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MPC 21-444 | K. Vachal

RIDESOURCING IN RURAL COMMUNITIES, NORTH DAKOTA DRIVER SURVEY

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The rise of ridesourcing services such as Uber and Lyft in recent years has revolutionized urban transportation across the globe. With the increased popularity of these services came negative impacts on industries such as taxi cab and public transit services. In an era when ridesourcing companies are expanding rapidly in previously untouched markets, rural markets might soon face unexpected changes. Our objective was to understand public perception and trip activities that may lead to success in rural ridesourcing markets, especially related to rider demand. Survey results showed a majority were familiar with ridesourcing services such as Uber and Lyft, but the share was well under the national rate. The accessibility in rural areas was very limited compared to the urban centers. With regard to market segment potential, ridesourcing was seen as a good option for older adult mobility and as a ride alternative to driving after drinking. A technological hurdle was also revealed in low rates of smartphone ownership among older rider cohorts. While limited to a single rural state, findings suggest that public education about trips via ridesourcing services may be needed. Promising views of ridesourcing as an impaired driving alternative, even in rural areas, support continued efforts to improve market accessibility and stability.

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Ridesourcing in Rural Communities, North Dakota Driver Survey

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November 2021

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Disclaimer

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ABSTRACT

The rise of ridesourcing services such as Uber and Lyft in recent years has revolutionized urban transportation across the globe. With the increased popularity of these services came negative impacts on industries such as taxi cab and public transit services. In an era when ridesourcing companies are expanding rapidly in previously untouched markets, rural markets might soon face unexpected changes. Our objective was to understand public perception and trip activities that may lead to success in rural ridesourcing markets, especially related to rider demand. Survey results showed a majority were familiar with ridesourcing services such as Uber and Lyft, but the share was well under the national rate. The accessibility in rural areas was very limited compared to the urban centers. With regard to market segment potential, ridesourcing was seen as a good option for older adult mobility and as a ride alternative to driving after drinking. A technological hurdle was also revealed in low rates of smartphone ownership among older rider cohorts. While limited to a single rural state, findings suggest that public education about trips via ridesourcing services may be needed. Promising views of ridesourcing as an impaired driving alternative, even in rural areas, support continued efforts to improve market accessibility and stability.

1. INTRODUCTION

Ridesourcing services have grown significantly since the introduction of Uber in 2009 (Clewlow and Mishra 2017). Similar companies such as Lyft, Hailo, Sidecar, and others have entered the scene. While Uber continues to dominate the market in the United States, the presence of Lyft has grown substantially. Ridesourcing services are expected to continue an upward swing as travel demand recovers after the COVID pandemic (Wong, 2021). According to the Pew Research Center (2018), 36% of U.S. adults have participated in ridesourcing services. By the year 2024, we can expect to see 1,588.2 million U.S. users of ridesourcing services (Statistica, 2019c). These services act as negotiators of supply (driver) and demand (rider).

On-demand service is accessed via mobile app after a user creates a profile with contact information and payment information, as payments are typically automatically processed. A user will request a ride to a specific destination using the app. Ride availability is generated by the app; providing a rider with nearly instant estimates of arrival time and trip cost for nearby drivers. This information is generated by the global positions system (GPS) in the users' mobile device. From here the user can accept a ride offer and a combination of technological features such as GPS, digital maps, and routing features enable the user to monitor real-time information about the ride. Vehicle sharing services, such as Zipcar, are another mobility option. As of May 2019, car-sharing was available in more than 30,000 cities worldwide (Wagner, 2019). This type of transportation, however, is generally limited to urban cities or college campuses. The model of shared mobility, such as demand-based ridesourcing services, has grown by 47% in the past three years (Mazareanu, 2020).

Interest in on-demand (ridesourcing) services as an alternative mode to driving among alcohol-impaired drivers has increased as these services expand to new market segments. It is estimated that about half of all alcohol-impaired driving arrests involve individuals whose last place of drink was a licensed restaurant or bar. Rural communities often lack these alternatives, making this option especially valuable. In addition, these services provide flexible employment opportunities for those looking to supplement job income or work occasionally as a student. Therefore, attributes associated with successful alternative ride programs, such as awareness, low cost, year-round availability, and rides to/from drinking venues make on-demand ride services especially attractive considering their agility and speed of service (Fell et al. 2020). Thus, it is evident that market segment diversity would be beneficial in sustaining this mode choice.

2. OBJECTIVE

Although ridesourcing has become and remains to be a popular transportation option in urban areas, the future of ridesourcing services in rural regions is ambiguous. While ridesourcing companies have made efforts to make services more accessible in rural and remote areas, the low population density and long travel distances limit potential for stable demand that typically attracts drivers (Pew, 2018). Moreover, it remains unclear whether people in rural areas would actually use these services, should they be available. Therefore, it is important to better understand factors that help facilitate and inhibit the growth of ridesourcing services in rural communities, such as rider accessibility, viable driver pools, and dependable market mechanisms in the supply and demand components that comprise technology-enabled ride transactions.

This research focuses on the demand factors in the ridesourcing market, such as current methods of transportation, frequency and purpose of use, and other contributing factors which may have a significant impact on popularizing these services. We surveyed licensed drivers in North Dakota to understand their perceptions of ridesourcing and general trip practices. Because of the limited population base, it is anticipated that older drivers are an essential customer group for gauging market potential in a largely rural state. As ridesourcing market segments have been successfully engaged in other demographics, understanding the potential demand-side market diversity of non-millennial adults is important to sustained market function and feasibility.

3. METHODOLOGY AND DATA

The mail survey method was employed to collect information about North Dakotans' knowledge, perception, and usage of ridesourcing transportation. The first two phases in the study focused on older drivers (those over age 34), with this iteration integrating the millennial[1] driver group (those 18-34). In 2020, the phase one survey was administered to adults 35 years and older. The younger population was integrated into those surveyed with the mailing this year. This group of adults under age 34 is attributed with the greatest propensity for ridesourcing growth as a mode of choice (Jiang, 2019). A survey identical to the 2020 instrument was disseminated to drivers which requested they refer to 2019 activities in their response. This time period coincided with the reference period used in the 2020 older driver survey and attempted to capture pre-COVID insight. A single question was inserted in the demographics section of the 2021 survey to acquire a general impact rating for COVID effects on ridesourcing use in 2020. As with the previous survey, appropriate weighting was factored into the statewide results to compensate for stratified random sampling.

The 2021 survey was administered statewide in a stratified random sample of 3,498 licensed drivers aged 18 to 34 years. Survey responses collected in 2020 from a statewide sample of 3,778 licensed drivers over age 34 (Vachal & Andersen, Forthcoming) were used in conjunction with those from the current survey for a statewide representation of adult drivers. The optimal distribution approach would have been a single mailing to the sample driver groups, but resource limitations required a phased approach. The 2020 mailing was a companion to the statewide sample of 3,778 licensed drivers over age 34 (Vachal and Andersen forthcoming).

Despite limiting the mail address sample to drivers under age 35, some responses were received from the older driver cohort, so they were folded into the statewide survey responses collected during the two years. The 2021 survey sample was comprised entirely of drivers under age 35, but that group accounted for 92.8% of the survey responses for 2021. Within the combined survey responses, the 18-to-34-year age cohort accounted for 31.6% of the licensed driver population in the state, which was similar to the 31.5% representation, in the statewide adult driver sample (Federal Highway Administration, 2018).

The disproportionate stratified random sample was designed to select participants by region (east/west) and geography (urban/rural), using county jurisdictional boundaries for the definitions (Figure 3.1). The disproportionate sampling has been beneficial in collecting sufficient responses across strata without greatly expanding the sample size and associated survey administration costs. Using simple average responses would provide skewed results in representing the statewide driver population. Therefore, a post-stratification weighting process is used to give an appropriate weight to responses for statewide estimates. Results from post-stratification consider the regional location and geographic environment of North Dakota registered drivers when weighting in the statewide driving population.

[1] Pew Research Center decided to use 1996 as the last birth year for Millennials. Anyone born between 1981 and 1996 (ages 23 to 38 in 2019) is considered a Millennial, and anyone born from 1997 onward is part of a new generation. | https://pewrsr.ch/2szqtJz

The regional definition was created by aggregating the state into two areas closely representing an east/west division of the state. The geographic environment definition is based on the urban/rural dichotomy that is based in population density and economic clusters. The sampling probabilities for the survey are displayed in Table 3.1.

Table 3.1 Sampling Rate

Region	Geography	Sampling Rate
East	Urban	40.8%
	Rural	12.3%
West	Urban	34.2%
	Rural	12.7%

Urban drivers are those from counties with the largest population in that category according to the most recently published data estimates from the U.S. Census Bureau. Six urban counties are located in the east and another six are located in the west. These counties represent the clear majority of the urban population in the state. Rural counties in North Dakota were divided into 19 east rural counties and 22 west rural counties (Figure 3.1).

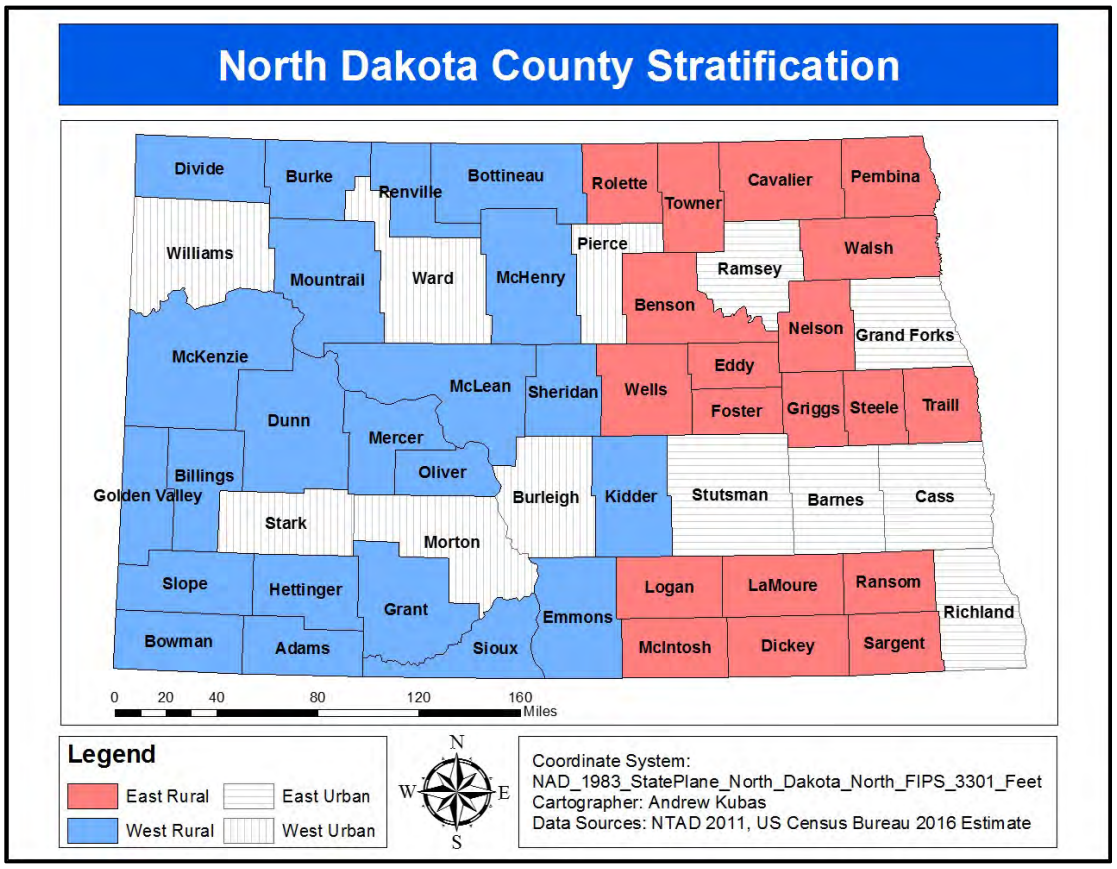


Figure 3.1 County Stratification

The mailing lists in each year included the addresses of 3,840 licensed adult drivers, randomly selected in equal counts across the four geographic quadrants. After cleaning to remove out-of-state and incomplete addresses, 3,778 surveys were mailed in 2020, and 3,796 were mailed in 2021. The mailing produced a return of 375 and 269 undeliverable surveys in 2020 and 2021, respectively. During the two- to three-month response window, a combined total of 1,026 valid responses were collected between the two surveys. The normal two-month window mail response window was expanded because of the COVID-19 pandemic that was recognized by a federal emergency declaration on March 13, 2020. Overall, the response rate of 14.8% was above the typical mail survey response rate of 10%.

The number of responses from each age group was sufficient for analysis. As anticipated, due to the sampling procedure, state generalization requires post-weighting of the sample response to more appropriately represent the associated driver population within the geographic and regional sampling frame. For example, 12.0% of the statewide driver population in the sampling frame resides in the west-urban region but it was overrepresented with a 24.1% share of the survey responses (Table 3.2). Of those responding, 30 individuals did not indicate a region and/or geographic location.

Table 3.2 Survey Response by Region and Geography

Region	Geography		
	Rural	Urban	Total
East	261	238	499
	26.2%	23.9%	50.1%
West	257	240	497
	25.8%	24.1%	49.9%
Total	518	478	996
	52.0%	48.0%	100%
Frequency Missing = 30			

4. RESULTS

Ridesourcing services such as Uber and Lyft have continued to gain widespread attention in recent years, because of their flexibility as transportation options for customers and as a unique method of quasi self-employment as an independent contractor for drivers. In this survey, the popularity of ridesourcing services among North Dakotans was investigated along with other factors, such as trip purpose and frequency of use. The sample demographics were considered in representation of population gender and age group. Gender responses were comprised of 37.4% males and 62.5% females. While some evidence has been offered for gender bias in ridesourcing use, means tests showed similar levels of familiarity and usage in the state (Barbour, Zhang and Mannering 2020).

Age was of particular interest given the technology-enabled ridesourcing market. The sample provided adequate representation for the population across five age groups. Responses ranged from a low of 14.2% from drivers 75 and older to a high of 22.5% in the 18- to 34-year group (Table 4.1). Substratum counts were sufficient to make comparisons, but not generalizations, about the driver age groups. The age strata were selected based on significant differences in cell phone ownership and cellular service as essential demand features. Within groups, means testing unveiled an age-based distinction within narrower older-driver groups compared to the wider age groups used for younger-driver cohorts of those under 55.

Survey respondents were asked to indicate if their travel choices related to on-demand ride services, such as Uber and Lyft, were impacted by COVID-19. Among the 265 responses, one in four offered the “Do Not Know” response and 58% indicated no change. The remaining responses were 34% reporting less use, and 10% indicating increased use. While the specific effects of the pandemic were not investigated, these responses support the assumption that it was appropriate to reference the year prior to the pandemic in completing the final survey round.

Table 4.1 Age Groups

	Survey		Driver Population*	
Age Group	Count	Percent	Count	Percent
18 to 34	234	22.5	176,948	32.4
35 to 54	208	20.4	171,430	31.4
55 to 64	218	21.3	94,515	17.3
65 to 74	221	21.6	62,835	11.5
75 and Older	145	14.2	40,911	7.5
Total	1,022		546,639	
Source: U.S. Department of Transportation, 2018.				

Vehicle access, which may influence ridesharing, was widespread as 97% confirmed household lease or ownership. A personal vehicle might be the only transportation option for individuals who live a considerable distance from urban centers, so a high ownership rate was expected given the state’s rural nature. However, among other options, ridesourcing apps could help reduce users’ dependence on owning and operating a personal vehicle, which is especially important for elderly persons seeking to stay mobile.

4.1 Ridesourcing Market Emergence

Ridesourcing was introduced in North Dakota when a Fargo market was established for driver and rider transaction opportunities, by Uber, in May 2015. A company spokesman noted that "7,500 people had looked for rides in the city during the six months leading up to the launch" (Glass-Moore 2015). Lyft began offering its competing ride service to Fargo in 2017. These companies subsequently expanded service platforms to facilitate markets in Grand Forks and Bismarck. Several other N.D. cities, along with adjacent communities served through these core location markets, have been added more recently (Huber and Ross 2017). About seven in ten respondents, 71.5%, were familiar with ridesourcing in North Dakota. About 65% of respondents acknowledged ridesourcing services were available where they lived.

A major challenge in rural areas can be technological infrastructure deficiencies in terms of network coverage and adoption rates. Ridesourcing services depend on adequate cellular service, which is more often unreliable or unavailable in rural areas compared to urban areas. Thus, there is a digital divide as Uber and Lyft are tech-enabled ride services. Regarding technology, 97.2% reported they had cellular service but only 87.3% owned a smartphone to enable ridesourcing orders. A majority (71.5%) of respondents were familiar with smartphone applications for ridesourcing services such as Uber and Lyft. The rate was well below the national rate of 97% of Americans (Jiang, 2019). Half (50.8%) of respondents reported they had used ridesourcing services.

Familiarity with ridesourcing was similar in the east and west regions. It varied significantly between urban and rural geographies $\chi^2(1, N=972) = .21$, $p < .001$., at 74.4% and 63.2%, respectively. While older drivers are becoming more familiar with the ridesourcing trip option (Vachal and Andersen, 2020), the anticipated inverse relationship between age and familiarity was evident in comparing across age groups (Figure 4.1). The primary effect of age in familiarity was significant in the current study ($F=82.33$, $df=4$, $p<0.001$). Nearly nine in ten of the 18- to 54-year-old drivers were familiar with ridesourcing. This compares to about half in the 65- to 74-year group and about one in four drivers 75 years and older (Figure 4.1). The 18-to-34 (*M=.89, SD=.31*) and 35-to-54 (*M=.88, SD=.33*) age groups were similar. The 55-to-64 (*M=.75, SD=.43*), 65-to-74 (*M=.50, SD=.50*) and 75+ (*M=.24, SD=.43*) age groups varied significantly within and compared to the younger age groups. Considering traffic safety implications for alcohol-impaired driving, the high rate among the youngest driver groups was positive as these drivers commonly need safe ride alternatives after drinking alcohol (U.S. Centers for Disease Control and Prevention [CDC] 2021a). The lack of familiarity among older cohorts may be a barrier in achieving ridesourcing market success characteristics such as diverse trips and user segments.

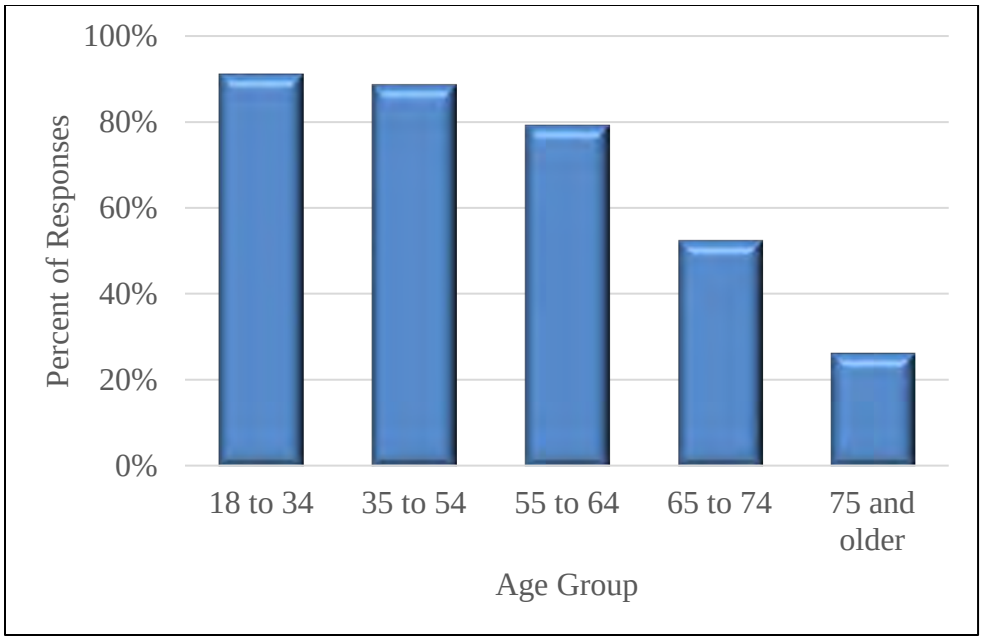


Figure 4.1 Familiarity by Age Group

4.2 Usage and Incentives

Although ridesourcing services are increasingly popular, the cost of on-demand services may be higher than personal vehicle or public transportation. Many jurisdictions have promoted ridesourcing as an alternative transport mode, especially with regard to alcohol-impaired driving. Others have offered it as a last-mile alternative to accessing public transit systems. The health industry has also begun to recognize they can have a role in facilitating ridesourcing to encourage more consistent, non-emergency, patient care (Chaiyachati 2018; Wolfe and McDonald 2020). The discount and voucher programs are intended to incentivize riders that should, in turn, increase demand and attract drivers into the ridesourcing market.

Drivers may decide to use ridesourcing in replacement of a personal vehicle trip. In highly urbanized metros with strong transit services this is not uncommon. However, in North Dakota, ride services are limited – especially outside the urban center boundaries. Among the respondents that had used ridesourcing, a single location use was reported by 54%. Respondents could indicate if they had used it in multiple locations. Among the roughly 50% that had used ridesourcing services, it was most frequently used outside the state at 74%. Among N.D. locations, Fargo was the most frequently selected location. It is the state's most populated city and was the first to market ridesourcing as a ride option so this is reasonable. Among other N.D. locations, it had been used by about 24% of respondents in Bismarck – the state capitol. Lyft or Uber services specifically had been used by 13.9% and 8.7% of respondents, respectively. Respondents could select as many sites as needed to reflect their use experiences. A time limit was not set for the look back with the locations.

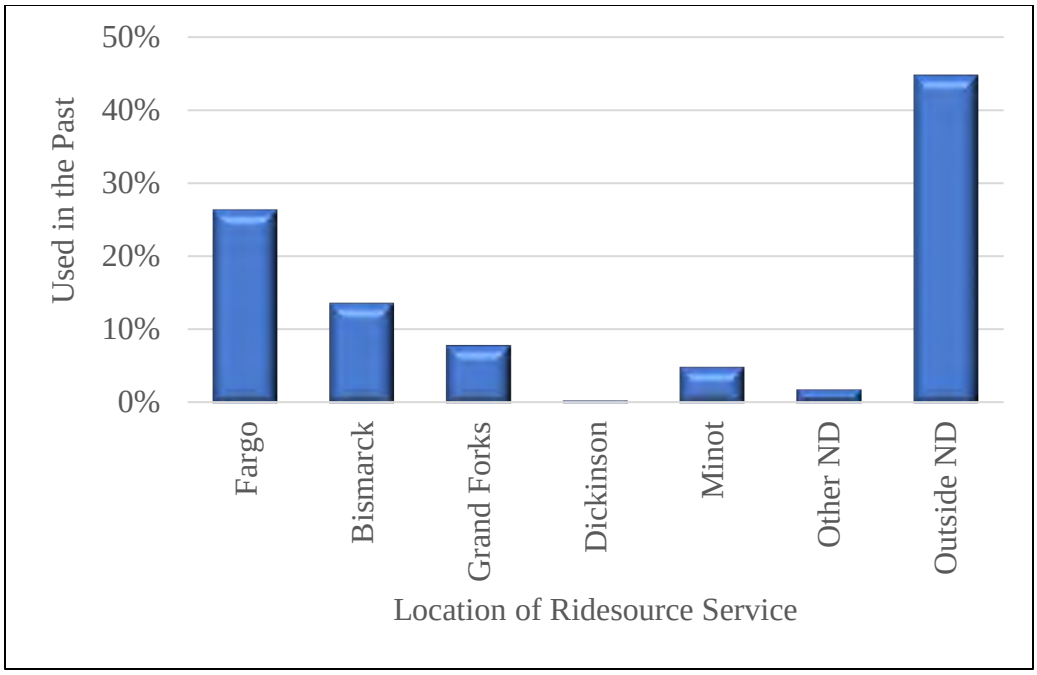


Figure 4.2 Locations ridesourcing has been used

Understanding willingness to use ridesourcing for various purposes is also helpful in gauging market potential. Among the 66.2% of respondents that indicated interest in ridesourcing services, airport transfers were highly accepted at 74%. Casual trips associated with parties and dinners were also a popular with 55% that had or were willing to use ridesourcing for this purpose. Other purposes such as healthcare, shopping and work were less common, with interest ranging between 11.3% to 7.3%. Trip-chaining (FHWA 2001; Ye, Pendyala and Gottardi 2007), confidentiality interest, or little purpose promotion may make personal vehicles a more likely mode. Additional insight may be useful in understanding the composition of the other purpose trip category since about one in four respondents had other purposes they had used or would be willing to use ridesourcing services.

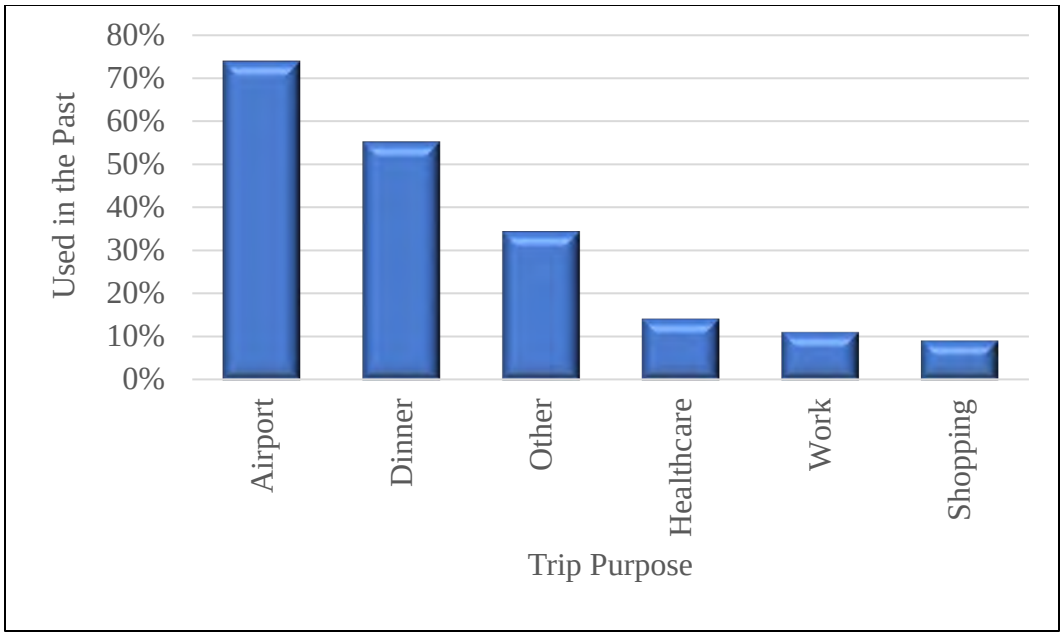


Figure 4.3 Ridesourcing mode trip purpose

Drivers were asked about trips they do or would use ridesourcing as a mode. Their views across trips according to purpose were collectively summarized by mode willingness across region, geography and age group in Table 4.2. Airport transfers were widely accepted across areas and by most age groups. The lower rate among the oldest driver group may be related to lower inclinations to use air travel. The older age groups did report a relatively high interest in using ridesourcing for healthcare trips. Trips related to social gatherings, which would likely capture some alcohol use, was a popular purpose – especially among younger driver groups. A willingness to consider ridesourcing for a diverse trip purpose seems especially important to viability in rural markets. While airport transfers were popular, rider demand is needed to generate a reliable driver ride supply. Drivers may be interested in serving the market or a segment with a broader and more frequent set of origins, destinations and time periods.

Table 4.2 Interest in ridesourcing, by purpose and user group, among respondents with at least one trip purpose selected

	Region		Geography		Age Group				
Purpose	East	West	Rural	Urban	18-34	35-54	55-64	65-74	75+
Airport	73.3%	78.7%	78.6%	75.2%	76.4%	81.4%	75.5%	78.0%	51.2%
Dinner/Party	52.9%	60.8%	55.2%	57.3%	71.4%	71.2%	50.3%	35.0%	11.6%
Other	37.8%	33.1%	37.0%	35.0%	30.2%	35.9%	46.9%	30.0%	32.6%
Healthcare	18.3%	10.8%	18.2%	13.6%	6.0%	7.7%	15.6%	26.0%	48.8%
Work	13.2%	9.6%	7.8%	12.6%	11.1%	19.9%	9.5%	4.0%	7.0%
Shopping	7.5%	11.5%	15.6%	8.1%	7.0%	5.1%	9.5%	11.0%	32.6%
Region, n=647; Geography n=646; Age Group n=663									

Use frequency was also explored for insight regarding current practices and future growth. Among respondents that had used ridesourcing, a few times per year was the most common use rate with 88.7%. A few times per month and weekly, at 9.8% and 1.1%, respectively, were also indicated by small segments in the sample.

4.3 Incentive/Voucher Affects in Ridesourcing Market Activities

Ridesourcing companies have offered their own incentive programs to attract riders when entering markets. In addition, partnerships with other such as hospitality groups, liquor distributors, individual businesses, and traffic safety stakeholders have made these discount/voucher programs increasingly common (Figure 4.4). Among current ridesourcing users, 31.0% would be more inclined to use ridesourcing services if a discount or voucher was provided to reduce the trip cost. Among nonusers, the case was quite different where 69.0% indicated greater likelihood to use the ridesourcing mode in the future with this type of incentive. The interest in the incentive was significantly different between those respondents who were experienced and inexperienced with ridesourcing $\chi^2(1, N=949) = 148.48$, $p < .001$.

Figure 4.4 Voucher Example

Main effect of a voucher or discount in ridesourcing with age group contingency was significant ($F=104.29$, $df=4$, $p<0.001$). Three in four of the 18- to 54-year-old drivers were more likely to use ridesourcing if an incentive were available. This compares to about one-third in the 65- to 74-year group and an even smaller share of drivers 75 years and older (Figure 4.1). The 18-to-34 (*M=.76, SD=.43*), 35-to-54 (*M=.58, SD=.49*), 55-to-64 (*M=.46, SD=.51*) age groups varied significantly within and compared to the older driver age groups. Familiarity was similar for the older driver cohort, 65-to-74 (*M=.34, SD=.46*) and 75+ (*M=.30, SD=.46*), but these varied significantly from the other driver groups. Stakeholder groups worked with ridesourcing companies to offer discounts or vouchers during high-risk DUI days such as St. Patrick's Day. Some bars provide Lyft or Uber vouchers to their customers as regular business practice. Diversifying the rider pool may require additional programs and/or partnerships to gain great acceptance and serve relevant trip purposes with the older driver groups. Some programs have been initiated between healthcare organizations and ridesourcing companies which may increase older driver participation in the market. Growing these other trip market segments would benefit traffic safety in a more robust demand base beyond those seeking safe rides to avoid alcohol-impaired driving.

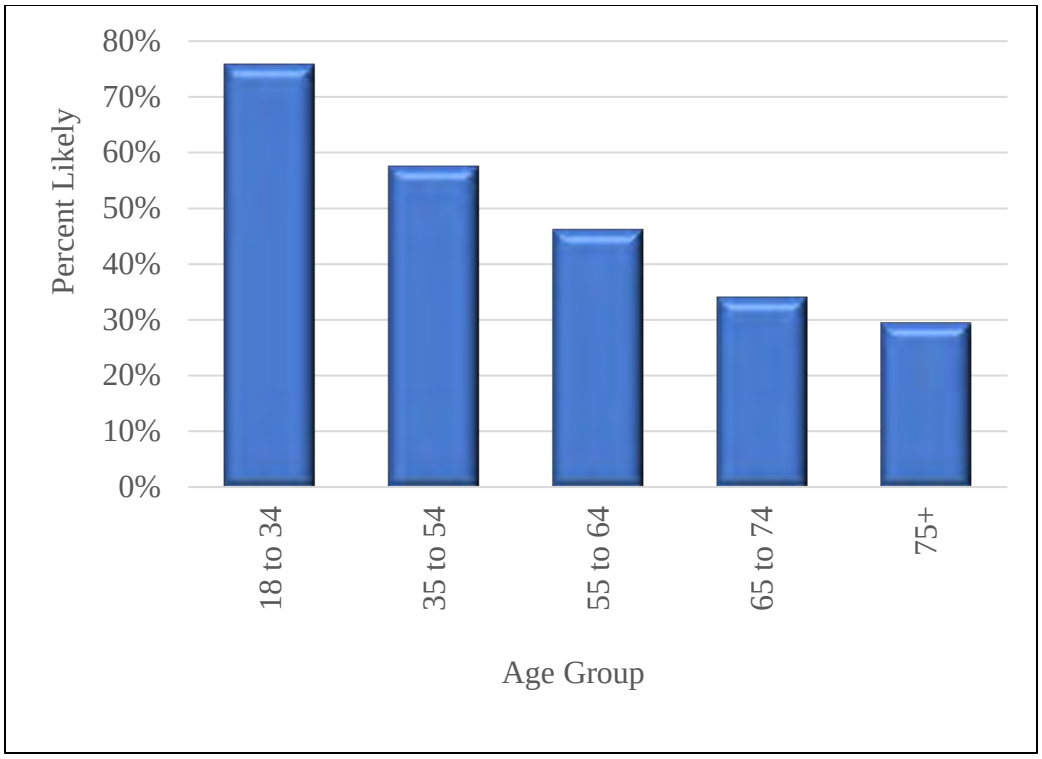


Figure 4.5 Likely to Use Ridesourcing with Discount or Voucher, by Age Group

4.4 Service Availability

A major challenge in rural areas is deficiencies in technological infrastructure. Ridesourcing services depend on adequate cellular service, which can be unreliable or unavailable in rural areas. Given that ridesourcing is not as frequently used in North Dakota, compared to major cities across the United States, a question regarding availability of ridesourcing services was investigated. Across the region and geography, about 1 in 5 respondents did not know if the ridesourcing services, such as Uber or Lyft, were available in their community. A significant difference was found comparing east and west regions in the state. The availability was greater for respondents in the east at 56.1% compared to 49.7% in the west $\chi^2(1, N=787) = 11.35$, $p < .001$. A service gap was evident when considering the geographic environment, with 85.1% in urban areas reporting service availability compared to 5.9% in rural areas $\chi^2(1, N=787) = 415.66.11$, $p < .001$. Among the respondents, approximately one in five (18.4%) did not know if they had ridesourcing services where they lived. About four in ten (39.1%) were likely to use the service if it was available. This share of "Do Not Know" (DNK) was slightly greater in the rural geography and the western region.

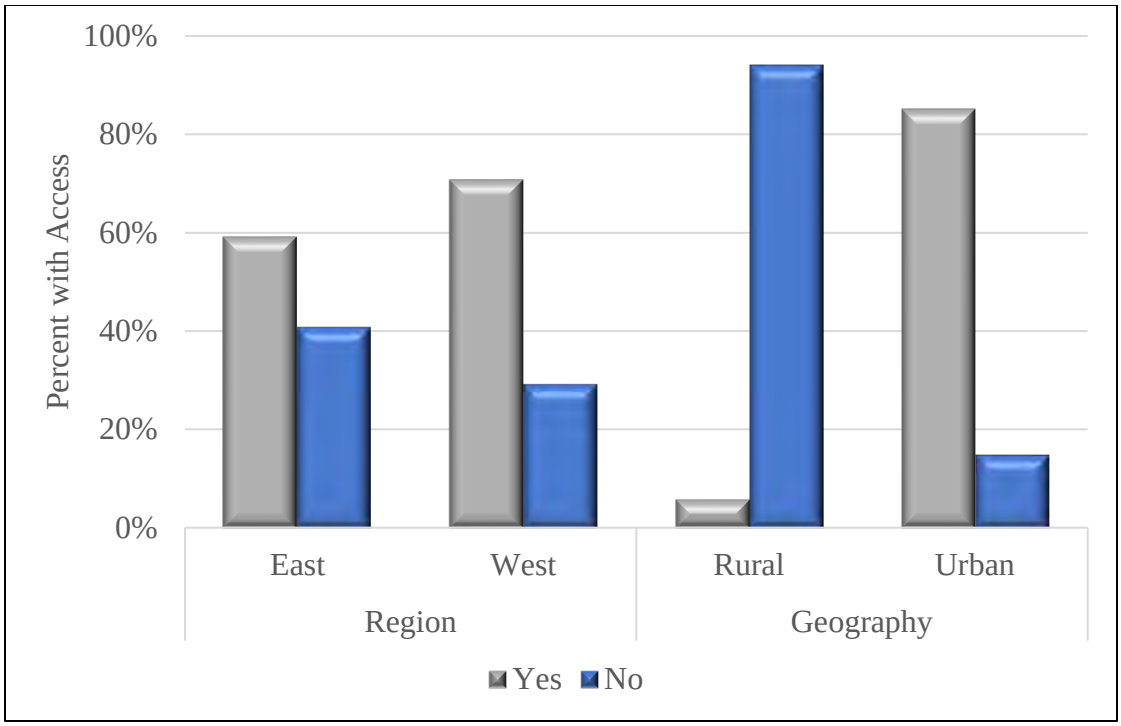
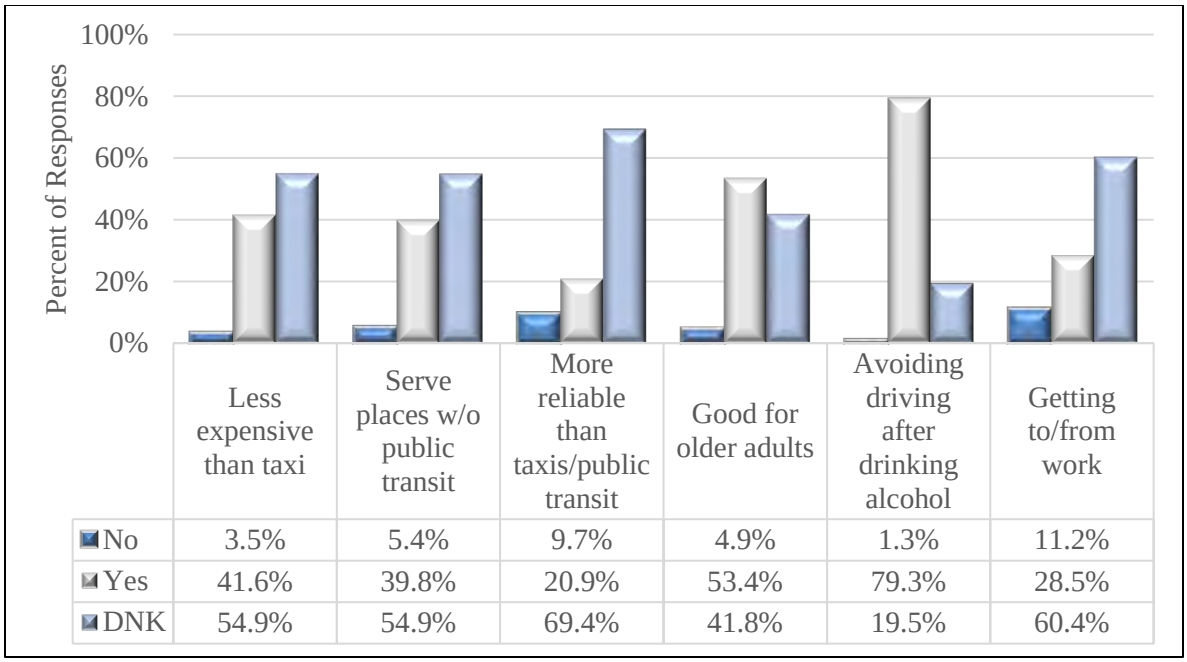


Figure 4.6 Ridesourcing Service Availability, by Region and Geography

4.5 Perceptions & Attitudes

To investigate public opinion toward ridesourcing services, participants were asked to respond to a set of statements about ridesourcing roles and characteristics. Statements regarding relative cost, accessibility, user-base and reliability were included (Figure 4.7). Lack of familiarity among respondents with ridesourcing service details was evident in the responses with a large share of DNK. The comparison to public transport reliability and taxi cost had the high uncertainty, with 60.7% and 50.4%, respectively responding DNK. This suggests that the DNK may stem from a lack of understanding or availability with regard to ride service modes.

Cost and reliability were areas of uncertainty where the market may look to building knowledge to expand rider and driver participation. However, it was interesting that the two market segments of high interest do have more clarity. The suggestion that ridesourcing may be a good option for older adult mobility and as a ride alternative to driving after drinking had a majority in agreement at 56.2% and 83.9%, respectively. A third market segment, workforce travel, also had support, with 31.4% seeing it as a good option, but over half of respondents (53.6%) were uncertain. This market segment, again, may benefit from additional educational efforts regarding ridesourcing services.



	Less expensive than taxi	Serve places w/o public transit	More reliable than taxis/public transit	Good for older adults	Avoiding driving after drinking alcohol	Getting to/from work
No	3.5%	5.4%	9.7%	4.9%	1.3%	11.2%
Yes	41.6%	39.8%	20.9%	53.4%	79.3%	28.5%
DNK	54.9%	54.9%	69.4%	41.8%	19.5%	60.4%

Figure 4.7 Perceptions of Ridesourcing Services

Two items in the perception statements were further analyzed by age group (Figure 4.8). The suggestion that ridesourcing may offer a safe alternative to driving after drinking was widely supported with at least one in seven respondents agreeing across all age groups. The highest level of acceptance among the youngest drivers was encouraging as they are typically associated with greater DUI likelihood. The youngest respondents were also more likely to be familiar with ridesourcing based on the typical user profile and the generational trend that they are increasingly more technologically adept. An interesting finding was that universities have partnered with ridesourcing businesses in their own ride safety programs (Ohio State University 2021; University of Central Florida 2021; University of Maryland Baltimore 2021).

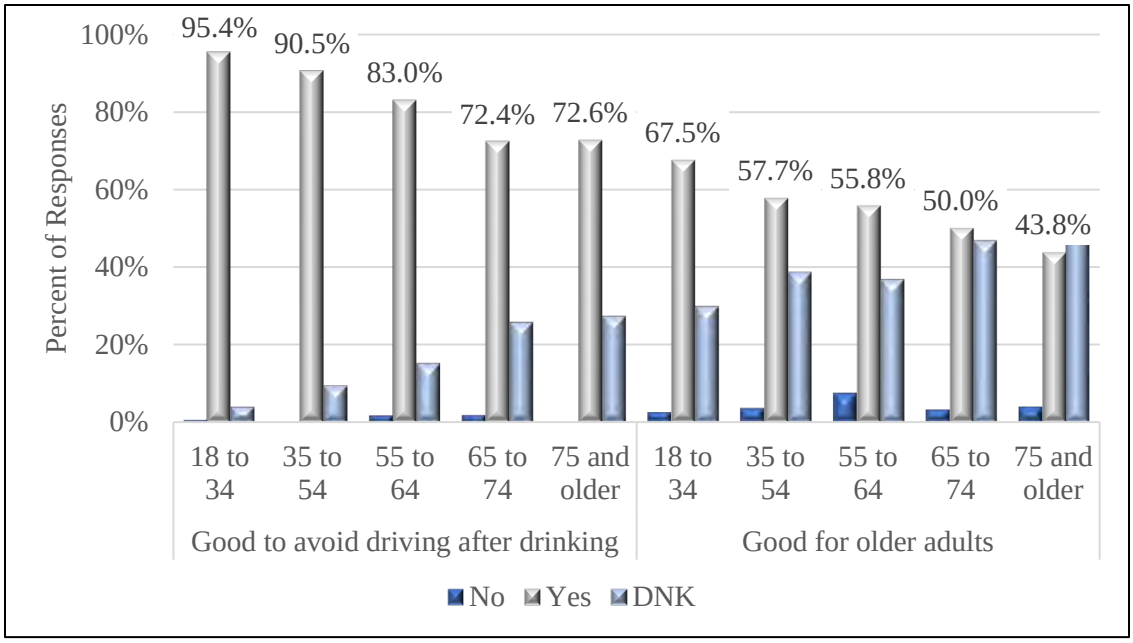


Figure 4.8 Ridesourcing option after drinking and for older adults

Aspects related to ridesourcing familiarity and technology availability and use appeared to influence the responses regarding ridesourcing as an alternative for older adults that need or want to reduce their time behind the wheel. However, it was noted that more than half of the respondents in each age group agreed it was a good alternative. The exception was among the drivers 75 years and older where the majority response was DNK. While the concept of ridesharing seems generally supported, a lack of understanding was evident, especially among the more mature driver cohorts that comprise the potential rider market segment.

It is important to point out the pattern that emerges when participant opinions are summarized. A frequent response from the survey across a simple average response to the questions was found to be DNK accounting for 44.5% responses across the six statements. This suggests that many respondents lacked a general understanding regarding the nature of ridesourcing services. Thus, the market may benefit from efforts to simply raise awareness of ridesourcing characteristics, function and services. This discovery reflects a need for knowledge improvement that, once satisfied, could bring positive change in a number of ways with regard to market development and stability.

4.6 Cost

North Dakotans were queried about their experiences with spending on ridesourcing services. Of those participants who had used ridesourcing services, they most frequently reported spending $6 to $15 for a typical ride (61.0%). Less than one percent reported they spent $50 or more on per ride. The average per ride cost in rural geographies of $11.99 *(SD=5.32)* was significantly higher than in urban geographies at $10.02 (*SD=8.70)* ($F=3.47$, $df=4$, $p<0.01$). Cost comparisons between the east and west regions were similar at $10.74 *(SD=7.54)* and $10.17 *(SD=7.26)*, respectively. The higher payment for the rural rides was not surprising given that these were likely for longer distances. In addition, the driver supply and rider demand functions in these

markets may be less stable resulting in fewer interactions to fulfill transactions competitively. It is encouraging that nil regional differences were found. Overall, this supports the notion that the urban centers, even in rural states, have established competitive ridesourcing markets. In addition, the magnitude in differences between the rural and urban geographies seems reasonable with the newer rural markets, with likely longer trip distances, about 20% higher.

The average paid for the on-demand ride services were significantly different among the age groups ($F=2.90$, $df=4$, $p<0.03$). Mean cost for each age group shows lower average ride payments were made by younger respondents at \$9.75 *(SD=7.31)* and \$9.87 *(SD=5.87)* for the 18- to 34-year-old and 35- to 54-year-old cohorts, respectively. The highest average ride payment was reported by the 65- to 74-year-olds at \$12.81 *(SD=7.76)*. The 55- to 64-year-old mean service payment was \$11.29 *(SD=8.87)* per ride. Only six payment values were available from drivers 75 years and older so the mean value of \$11.01 *(SD=7.12)* should be used with caution. The nature of the ride with factors such as on-demand versus scheduled service nature, trip distance and market location would influence these average ride payments. Information such as this may be helpful to novice riders seeking to know more about typical rates and reasonable payment ranges for ordering ridesourcing services.

To identify U.S. spending patterns for Uber and Lyft, Empower – a money-management app, looked at the transactions of 50,000 users in 32 major cities. San Francisco, CA, reported the highest monthly average of \$110 dollars spent on Uber and \$89 on Lyft. Columbus, OH, reported the lowest monthly average of \$26 spent on Uber, and \$23 on Lyft (Elkins, 2018). While fares vary widely, it does provide some context for discussing for-hire ride services with most urban fares ranging from \$10 to \$13 (Davidson, 2015). Rural areas may have wider fare ranges because longer average trip distances may be common. Because of the uncertainty about for-hire ride services, basic knowledge that prices are estimated when a ride is requested to allow the rider to decide whether to use them may be helpful. Experiencing this service request would also provide insight regarding provider service options such as on-demand standard and scheduled in advance (Helling, 2021).

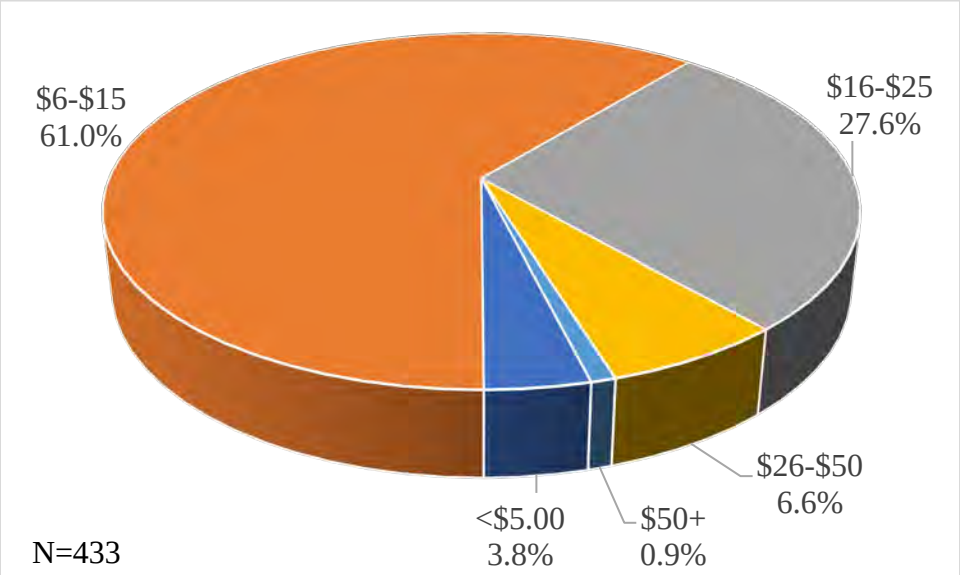


Figure 4.9 Payment Per Ride

The extended trip length and broader possibilities in rural market demand may, however, emerge if market segments such as airport, medical care and other urban-center linked destinations become increasingly viable. Newer demand-based service options do allow riders to schedule rides up to a week in advance which may more easily facilitate market interactions for these longer, appointment-type trips. The payment results are shown in Table 4.3, summarizing results by region, geography and age group.

Table 4.3 Payment per Ride with Region, Geography and Age Group Contingencies, 2020

	Region		Geography		Age Group					
Average Ride Payment	East	West	Rural	Urban	18-34	35-54	55-64	65-74	75+	18-34
<$5.00	0.9%	6.6%	2.2%	4.3%	2.9%	6.6%	2.0%	4.5%	0.0%	3.8%
$6-$15	61.0%	61.1%	49.4%	64.3%	67.6%	59.1%	59.2%	44.5%	58.9%	61.0%
$16-$25	30.9%	24.3%	39.3%	24.3%	23.9%	29.1%	29.6%	33.5%	32.0%	27.6%
$26-$50	6.2%	7.0%	8.1%	6.2%	4.5%	5.2%	7.0%	17.6%	9.1%	6.6%
$50+	0.9%	0.9%	1.1%	0.9%	1.1%	0.0%	2.2%	0.0%	0.0%	0.9%

4.7 Drinking & Driving

A key objective in the survey was to identify if ridesourcing plays a role in reducing alcohol-impaired driving. North Dakota was ranked 3rd of 50 states as most reported episodes of binge drinking by the CDC in 2018 so understanding ride alternatives is important in mitigation strategies (CDC, 2021b). The prevalence of binge drinking in North Dakota is not waning based on self-reported health behaviors (Kanny et al., 2020). Therefore, we can posit that if Uber or Lyft type ridesourcing services could be used as alternatives to driving after alcohol consumption, fewer alcohol-related traffic crashes would likely occur. The use of ridesourcing services after alcohol consumption was investigated in-depth as a potential traffic safety strategy.

About 18% of participants indicated that they do not drink alcohol, while the remaining participants reported whether they have used on-demand ridesourcing service (Uber, Lyft, e.g.), taxi, public transit, or other methods to get home after drinking. About 36.0% of respondents reported using ridesourcing as an alternative mode to driving after drinking alcohol (Figure 4.10). Taxi was close as a second reported mode at 33.1%. Public transit options were used in the past by at least one in five respondents. Bike share was an interesting find, with 16.9% reporting this as a chosen ride alternative to driving. Other modes, such as biking, designated drivers and walking, were less commonly reported.

An important statistic that underlies this question in the survey is that more than half of the respondents that reported drinking had not used any alternative to self-driving. While some participants may have limited their alcohol consumption, it seems reasonable to assume that many respondents may have found themselves behind-the-wheel while experiencing some level of alcohol-related impairment. The limited alternative ride access, and/or lack of understanding

about these services, may factor into this problem. Cultural rural independence and widely dispersed populations have also been traditional contributors to chronic alcohol-impaired driving behaviors.

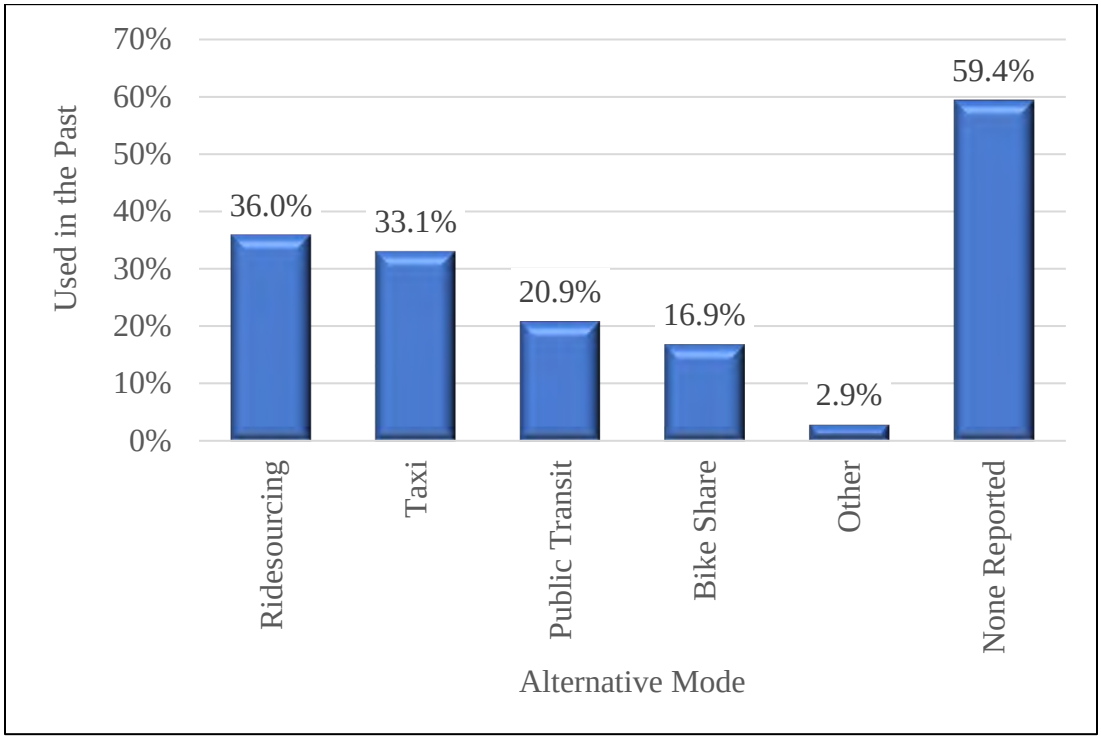


Figure 4.10 Alternative Modes Used to Avoiding Driving After Drinking, Among Respondents that Drink Alcohol

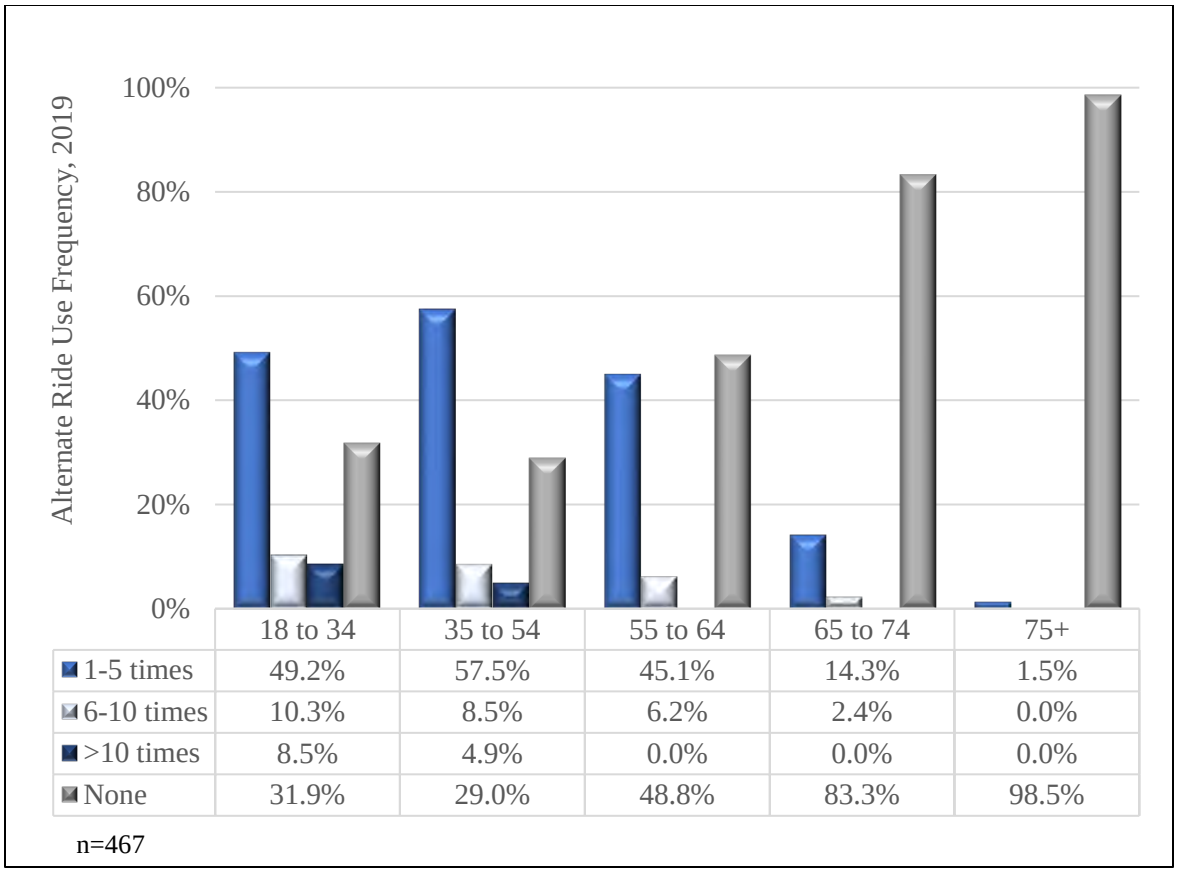
Detailed distribution for service used to avoid driving after drinking responses are presented in Table 4.4. The information may be useful in focusing on encouraging ride alternative based on current practices, considering geography and age group. Considering alternative ride modes used after drinking, generally, no significant differences in participation levels were found between regions or genders with the exception of taxi use by gender with less use among females $\chi^2(1, N=798) = 8.01$, $p < .01$. Considering geography, the use by rural residents was significantly lower than urban $\chi^2(1, N=798) = 4.32$, $p < .04$.

The insight is valuable for more effectively directing messaging/education regarding the specific services and user subpopulations based on other cohort groups. It could also be a source of information for growing more commonly used alternatives among and across subpopulations. This alternative ride use would be beneficial in terms of safety outcomes and increased market demand for these services. Related to this potential increase in demand, respondents were asked about driving for on-demand providers like Uber and Lyft. Among 933 responses, three in four were not interested. About 14% expressed interest in the idea while 1% reported they were currently a driver with one of the on-demand providers.

Table 4.4 Ride Alternatives Used to Avoid Driving After Drinking

	Region		Geography		Age Group					
Service Used	E	W	R	U	18 to 34	35 to 54	55 to 64	65 to 74	75+	Total
Responses Among those that Drink Alcohol										
On-Demand	34.3%	37.7%	30.2%	38.1%	72.8%	48.8%	29.3%	6.7%	1.1%	36.1%
Taxi	17.2%	16.7%	16.7%	17.0%	27.2%	28.9%	16.0%	3.6%	0.0%	17.0%
Transit/Bus	1.4%	1.4%	2.5%	1.0%	3.1%	2.4%	0.0%	0.0%	1.1%	1.4%
Other	2.2%	0.8%	2.0%	1.3%	2.1%	1.8%	1.7%	1.2%	2.2%	1.8%
Do Not Drink	*17.0%*	*20.0%*	*16.0%*	*19.0%*	*13.0%*	*17.4%*	*17.4%*	*19.9%*	*27.6%*	*18.2%*
n=798 drink alcohol; n=178 do not drink										

Note that out of 977 participants, approximately 20% indicated that they do not drink alcohol, thus, implying that 80% participants may potentially drive after drinking. A combined total of 467 of responses indicated either using one of the mentioned services, or not drinking alcohol, during 2019 (Figure 4.11). Among those reporting use in 2019, the most common use frequency was within the one to five alternative ride range (78.4%). Among more frequent users, 13.6% report using it six to ten times and 8.1% used it eleven or more times. The expected lower use rates were found among the older respondent groups with less than one in five reporting any use frequency for 2019. The lower range in the 18- to 34-year-old group may reflect that part of this group would be less likely to be at bars until they are at least 21 years old. Thus, this figure may be skewed in comparing the two youngest age groups.



	18 to 34	35 to 54	55 to 64	65 to 74	75+
1-5 times	49.2%	57.5%	45.1%	14.3%	1.5%
6-10 times	10.3%	8.5%	6.2%	2.4%	0.0%
>10 times	8.5%	4.9%	0.0%	0.0%	0.0%
None	31.9%	29.0%	48.8%	83.3%	98.5%

n=467

Figure 4.11 Frequency of Ride Alternative Used to Avoid Driving After Drinking during 2019

Among respondents, 42.1% have used a ride alternative to avoid driving after drinking. This group was likely a subset of the dinner/party category in Table 3.1. A majority (58.3%) were more likely to use ridesourcing if a voucher or discount was offered. Within the cohort indicating they do consume alcohol, 54% were more inclined to use on-demand ride services if they were current users while significantly less, only 16%, that had not used these services in the past would be more likely to use them $\chi^2(1, N=821) = 127.42$, $p < .001$. The difference was not significant by region or gender, but only 44% of rural residents, among current users, more were inclined with a voucher or discount, compared to 56% in urban settings $\chi^2(1, N=277) = 3.68$, $p < .06$). Among the group consuming alcohol, 53% had not previously used on-demand ride services to avoid driving after drinking. Figures were similar with only 47% of rural residents having their interest piqued with the voucher or discount compared to 54% in the urban areas $\chi^2(1, N=522) = 9.23$, $p < .01$).

The effect of incentives did vary significantly, by age group, among drivers that reported using alternative ride services to avoid driving after driving ($F=247.51$, $df=2$, $p<0.001$). About four in ten of 18- to 34-year-old *(M=.80, SD=.41)* respondents were more inclined to use the services with the discount (Figure 4.12). Appeal to the older driver cohorts was similarly low with the 65-to-74 (*M=.07, SD=.26*) and 75+ (*M=.01, SD=.10*) age groups. Age groups varied significantly within and compared to the other driver age groups among those age 35 to 54 (*M=.59, SD=.49*) and 55 to 64 (*M=.44, SD=.53*). These results were similar to those for ride service use across the larger set of trip purposes.

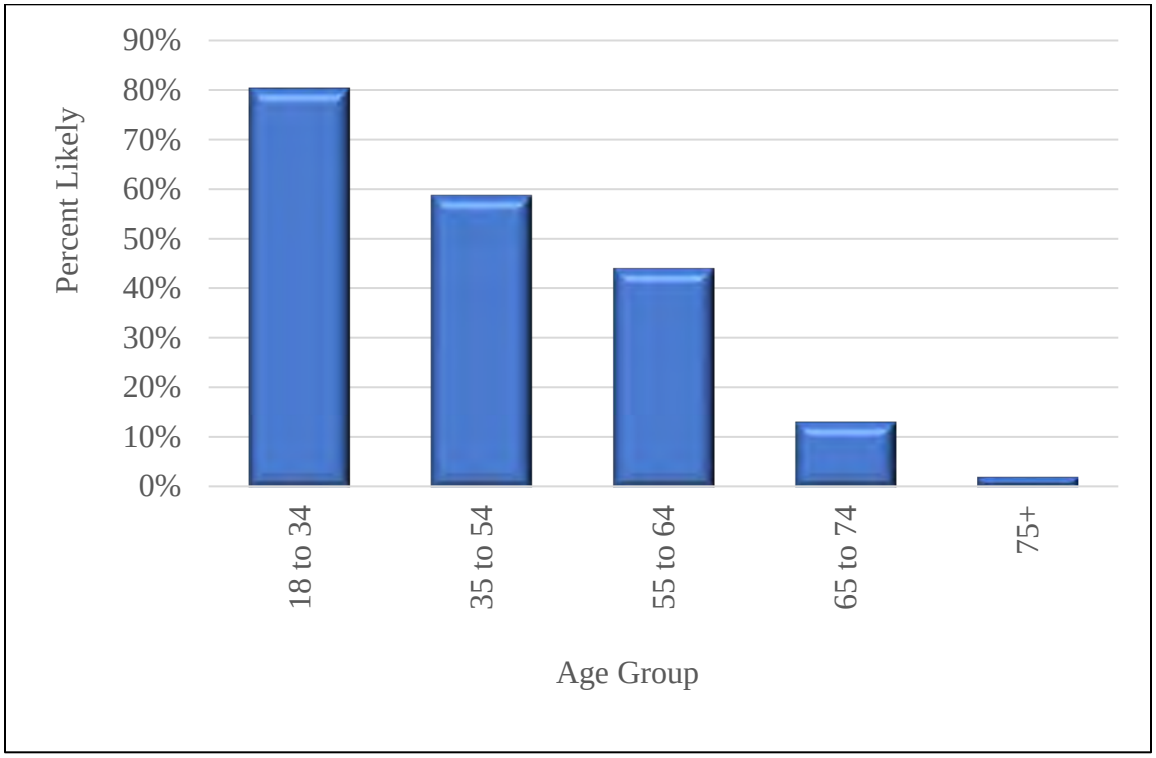


Figure 4.12 Likely to Use Ridesourcing with Discount or Voucher, by Age Group Among Respondents that Indicated Alcohol Consumption

5. CONCLUSION

While ridesourcing has become a popular transportation option in urban areas, the future of ridesourcing services in rural regions remains ambiguous. This mode is highly agile in reacting to market demand and reaching a multitude of locations. It is also attractive from a safety perspective as an alternative to driving after drinking for rural areas with few alternatives to self-driving. Ridesourcing companies continue efforts to try to make services more accessible in rural and remote areas. However, low population density and longer travel distances are challenges to a stable demand that typically attracts drivers. Moreover, it remains unclear how many people in rural areas would actually use these services, should they be more widely available. Therefore, the goal of this study was to better understand the demand environment in North Dakota, as a highly rural state. Understanding public perceptions and practices is key in the potential to facilitate ridesourcing market growth. This research focused on the demand factors in the ridesourcing market to determine which of those factors may have a significant impact on popularizing these services in the rural context.

A survey of adult drivers revealed one in ten were familiar with ridesourcing services such as Uber and Lyft, and that about half of those had used such services. The technology does pose an obstacle. While 97% reported they had cellular service, only 87% were using a smartphone that would enable them to participate in this market. Beyond accessibility, cost was considered a key factor. The average ride cost was most frequently between $6 and $15, which reasonably compares to the national average. Interestingly, two market demand segments of high interest do have more clarity with regard to potential market growth. The suggestion that ridesourcing may be a good option for older adult mobility and as a ride alternative to driving after drinking had a respondent majority in agreement at 56.2% and 83.9%, respectively. Responses across several topics, such as familiarity, accessibility, and incentives, make it evident that education about ridesourcing services may be beneficial.

Also note that, in investigating alternative modes to driving after drinking, it was estimated that more than half of the participants that indicated that they do consume alcohol did report using ride alternatives. It may be presumed that others opted to drive under the influence of alcohol, posing a topic for future investigation. Practices in other rural states maybe informative – especially related to success of ridesourcing in remote areas. Periodic surveys regarding alternative ride uses, especially as an impaired driving alternative paired with a continuous campaign to inform the public about ridesourcing may also prove beneficial in understanding market segment demand and growth. Monitoring the supply side terms of driver counts and/or incentive redemptions may also be helpful in gauging market stability. While limited to a single state, sustaining information on these factors will enable more informed, data-driven decisions of evolving trip modes and ride alternatives in North Dakota.

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