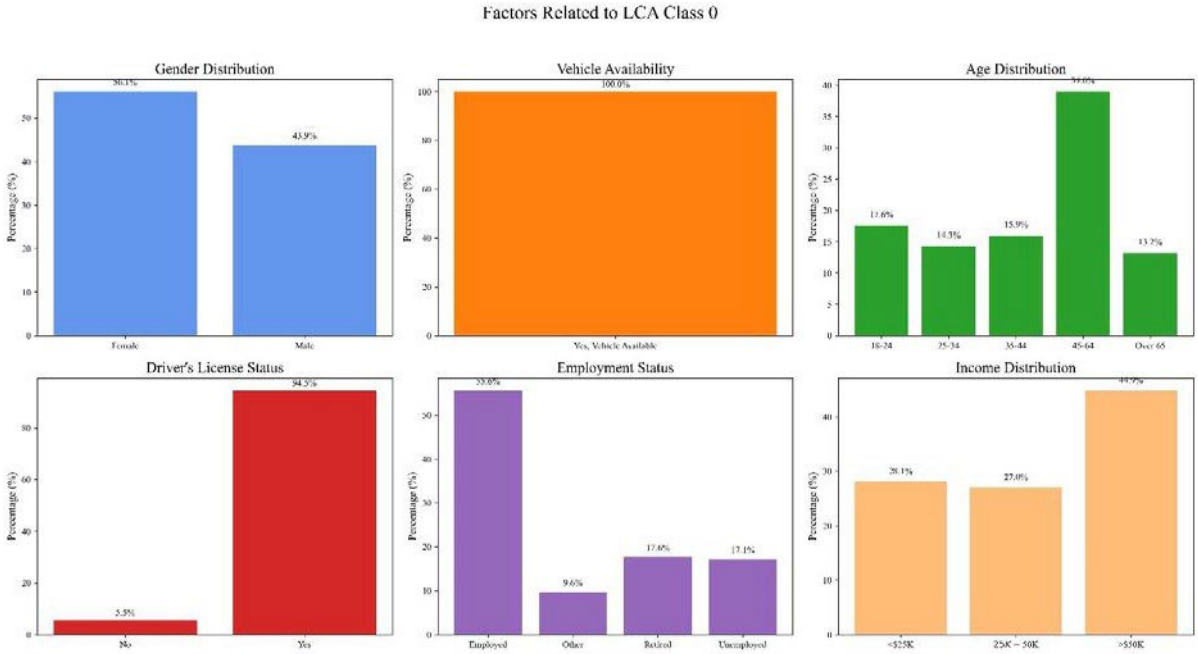

Figure J1: Compilation of Socio-Demographic Factors

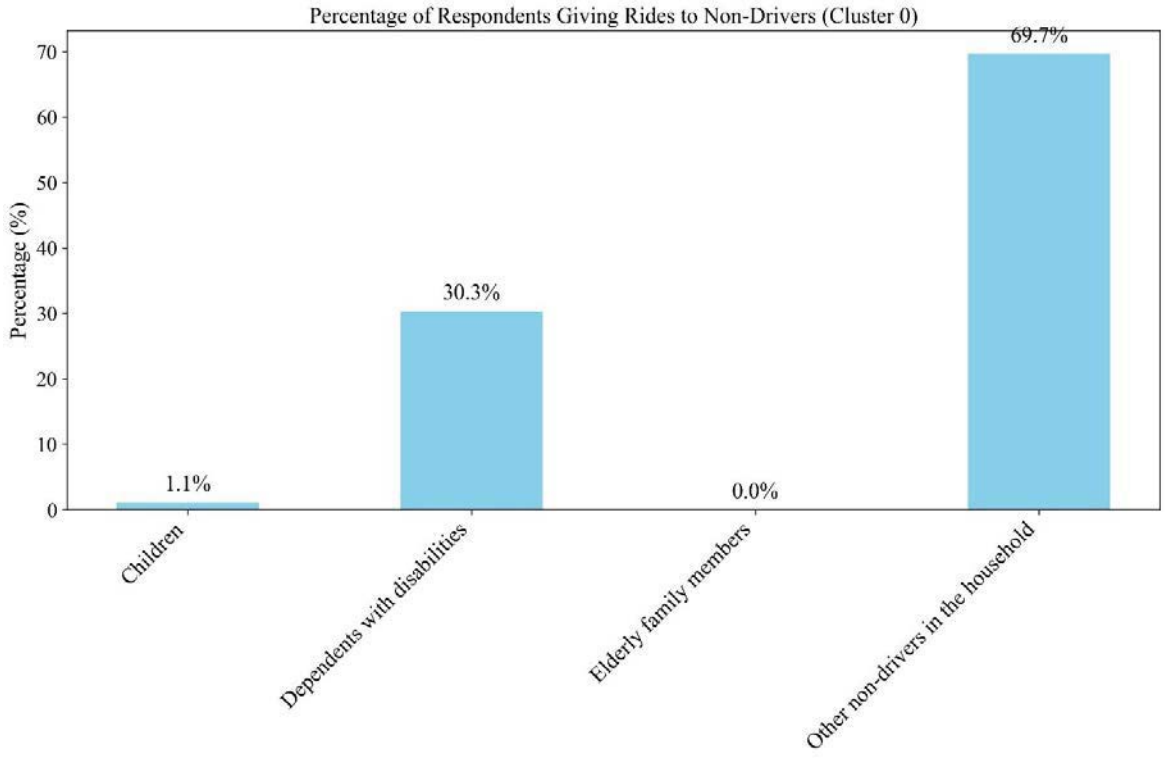

Figure J2: Type of Non-Drivers

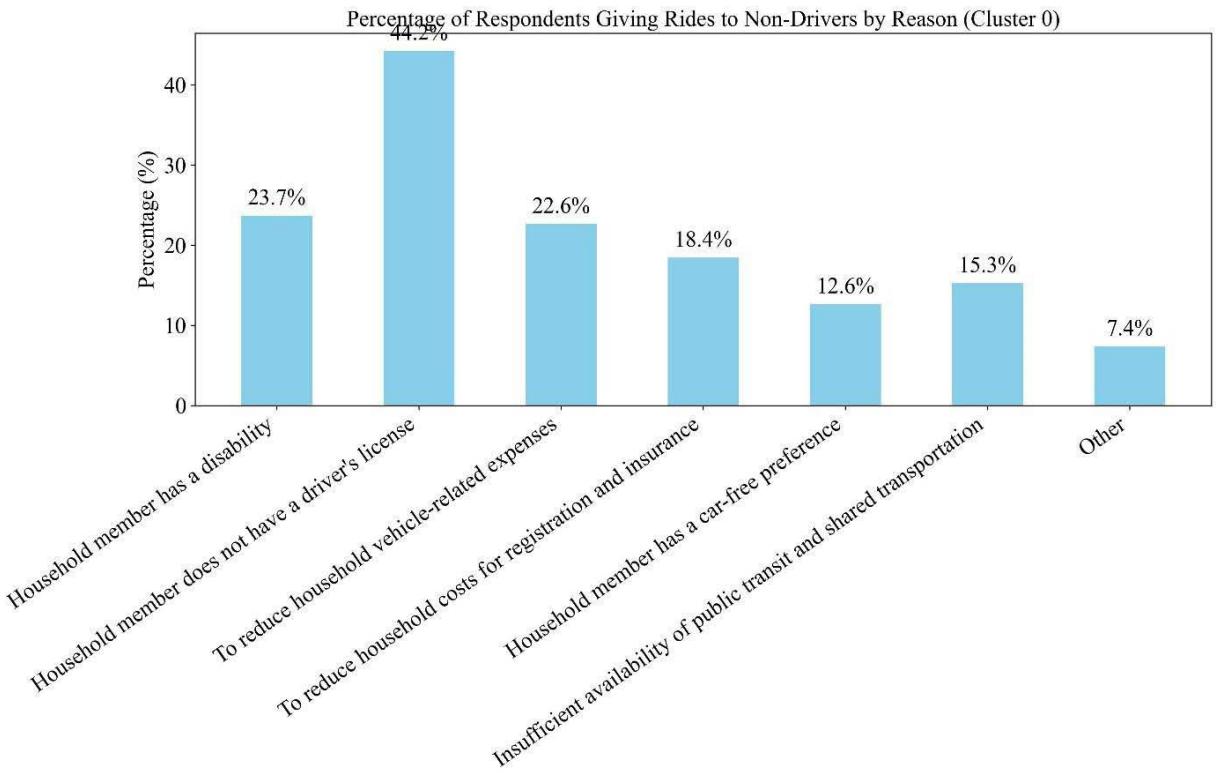

Figure J3: Reason for Providing Rides

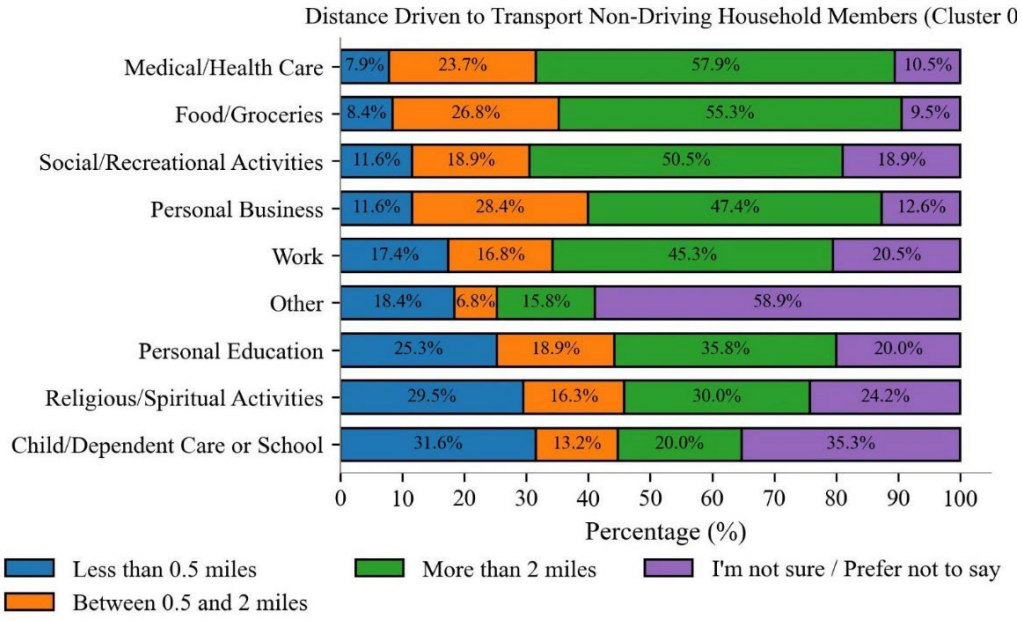

Figure J4: Distance Driven for Non-Drivers

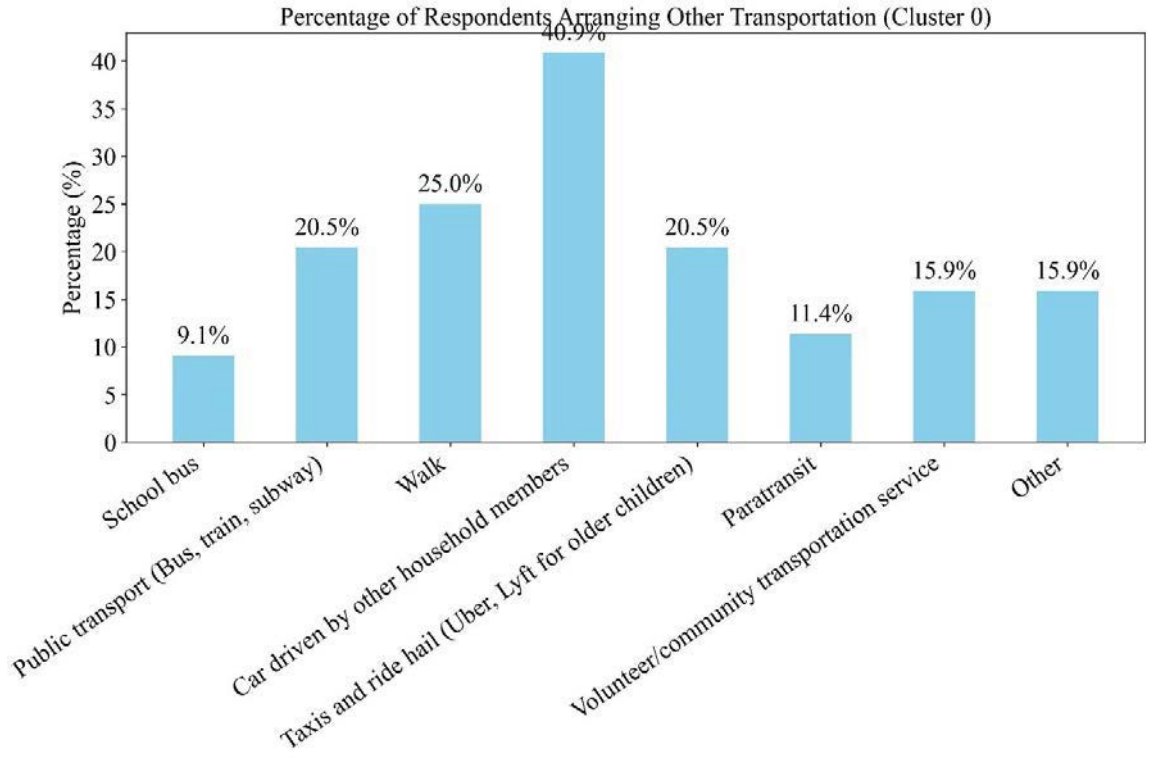

Figure J5: Type of Arrangements of Transportation

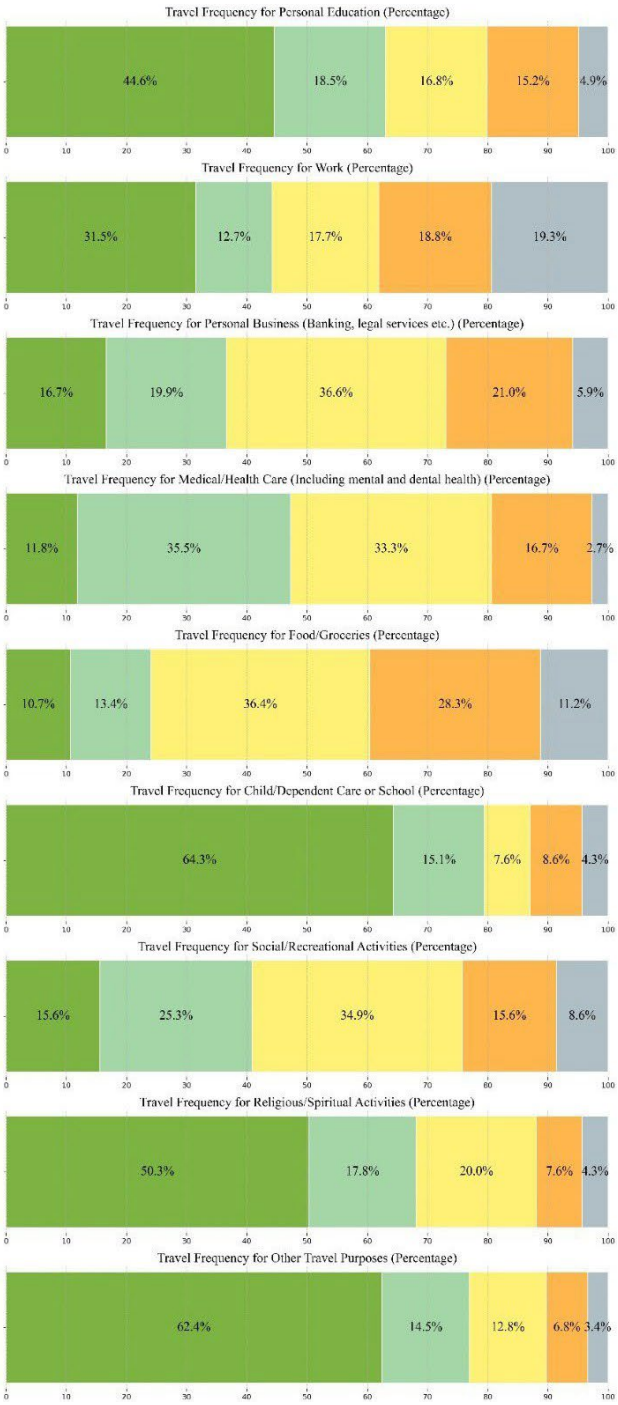

Figure J6: Compilation of Travel Frequency Purposes - Percentage

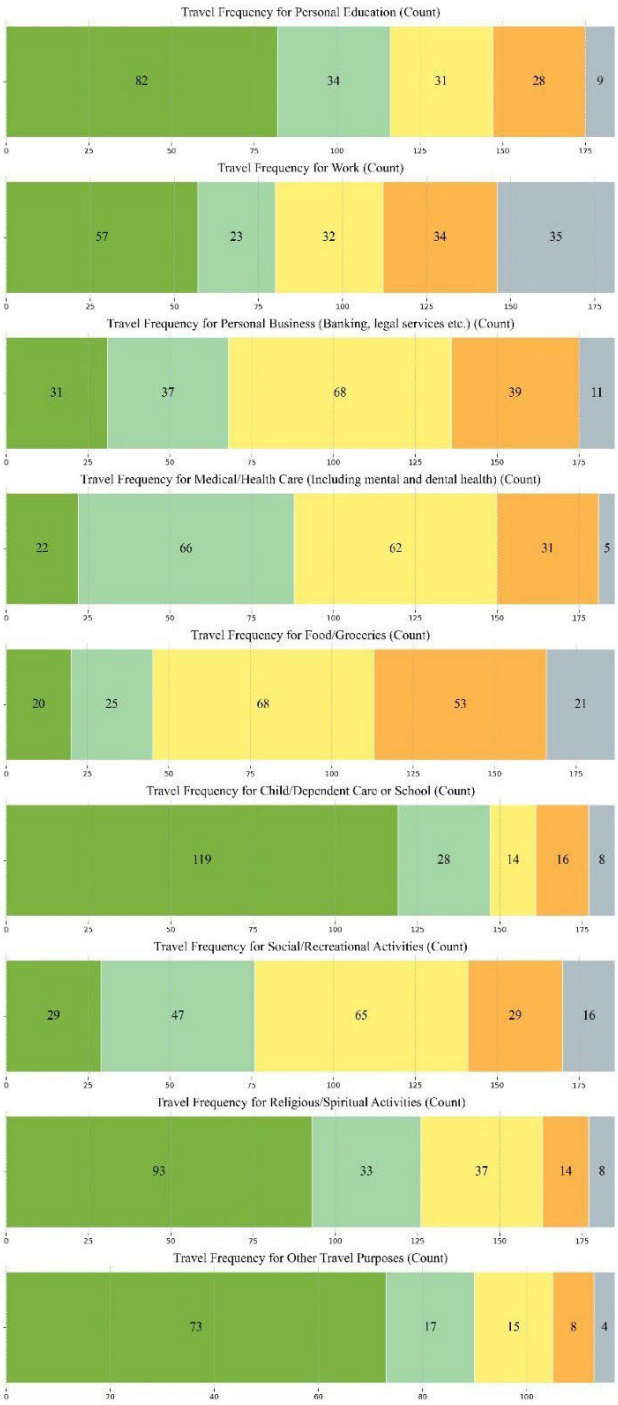

Figure J7: Compilation of Travel Frequency Purposes - Counts

Appendix K: Non-Driver Adjacent Latent Class Analysis – Class 1

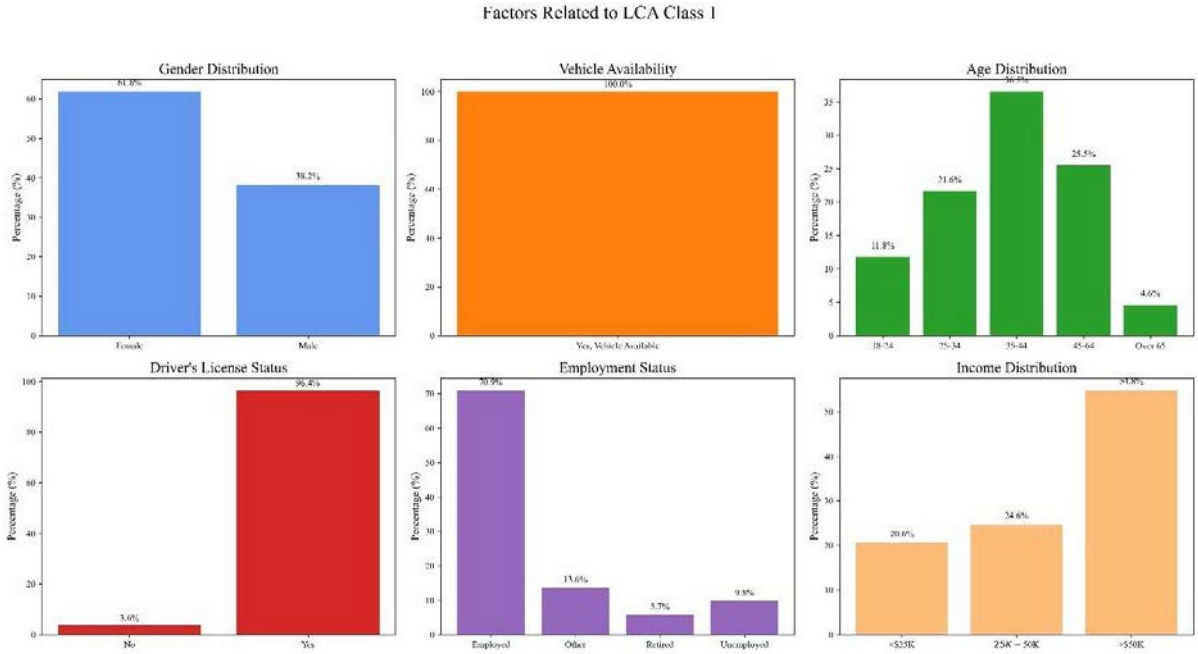

Figure K1: Compilation of Socio-Demographic Factors

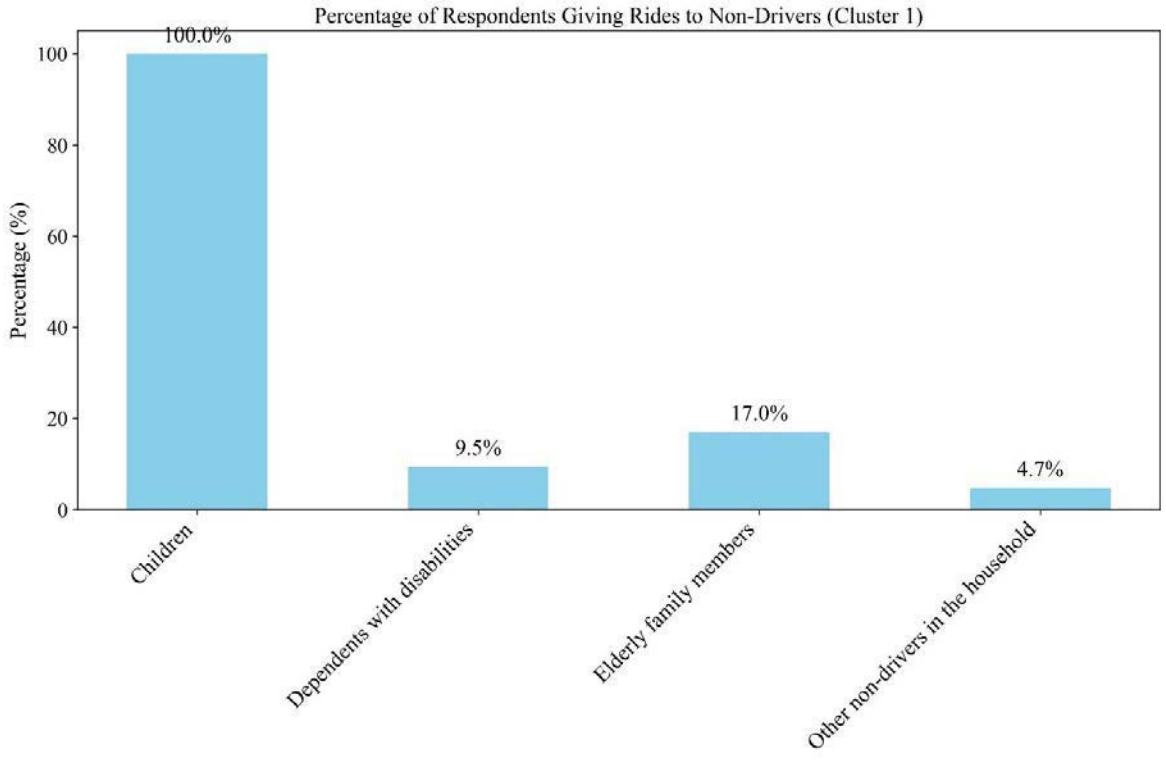

Figure K2: Type of Non-Drivers

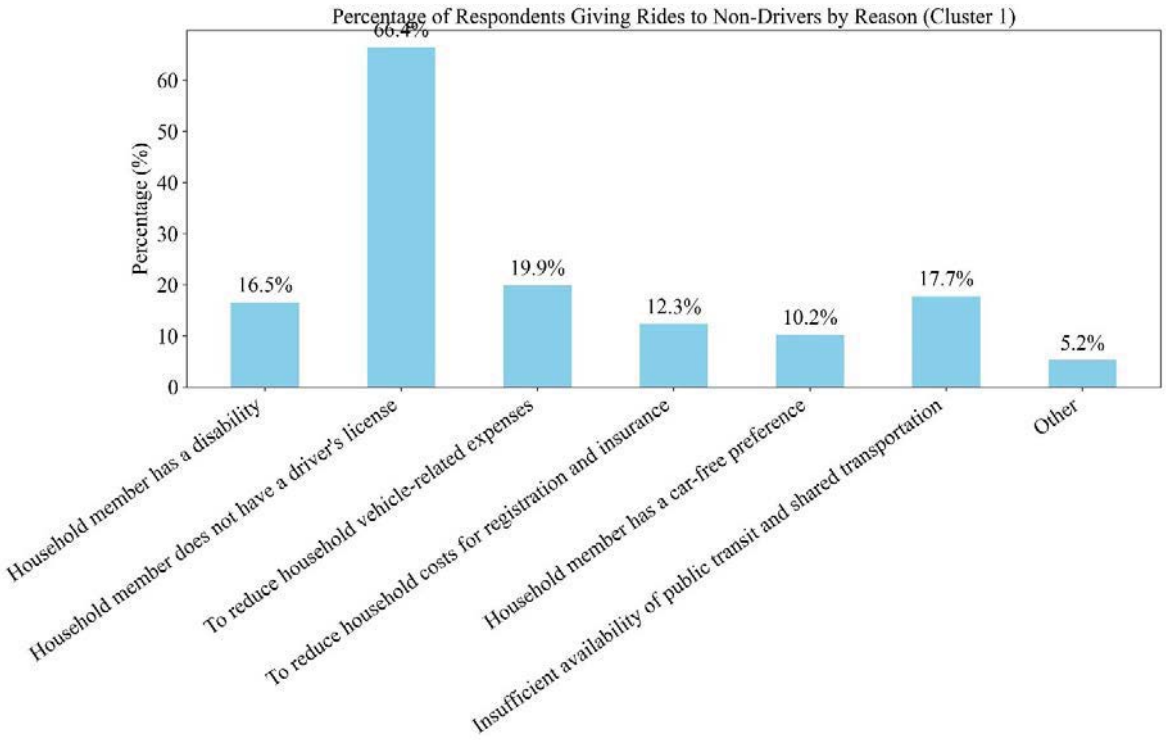

Figure K3: Reason for Providing Rides

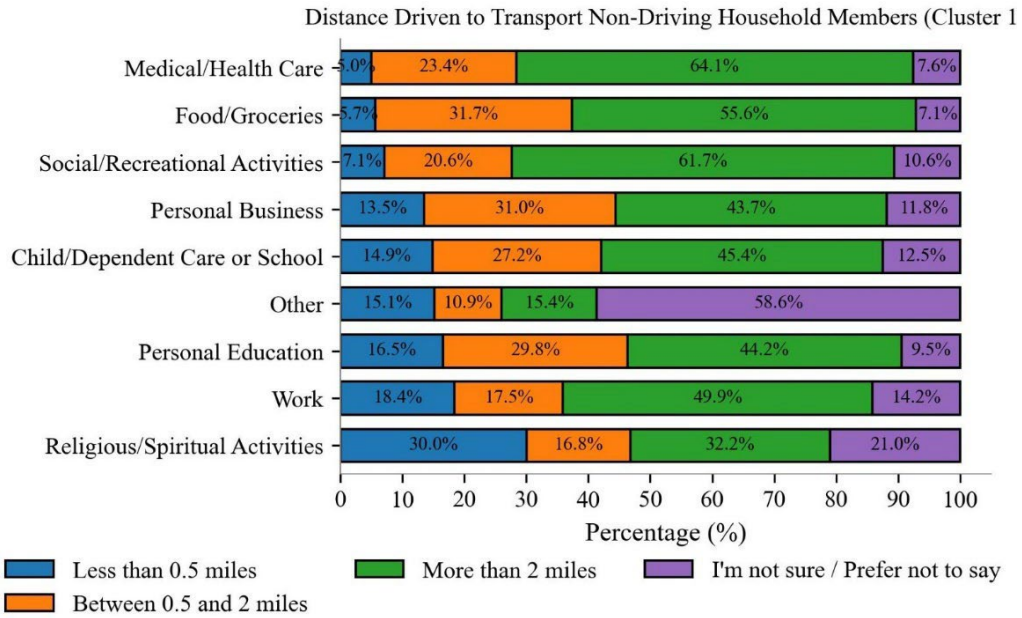

Figure K4: Distance Driven for Non-Drivers

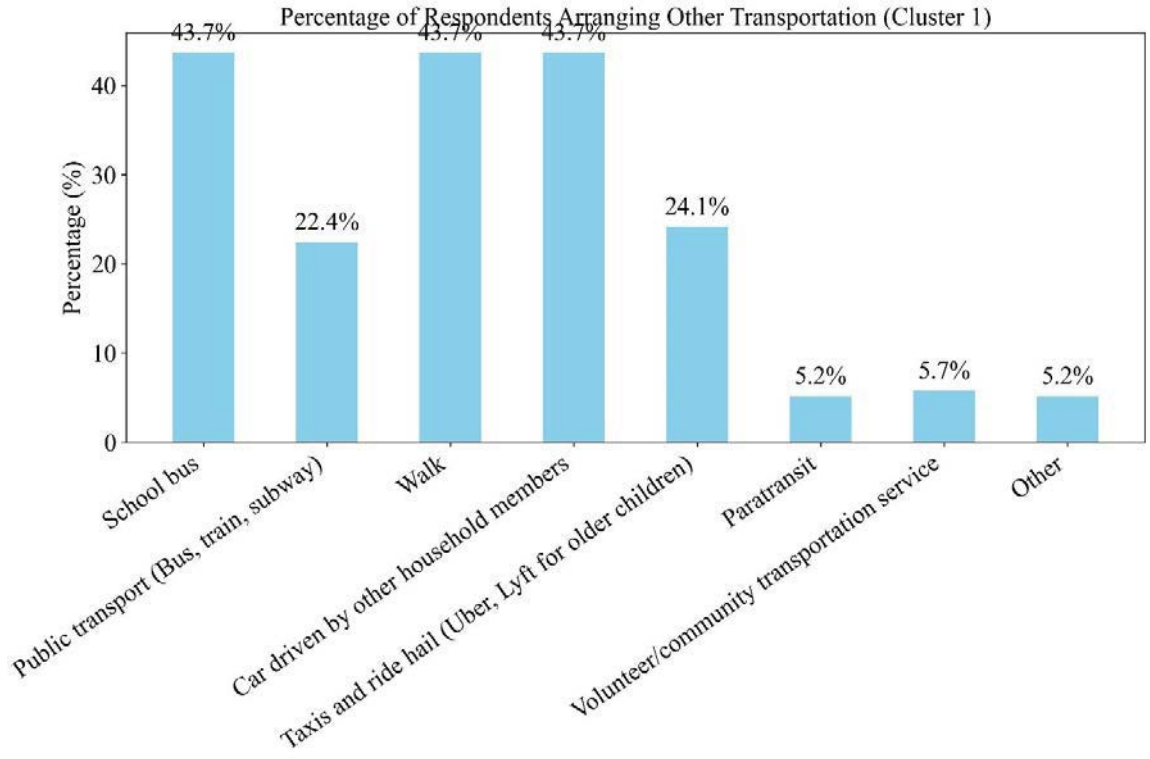

Figure K5: Type of Arrangements of Transportation

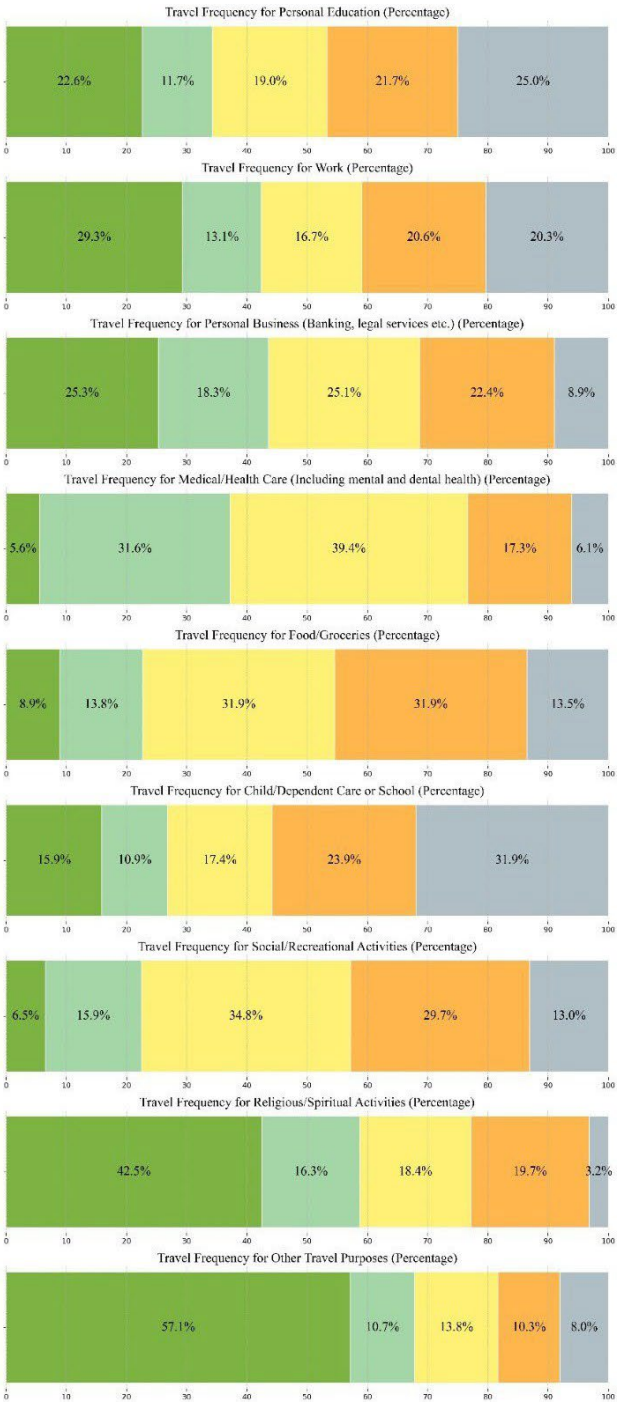

Figure K6: Compilation of Travel Frequency Purposes - Percentage

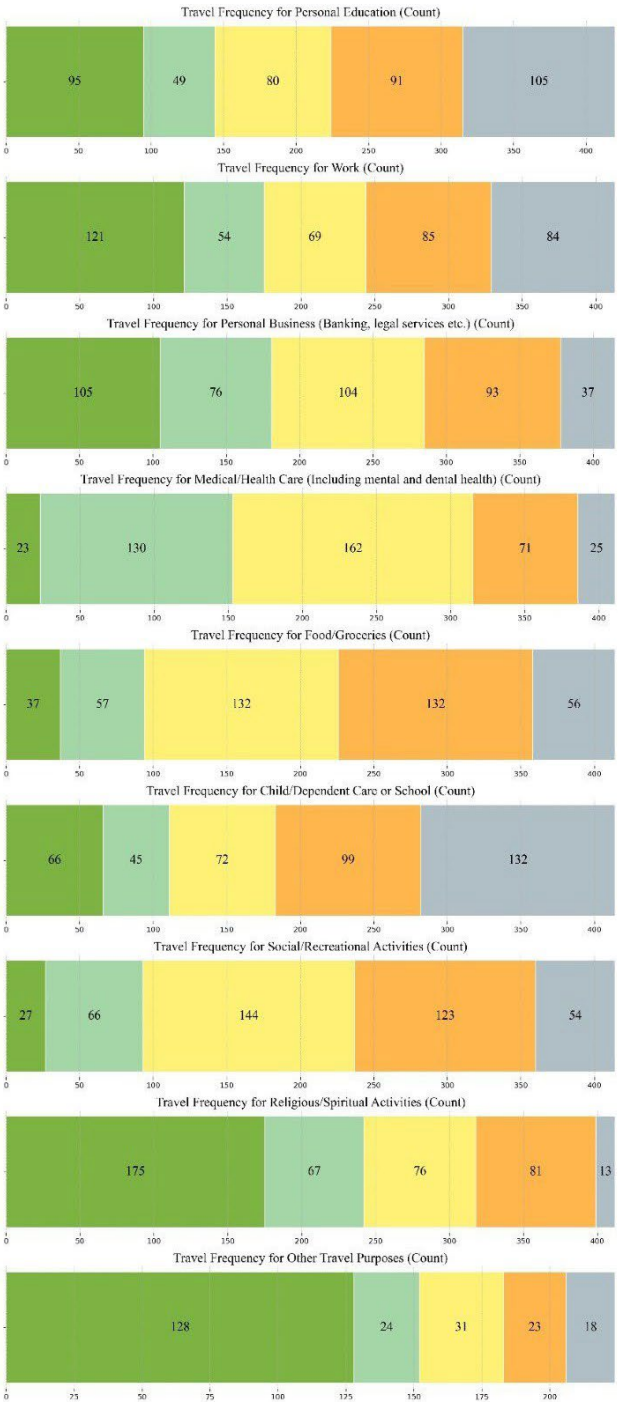

Figure K7: Compilation of Travel Frequency Purposes - Counts

Appendix L: Non-Driver Adjacent Latent Class Analysis – Class 2

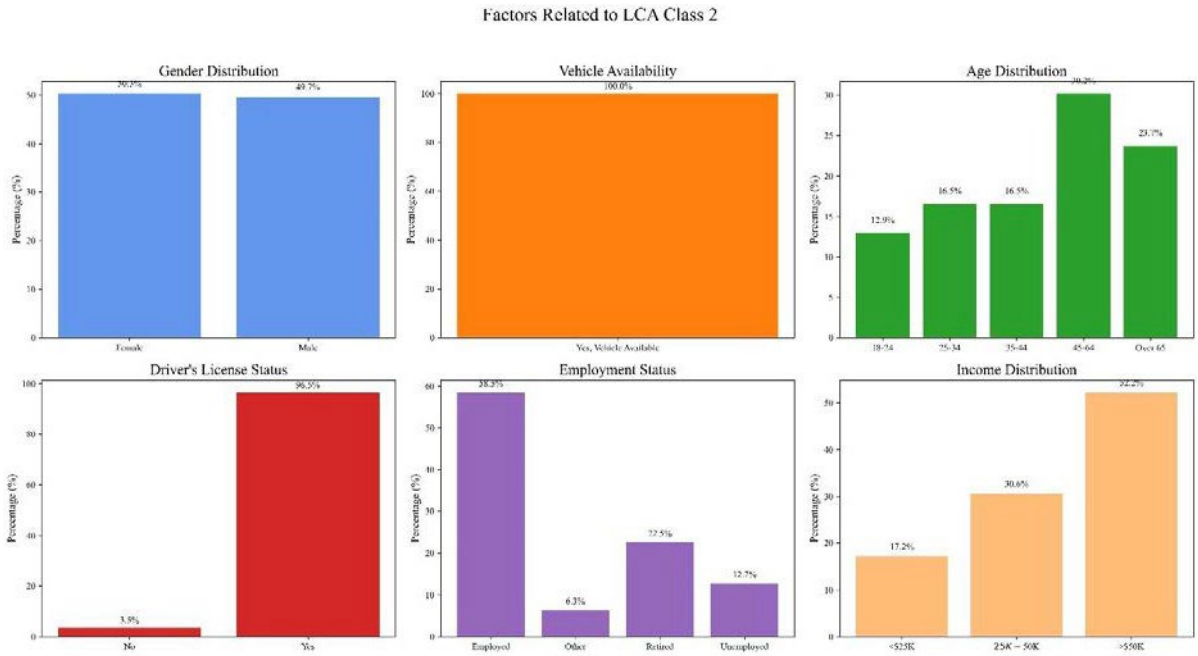

Figure L1: Compilation of Socio-Demographic Factors

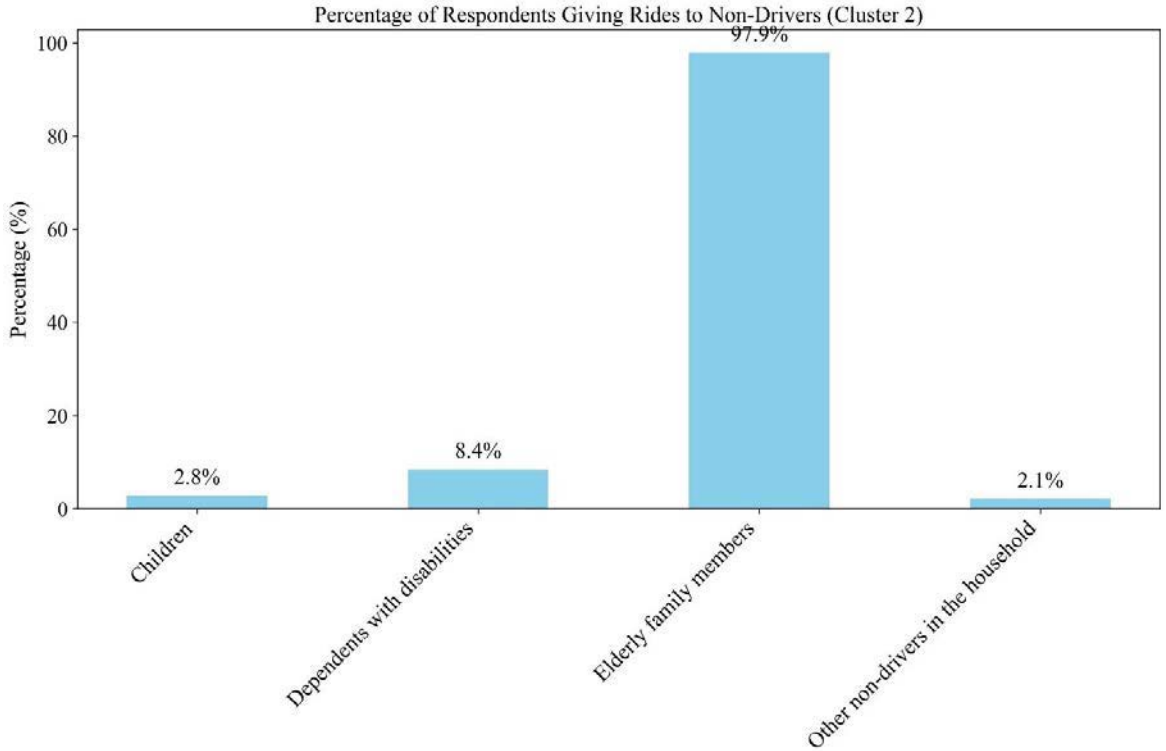

Figure L2: Type of Non-Drivers

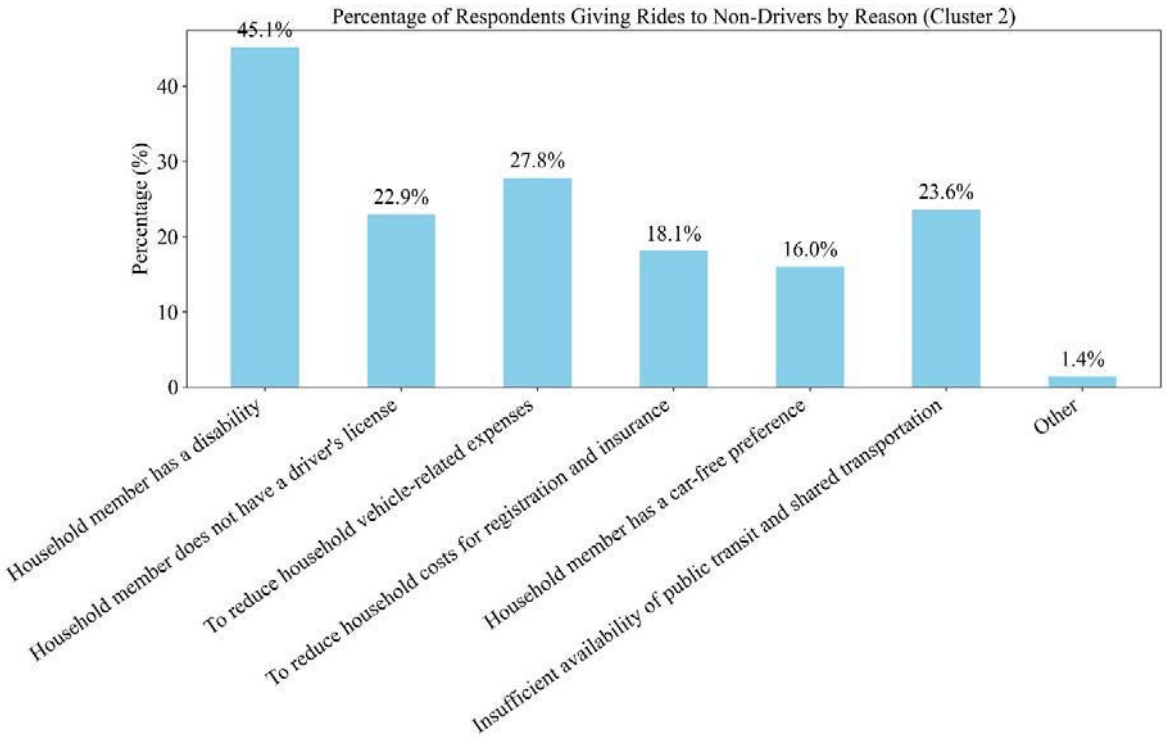

Figure L3: Reason for Providing Rides

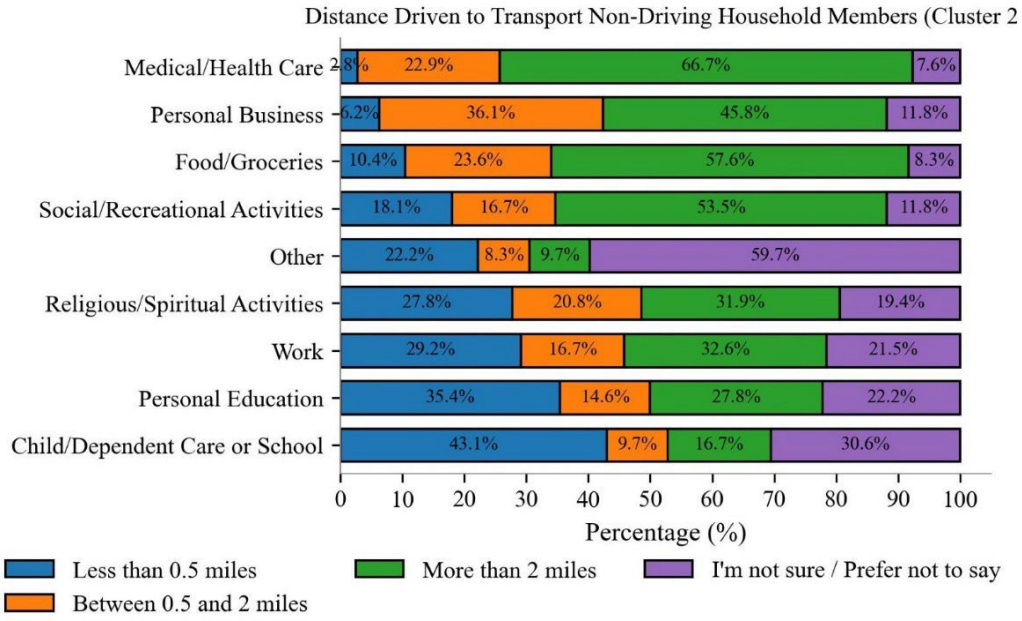

Figure L4: Distance Driven for Non-Drivers

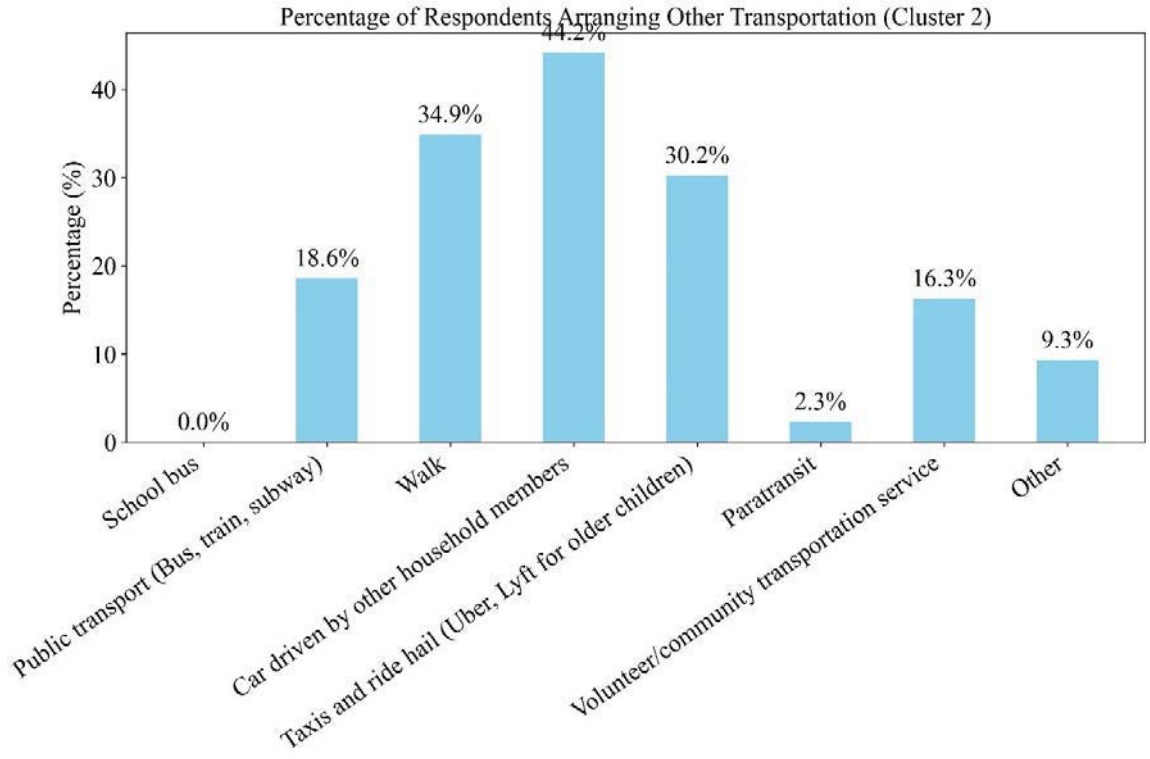

Figure L5: Type of Arrangements of Transportation

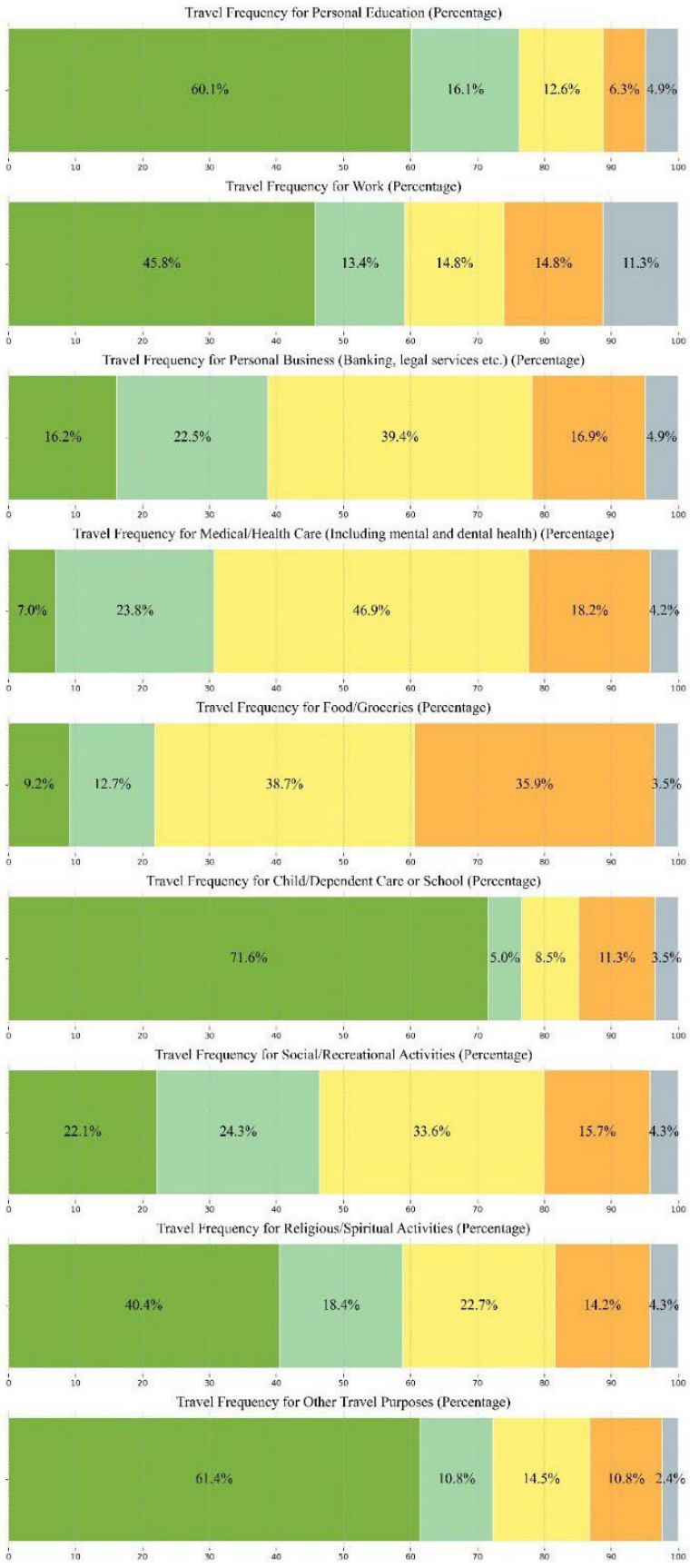

Figure L6: Compilation of Travel Frequency Purposes - Percentage

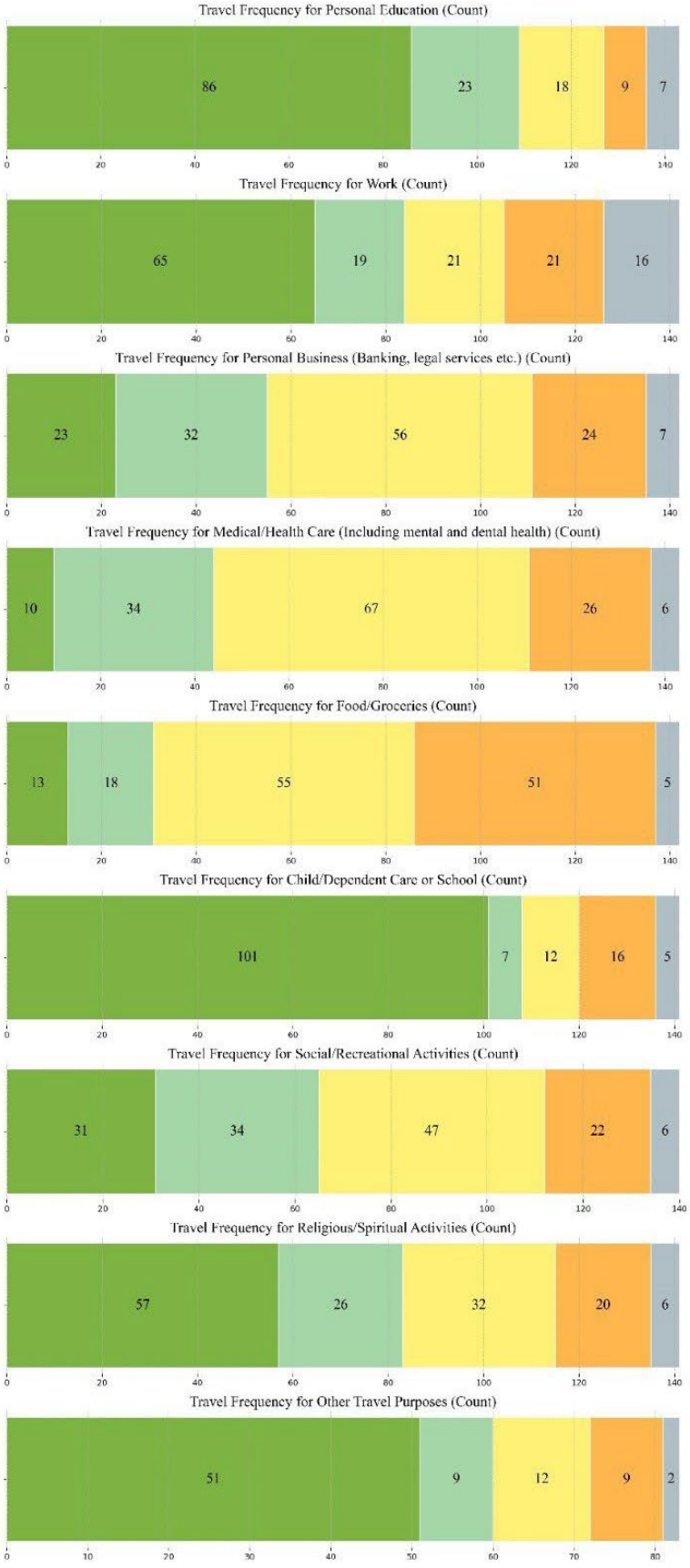

Figure L7: Compilation of Travel Frequency Purposes - Counts

Appendix M: Implementation Prioritization

Implementation Plan for Strategies

This implementation plan aims to transition from broad goals to effective, strategic actions. It serves as a guide for setting clear goals, objectives, and actionable steps for each planning task. The plan is designed to help WisDOT initiate or enhance the integration of non-driver mobility, safety, accessibility, and equity into various aspects of its planning and program development processes. There are a total of four action plans, including three for non-driver group and one for non-driver adjacent group.

Title: Resilient Mobility Solutions for Non-Drivers: A Community-Based Approach

Goals And Objectives

Develop flexible funding mechanisms and forge new partnerships with local organizations, non-profits, and community advocates to identify, implement, and sustain innovative solutions for improving non-driver mobility across Wisconsin. Prioritize outreach and tailored solutions for underrepresented groups, for example Black or African American (21.4% of respondents), and Hispanic or Latino (7.3% of respondents) communities, to ensure equitable access to mobility options.

Background Information

A recent survey on non-driver transportation behavior revealed a pressing need to enhance mobility and accessibility to essential services, recreational and social activities. A significant number of respondents (28.5%) stated in the open-ended question that due to the lack of transportation it leads to missed social events and a reduced ability to maintain relationships, especially those in rural areas, which have less transportation options available. Also, groceries (39.5%) and healthcare (34.3%) are chosen as the highest travel frequency for non-drivers, however due to schedule conflicts non-drivers feel like and burden and are constrained by the availability of the non-drivers adjacent. Although some non-drivers may have other transportation options, financial constraint (28.71%) is an issue among non-drivers that may not be able to finance the cost of using public transit and private transportation services like taxis, uber, and Lyft. Public funding cannot meet the growing demand. However, research indicates that community-driven mobility initiatives can flourish when tailored to local needs and supported by a strategic blend of partnerships, technology, and community engagement. Addressing equity gaps requires intentional outreach and solutions designed for Black, Hispanic, and other underrepresented communities.

Action Steps

To achieve these goals, the following actions are proposed:

a) Resource Review and Seed Funding Identification: Conduct an internal review of available resources to identify potential state and federal grants, cost-sharing opportunities, and grant-writing support. Prioritize funding opportunities that target underserved populations, such as Black and Hispanic communities.

b) Fundraising Initiatives: Engage local or consultant expertise to design, plan, and pilot fundraising events. Sustainable funding sources may include local grants, charitable organizations, and community crowdfunding campaigns.

c) Community Bike and E-Scooter Programs: Work with local agencies or consultant assistance to develop strategies and MOU for leveraging state resources,

supplemented by private funding or local grants, to support community bike and e-scooter programs. Focus on areas with adequate population density and demonstrated demand, particularly in neighborhoods with higher concentrations of underrepresented communities. Offer subsidized memberships and training to ensure accessibility.

d) Pilot Community Partnerships: Launch a pilot partnership with local businesses and organizations in selected communities. For example, grocery stores and health clinics can collaborate to bridge mobility gaps and increase accessibility for non-drivers. Partner with culturally specific organizations to ensure services are tailored to the needs of underserved communities, such as Black and Hispanic communities.

e) Volunteer Driver Program (VDP) Expansion: Partner with existing volunteer driver program operators to identify barriers and resources needed to expand these programs in urban areas. Ensure programs are inclusive by providing language-accessible services (e.g., Spanish-speaking drivers) and wheelchair-accessible vehicles.

f) Urban Pilot Programs: Pilot the VDP programs in urban communities through collaborations with non-profits or neighborhood associations, utilizing local or consultant support to ensure successful implementation. Engage churches, community centers, and other trusted organizations within underserved communities to promote participation and build trust.

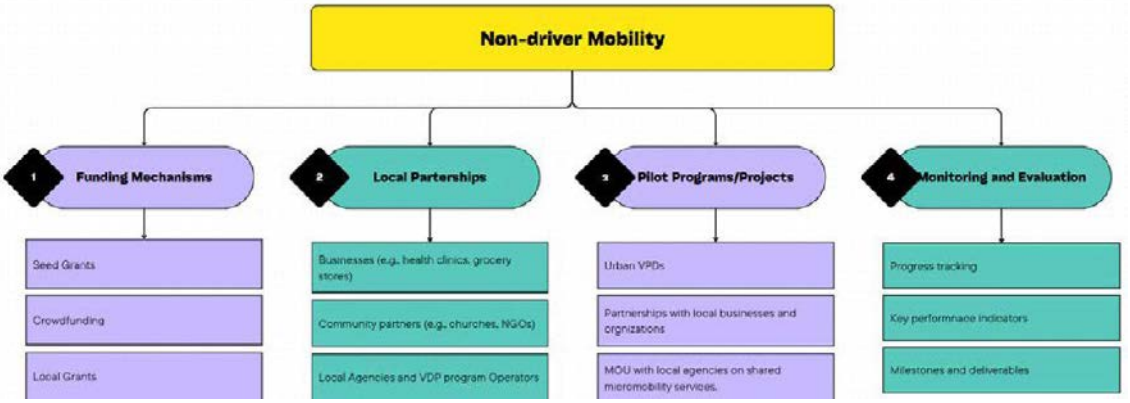

Fig 1. Flow chart of action steps

g) Recommended Research Funding and Schedule

a. Funding requirement: $150K-$250K
b. Timeline: 18 months (6-month planning phase and 12-month implementation phase)

Anticipated Result

This project aims to identify barriers to initiating and sustaining community-driven mobility solutions. Seed grants are expected to support key non-driver mobility activities. The two pilot studies — one on partnerships with local businesses and organizations and another on urban volunteer driver programs — will serve as models for:

- Continuous fundraising strategies
- Recruiting and retaining volunteer drivers

- Efficient resource allocation and prioritization
- Future service expansion plans

These efforts will lay the groundwork for scalable, sustainable, community-based mobility solutions across Wisconsin.

Monitoring and Evaluation
The agency should identify the person or organization responsible for initiating/implementing the activity, providing direction for the work, and monitoring progress. The leaders are not expected to accomplish all the work; however, they will ensure the activities are carried out. Track and regularly report progress on each activity. Evaluate the effectiveness of the strategies and activities and recommend course corrections where appropriate.

Title: Modernizing Paratransit: A Technology-Driven Approach to Inclusive Mobility Goals And Objectives

Enhance paratransit services for people with disabilities, particularly in rural areas, through innovative, cost-effective solutions that improve accessibility, efficiency, and service delivery.

Background Information

Recent survey data on non-driver transportation behavior in Wisconsin shows that a significant percentage of respondents are individuals with physical or mental disabilities. Disability (23.17%) was one of the top three choices for the reason why non-drivers are not driving and these disabilities were due to physical disability (44.84%), mental disability (33.18%), and vision impairment (26.46%). Most respondents with disabilities have limited transportation options, since some may require more assistance on and off transportation. Additionally, Wisconsin's population of individuals with disabilities is projected to grow, particularly among those with mental health conditions. Suggestion to have personal care workers in public transit and paratransit as well as extending paratransit hours would be beneficial to the respondents. In the open-ended questions for both the non-drivers and non-drivers adjacent, respondents wants simplification and improvement of apps, to allow easy navigation access for arranging and keeping track of transportation information. The need for improved paratransit services is especially critical in rural areas where service options are limited, posing significant barriers to mobility and independence.

Action Steps

To achieve these goals, the following actions are proposed:

a) Technology and Service Model Review: conduct a salient review of current technologies and service models for optimizing paratransit operations, focusing on: Flexible Service Models: Integrating both fixed-route and on-demand services to better adapt to rider needs; and Technology Integration: Implementing advanced scheduling and routing software to improve operational efficiency.

b) Prioritization: prioritize technologies and models that are market-ready, regulation-compliant, and applicable in Wisconsin's context.

c) Needs Assessment: conduct a two-fold needs assessment.
   - Current State: Evaluate existing paratransit services and identify immediate needs.
   - Future Needs: Project future service demands based on demographic trends. Identify areas with high potential for implementing the recommended service models and technologies, ensuring coverage across rural and urban settings.

d) Pilot Programs: collaborate with paratransit providers, technology vendors, and consultants to develop strategies leveraging state resources, supplemented by private funding or local grants. Recruit participants and implement these strategies in selected communities, including rural communities.

e) Driver Training Programs: develop and deliver specialized training for paratransit drivers, focusing on understanding and addressing the unique needs of riders with disabilities; and effective use of new technologies within enhanced service models.

f) Pilot Program Evaluation: conduct surveys with service providers, operators and riders to gather feedback on the effectiveness of new technologies and service models. Assess benefits, strengths, and areas for improvement. Compile the findings into a final report with actionable recommendations for future enhancements.

Recommended Research Funding and Schedule

c. Funding requirement: $200K-$300K
d. Timeline: 18 months (6-month planning phase and 12-month implementation phase including evaluation)

Anticipated Result

This project will enhance paratransit services in Wisconsin by integrating innovative technologies and service models, leading to:

- Optimized Operations: Improved service efficiency through advanced scheduling and flexible service models.
- Increased Accessibility: Enhanced mobility for people with disabilities, reducing reliance on caregivers.
- Scalable Solutions: Development of a blueprint for future service expansion and continuous improvement.

These innovations will demonstrate the paratransit innovations that have the great potential of significantly elevating the quality of paratransit services across Wisconsin, providing a model for scalable, inclusive mobility solutions.

Monitoring and Evaluation

The agency should identify the person or organization responsible for initiating/implementing the activity, providing direction for the work, and monitoring progress. The leaders are not expected to accomplish all the work; however, they will ensure the activities are carried out. Track and regularly report progress on each activity. Evaluate the effectiveness of the strategies and activities and recommend course corrections where appropriate.

Title: Expanding Mobility Options for Low-Income Families Through TNC Partnerships

Goals And Objectives

The goal is to enhance mobility for low-income families, particularly in underrepresented communities (e.g., Black or African American and Hispanic or Latino populations), by facilitating partnerships with TNCs, providing funding, data analysis, and supportive policies, while integrating TNC services with public transit to improve accessibility and affordability.

Background Information

A recent survey on non-driver transportation behavior revealed a critical need for improved access to essential services, jobs, schools, social, and recreational activities. Since 44% of non-drivers makes less than $25K, the financial constraint leads to less transportation options being available. Due to less transportation options, non-drivers (14.46%) are more inclined to rely on non-drivers adjacent, which due to the travel frequency can lead to costly vehicle maintenance. Many respondents from both the non-drivers and the non-drivers adjacent would like programs created to help obtain reduced fare cost for those with low-income to help non-drivers with more transportation options and reduce the vehicle related expenses (28.71%) of the non-driver adjacent. Many respondents rely on public transit (32%), but its limited coverage, especially in rural and tribal areas, cannot meet the demand. TNC services could supplement public transit or serve as a primary travel option in certain areas, offering essential mobility solutions for non-drivers and underserved communities.

Action Steps

To achieve these goals, the following actions are proposed:

a) Literature Review: conduct a comprehensive review of successful TNC service expansion models in states similar to Wisconsin, focusing on strategies like subsidized ride programs, integration with public transit, and flat-fare or income-based pricing, with particular attention to their impact on underrepresented groups.

b) Prioritization: prioritize strategies that are market-ready, regulation-compliant, and applicable in Wisconsin’s context, with a focus on solutions that reduce equity gaps.

c) Stakeholder meetings and workshops: identify and engage key stakeholders, including TNCs, local transit agencies, state and municipal regulators, and community groups (including those serving such as Black or African American and Hispanic or Latino communities). Host workshops to present findings from the review and prioritization phases and identify strategies for pilot programs.

d) Pilot Programs and Evaluation: collaborate with stakeholders to implement pilot programs in selected urban, rural and tribal communities with high concentrations of low-income and underrepresented residents and collect feedback from diverse community members to assess the impact and identify future program improvements that ensure equitable access to TNC services.

Recommended Research Funding and Schedule

a. Funding requirement: $150K.
b. Timeline: 12 months (6-month planning phase and 6 months implementation phase)

Anticipated Result
The project is expected to establish a robust framework for integrating TNC services into Wisconsin's transportation system, enhancing access for low-income families and underserved communities. The pilot programs will serve as a testing ground for strategies such as subsidized rides and partnerships with public transit systems, providing actionable insights for future statewide implementation. Successful implementation of these strategies will lead to improved mobility options, reduced transportation burdens for low-income families, and a more efficient, accessible transportation network across Wisconsin, particularly in rural, tribal areas, and historically underserved urban areas.

Monitoring and Evaluation
The agency should identify the person or organization responsible for initiating/implementing the activity, providing direction for the work, and monitoring progress. The leaders are not expected to accomplish all the work; however, they will ensure the activities are carried out. Track and regularly report progress on each activity. Particular focus can be put into addressing mobility gaps for underserved communities such as Black or African American and Hispanic or Latino communities . Evaluate the effectiveness of the strategies and activities and recommend course corrections where appropriate.

Title: Building Community Connections: Local Carpool Networks and Ride-Matching Platforms for Non-Drivers

Goals And Objectives

Enhance transportation access for non-drivers by expanding state-supported shuttle services to key community hubs, including tribal nations, and developing local carpool networks with a digital ride-matching platform. This integrated approach aims to reduce household transportation burdens, improve ride-sharing coordination, and increase accessibility to essential non-work destinations such as schools, grocery stores, and medical appointments.

Background Information

Recent survey data on non-driver transportation behavior in Wisconsin highlights the significant burden placed on caregivers who provide transportation to non-drivers. Many respondents expressed that providing rides takes away time from their personal activities, work, or relaxation and they often have to rearrange or cancel their plans to provide rides. Non-drivers adjacent (35.6%) continued by stating they face difficulty managing and arranging transportation when several non-driver household members have activities at the same time. Also, frequent driving to school (19.5%) and work (18.6%) combined with the increase in the cost of gas, it result in high maintenance costs for non-drivers adjacent, therefore it makes it difficult for non-driver adjacent to provide regular transportation for non-drivers. This strategy addresses the need for a more coordinated approach to ease these burdens and improve accessibility for non-drivers across diverse communities, including rural, urban, and tribal areas.

Action Steps

To achieve these goals, the following actions are proposed:

e) Needs Assessment: conduct a needs assessment to identify service demand in areas with concentrations of schools, senior living communities, senior centers, and other community hubs for non-drivers. Ensure geographic coverage across rural, urban, and tribal communities.

f) Resource allocation and acquisition: explore state funding and coordinate opportunities to expand shuttle services serving institutional locations identified in the needs assessment.

g) Development of carpool networks and digital ride-matching platform: establish local carpool networks with a reliable and sustainable communication plan, develop or adapt a digital ride-matching platform to facilitate shared rides for households with young children or elderly family members, focusing on destinations like schools, grocery stores, and hospitals/clinics; reduce the number of trips needed per household by coordinating shared rides.

h) Pilot Programs: collaborate with shuttle service providers, technology vendors, and consultants to develop funding strategies and recruit participants and implement pilot programs in selected urban, rural and tribal communities.

i) Pilot Program Evaluation: conduct surveys with service providers, operators and riders to gather feedback. Assess benefits, strengths, and areas for improvement. Compile the findings into a final report with actionable recommendations for future enhancements.

Recommended Research Funding and Schedule

c. Funding requirement: $200-$300K. (Adjust based on whether a new digital platform is developed, or existing market products are used).
d. Timeline: 12-18 months (6-month planning phase and 6-12 months implementation phase including evaluation. Adjust based on whether a new digital platform is developed, or existing market products are used)

Anticipated Result

The project is expected to enhance transportation access to non-work based trips for non-drivers by:

- Optimizing Ride-Sharing: Reducing individual household trips through a coordinated network of shared rides.
- Improving Accessibility: Expanding shuttle services to key community hubs, including rural and tribal areas.
- Reducing Transportation Burdens: Easing the load on caregivers by offering more reliable, shared transportation options.
- Strengthening Community Connections: Fostering collaboration between households, local organizations, and transportation providers, resulting in a more integrated and efficient transportation network.

These efforts will create a scalable and sustainable transportation model that benefits non-drivers across Wisconsin, particularly in underserved communities.

Monitoring and Evaluation

The agency should identify the person or organization responsible for initiating/implementing the activity, providing direction for the work, and monitoring progress. The leaders are not expected to accomplish all the work; however, they will ensure the activities are carried out. Track and regularly report progress on each activity. Evaluate the effectiveness of the strategies and activities and recommend course corrections where appropriate.