

Workforce Planning and Human Resource Development Strategies for Minnesota's Public Transportation Agencies

Kenneth Bartlett, Principal Investigator

Department of Organization Leadership, Policy, and Development
University of Minnesota

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FINAL REPORT

Prepared by

Dr. Kenneth Bartlett (Principal Investigator; corresponding author: bartlett@umn.edu)
Dr. Joshua Collins
Tasha S. Hart-Mrema
Michael Valesano

College of Education and Human Development
Department of Organizational Leadership, Policy, and Development
University of Minnesota

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LIST OF ABBREVIATIONS

ANOVA- Analysis of variance

BLS- Bureau of Labor Statistics

COVID- Coronavirus

CTS – Center for Transportation Studies

DOT- Department of Transportation

HRD- Human Resource Development

HRM- Human Resources Management

LRRB – Minnesota Local Road Research Board

MnDOT- Minnesota Department of Transportation

MRANK- Mean Rank

NDDOT – North Dakota Department of Transportation

NMISS- Number of Missing

PTO- Paid Time Off

PE- Professional Engineers

RNK- Rank

SCOPE- Situation, Core competencies, Obstacles, Prospects, and Expectations

SHRM- Society of Human Resource Management

SPSS- Statistical Package for the Social Sciences

STEM- Science, Technology, Engineering and Mathematics

SWOT- Strength, Weakness, Opportunity, and Threat

TAP-Technical Advisory Panel

EXECUTIVE SUMMARY

This study explored and examined possible causes of the workforce shortage in Minnesota's transportation industry. Appropriate human resource strategies were proposed in response. An initial literature review provided the foundation to inform the development of an online questionnaire, subsequent audio interviews, and final recommendations to help guide future practices for recruitment and retention of skilled workers. Participants included employees, contractors, supervisors, and potential employees within Minnesota's transportation industry. After gaining greater understanding of the current — as well as the likelihood of future — driving forces that may contribute to the workforce shortage, the focus of this project shifted to consider optimum strategies in response. Specifically, recruitment, retention tactics, and human resource development (HRD) strategies, including various approaches to on-the-job training and online learning, from both the public and private sector, were examined to identify a range of workforce planning and development solutions. As such, the project sought to:

- Explore and examine possible causes of the workforce shortage in Minnesota's public transportation industry
- Understand the dichotomy between technical workers and engineers
- Identify strategies already in place to address the shortage in regard to recruitment and retention
- Identify appropriate HRD strategies to address the shortage

Four interrelated approaches were undertaken: 1) a literature review, 2) a questionnaire, 3) audio interviews, and 4) integration of data to generate recommendations for Minnesota's public transportation agencies that may be affected by the workforce shortage.

The findings show a general level of agreement for a shortage of qualified individuals. Generational differences in the context of the transportation industry appear to operate differently than in other sectors. Additional investigation is needed to further examine if the difference in perceptions is more prominent at the industry or organizational level. When asked about recruitment strategies that are being implemented by their organization or agency, 17.4% of respondents report that nothing is being done. The stated benefits of working for public agencies include job stability, set work hours for some positions, and work-life balance. Constraints of working in the public sector largely deal with inflexible regulations, politics, and the complex barriers that managers have to go through to bring on new employees. Interviewees expressed overall satisfaction with their agency, but several noted problems that reflect bureaucratic policies. Standard pay scales, preferences for seniority, and lack of transparency for job roles are believed to be significant contributors to the workforce shortage.

In this report, we recommend a holistic approach to developing Minnesota's public transportation industry through purposive change that focuses on existing opportunities related to the state's and the nation's changing demographics, as well as significant cultural shifts related to the meaning and purpose of work.

CHAPTER 1: INTRODUCTION

1.1 BACKGROUND INFORMATION

There is increased recognition of the importance of future human resources projections needed to help organizations and industries counteract potential disruptions through labor shortages, high turnover, as well as employee knowledge and skills non-aligned with a rapidly changing and dynamic external environment. The transportation industry has been noted for a severe and growing workforce shortage. Further, the dual impacts of insufficient new workers entering the field and difficulty in the retention of current employees have created challenges for local agencies to find staff to deliver projects and services. These problems are especially acute for technical workers including engineers, engineering technicians, surveyors, and surveying technicians in Minnesota's transportation public agencies.

Significant demographic shifts can result in challenges that contribute to the overall complexity of the labor market as well as within the workforce of specific industries. A large percentage of workers in the public transportation industry are retiring, which has created a shortage of skilled workers. Added to this are issues of career awareness for recent university graduates and other potential employees seeking entry into the workforce. Further, new technology, emerging forms of contingent employment, and organizational restructuring can also create or magnify labor shortages. There is a need to examine and better understand the causes and consequences of the current workforce shortage. This includes reviewing global and localized workforce trends as well as current and projected labor market analyses of the public transportation industry. A more focused examination is needed to analyze effective recruitment and retention practices used within the public transportation industry. This consists of the types of incentives, onboarding, and training processes that are aimed at reducing attrition rates and fostering workforce development within the industry. The purpose of this report is to summarize highlights from a review and survey of key labor market and workforce trends and impacts to the transportation workforce employed in public agencies in Minnesota. This research benefits Minnesota taxpayers by providing data to identify key trends that can have a significant impact on the transportation workforce in Minnesota's public agencies. Recruitment challenges, due to workforce shortages, require additional time and resources to find and hire employees. High turnover also increases agency expenditure with additional recruitment efforts and training needed for new hires. In addition, high turnover impacts agency staff with vacant positions resulting in overwork, often with overtime, and increased workplace stress. Consequently, workforce shortages and low retention are critical issues with significant potential impacts on the efficiency, effectiveness, and costs for providing and maintaining a transportation infrastructure to support state needs. Understanding the causes of workforce shortages will allow informed examination of appropriate recruitment, retention, and human resource development strategies to benefit agencies experiencing challenges and help those with no or minimal impacts avoid future disruptions. Understanding the causes of workforce shortages will allow an informed examination of appropriate recruitment, retention, and human resource development strategies to benefit agencies that are experiencing challenges while also helping those with no or minimal impacts avoid future disruptions. The study can benefit Minnesotans by improving the

effectiveness and efficiency of public transportation projects and services provided by agencies adopting a forward looking, proactive, and strategic approach to workforce planning.

1.2 PURPOSE AND OBJECTIVES

This study explored and examined possible causes of the workforce shortage in Minnesota's transportation industry. Appropriate human resource strategies were proposed in response. An initial literature review provided the foundation to inform the development of an online questionnaire, subsequent audio interviews, and final recommendations to help guide future practices for recruitment and retention of skilled workers. Participants included employees, contractors, supervisors, and potential employees within Minnesota's transportation industry. After gaining a greater understanding of the current — and the likelihood of future — driving forces that may contribute to the workforce shortage, the focus of this project shifted to consider optimum strategies in response. Specifically, recruitment, retention tactics, and human resource development strategies, including various approaches to on-the-job training and online learning, from both the public and private sectors, were examined to identify a range of workforce planning and development solutions. As such, the project sought to:

- Explore and examine possible causes of the workforce shortage in Minnesota's public transportation industry
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- Identify strategies that are already in place to address the shortage in regard to recruitment and retention
- Identify appropriate human resource development (HRD) strategies to address the shortage

Four interrelated approaches are undertaken: 1) a literature review, 2) a questionnaire, 3) audio interviews, and 4) Integration of data to generate recommendations for Minnesota's public transportation agencies that may be affected by the workforce shortage. To evaluate the proposed recommendations, a SCOPE analysis is used. More information about the multiple approaches utilized in this study are presented below.

1.3 APPROACH

A sequential multiple-methods approach was used to gather data for this study. This allowed for an in-depth understanding of factors impacting Minnesota's public sector transportation workforce. An online survey, transcribed audio interviews, and digital focus groups were used. The survey was intended to provide insight into job satisfaction, work engagement, and general perceptions of Minnesota's transportation workforce. Survey items were structured such that open- and closed-ended responses could be provided. The survey was utilized to statistically quantify relationships between job satisfaction, work engagement, turnover intention, and general perceptions of the workforce. Audio interviews were conducted to gain more insight into some of the more subjective open-ended responses obtained from the survey. Initially, focus groups were expected to contribute to a third phase of data collection. However, due to time constraints and difficulty soliciting participants for in-person sessions during the COVID-19 pandemic, the length of some audio interviews was expanded to have

respondents describe their thoughts on the workforce shortage, explore the feasibility of some preliminary ideas on how to address the shortage, and provide their general input about the transportation industry as a whole. Data from each phase of this study were integrated to develop a comprehensive assessment of perceptions on what might be contributing to the shortage as well as what might be acceptable methods for addressing the shortage. This study was approved by the University of Minnesota’s Institutional Review Board and findings were situated and presented within the SCOPE situational analysis framework.

1.4 DATA ANALYSIS

Data analysis included descriptive assessments and a comparative investigation of emergent themes from the preliminary results obtained through each phase of data collection. Where appropriate, statistical assessments were used to consider if, and at what strength, differences in workforce planning, recruitment, retention, and training strategies existed. Differences were grouped and assessed by comparing the demography of employees in urban/rural agencies, age, education (type and level), and gender. A synthesis and integrated evaluation of all findings were then presented within the SCOPE Situational Analysis framework.

1.5 APPLYING THE SCOPE FRAMEWORK

In addition to presenting the results individually from each data collection approach, collective findings are integrated and presented within the SCOPE Situational Analysis framework. The premise behind SCOPE is to offer an analysis that takes a 360-degree view, encompassing past, current, and future perspectives impacting the workforce. A SCOPE situation analysis includes examination of the following attributes: situation, core competencies, obstacles, prospects, and expectations. Use of the SCOPE framework has emerged as a more strategic and forward-looking extension of the SWOT analysis (Strengths, Weaknesses, Opportunities, Threats). Presentation of data within the SCOPE framework easily allows for the identification of optimal characteristics associated with workforce planning, recruitment/retention strategies, and HRD through a more holistic lens to aid discussion and implementation of recommendation strategies at the agency level. Figure 1 displays the five aspects included in a SCOPE analysis as it relates to this project.

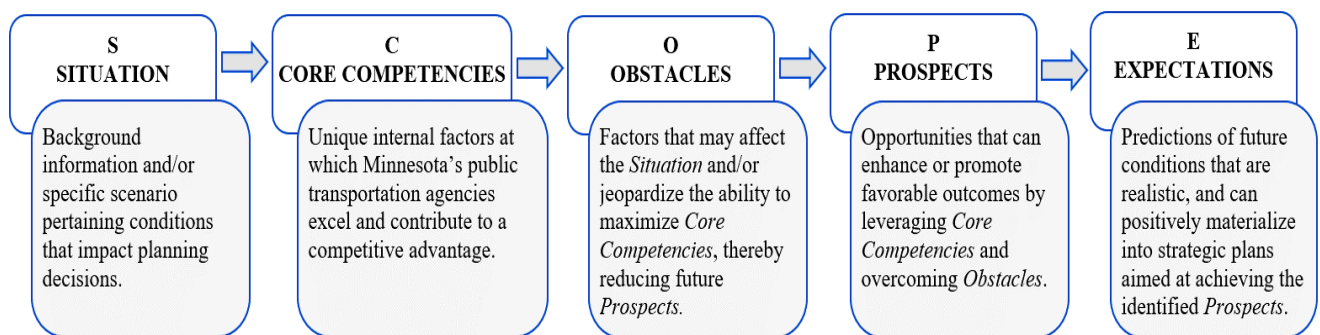


Figure 1: SCOPE Analysis Framework

CHAPTER 2: TASK I: LITERATURE REVIEW

This literature review examines published academic research, technical reports, and industry-based resources that are focused on workforce demographics, labor market analysis methods, and the possible causes and status of current and projected workforce shortages in public transportation agencies. Additionally, this review covers existing and emergent recruitment, retention, and re-skilling tactics, as well as, the evaluation of human resource development (HRD) strategies. Such strategies often include on-the-job training, mentoring, online learning, and career planning and development. Further, this literature review seeks to assess existing and emergent innovative recruitment tactics by examining approaches to employee engagement and retention within other state DOTs. Sources were identified using keyword searches through multiple databases including Google Scholar, U.S. Bureau of Labor Statistics, U.S. Department of Labor, Transportation Research Board, University of Minnesota Center for Transportation Studies, and the online archives of the Minnesota Department of Transportation (MnDOT) Library. Discussion for improving retention within larger public transport agencies, including MnDOT, was informed by anonymous employee feedback posted on reputable on-line job boards. Sources were chosen based upon relevance to search terms and the year published. Sources published before 2002 were largely excluded due to the substantial difference in workforce demography and the impact of current trends and contemporary conditions. The structure and scope of the literature review were guided by Torracó's (2016) work on "integrated literature reviews" as a method for a distinctive form of research that uses existing literature to create new knowledge. It should be noted that this literature review takes a holistic funnel approach to analyze trends in the transportation workforce. General trends were explored at the national level, while utilizing relevant information to narrow the focus on factors that may be of use to the state of Minnesota.

2.1 WORKFORCE DEMOGRAPHICS

Every two years the U.S. Bureau of Labor Statistics (BLS) utilizes U.S. Census Bureau data to make projections in four key areas related to the workforce: population and labor force, aggregate demand, industry output and employment, and occupational employment. U.S. Census Bureau population projections include assumptions about future fertility, mortality rates, and immigration. The BLS utilizes this data to develop macroeconomic projections, including measuring the rate and level of growth of the labor force with overall and segmented labor force participation rates over the next 10 years. Labor force statistics are analyzed and projected alongside more than 1,000 variables, behavioral economic equations, and identities including gender, age, race, and ethnicity. The BLS uses macroeconomic projections to estimate more specific models for hundreds of individual industries. The labor force (the number of people working or looking for work) and the labor force participation rate (people available for work as a percentage of the total population) are two of the key measures in labor market analysis.

2.1.1 Labor Force

The BLS labor market projections depict a U.S. labor force that will continue to grow slowly, age rapidly, and become more diverse. The most recent projections show the labor force to grow at a compound

annual rate of 0.6 percent between 2016-2026 (Lacey, Toossi, Dubina, & Gensler, 2017). Historically, the labor force was highest between 1970-1980 growing by 2.6 percent, with a subsequent decline during every decade since. Between 1994-2004 the labor force grew by 1.3 percent on average, however, the growth rate was cut in half in the following decade, between 2004-2014, when the growth rate slowed to 0.6 percent (Lacey et al., 2017). The substantial decrease in labor force growth between 2004-2014 can be attributed to the shifting demographic composition of the labor force (Toossi, 2015). Specifically, the ageing of the large “baby boom” generation has had significant dampening effects on the labor force growth rate. The baby boom generation (individuals born 1946-1964) were of prime working age in the year 2000 and every year since have moved closer to retirement eligible age. The U.S. labor force is currently in the midst of experiencing this generational shift as the average baby boomer is between 56-74 years old in 2020. The eldest of the baby boom generation reached full retirement at age 66 in 2012 while the youngest will reach age 66 in 2030. The continued aging of this generational cohort will have lasting effects on the labor force growth rate for decades to come (Toossi, 2015)

2.1.2 Labor Force Participation

Much like the labor force growth rate, the labor force participation rate peaked between 1997-2000 at 67.1 percent and has steadily declined ever since (The Economics Daily, 2017). Following a sharp decline during the 2007-2009 recession, the participation rate was recorded at 62.8 percent in 2016 which equals a 4.3 percent drop since 2000. The current participation rate is predicted to continue to decline to 61.0 percent by 2026 (The Economics Daily, 2017). The decline in the participation rate can largely be accredited to the ageing labor force population. For context, the entire baby boom population had a labor force participation rate of 83.8 percent in 1996 (The Economics Daily, 2017). As the baby boom cohort continues past prime working age and into age groupings that have had historically low participation rates, the labor force participation rate is expected to continue to drop.

2.1.3 Changing Demographics

The future U.S. workforce is aging, and it will continue to age with a median age expected to rise from 42.0 years in 2016 to 42.3 in 2026, potentially the highest level ever recorded (Lacey et al., 2017). Projections in Table 1 show the fastest growing workforce age group to be 75 and older, followed by the 65 to 74-year-old age group. While enrollment numbers in college and post-secondary institutions continue to rise, the 16-24 age group is predicted to continue to experience declining labor force participation rates, as it has over the past several decades.

Table 1: Labor Force Participation (Actual & Projected), by Age Group

Age Cohort	1994	2004	2014	2024
16 to 24	66.4%	61.1%	55.0%	49.7%
25 to 54	83.4%	82.8%	80.9%	81.2%
55 to 64	56.8%	62.3%	64.1%	66.3%
65 to 74	17.2%	21.9%	26.2%	29.9%
75 and older	5.4%	6.1%	8.0%	10.6%
Total	66.6%	66.0%	62.9%	60.9%

Note. Bureau of Labor Statistics

The U.S. labor force, in addition to becoming older, is projected to become more diverse in a number of ways including but not limited to gender, ethnicity, culture, religion, sexual orientation, and disabled. The percentage of women in the labor force is expected to grow at an annual rate of 0.8 between 2016-2026 while the percentage of men is projected for an annual decrease of 0.5 percent (Lacey et al., 2017). Immigration, despite recent policy changes, remains a key driver of population growth and projections show Asian and Latino/a [U.S. data sources use the term Hispanic] immigrants will increase the percentage of minorities entering the workforce in comparison to the previous decade. By 2030, net migration is expected to be the primary cause of population growth in the U.S. (Toossi, 2015). Immigration, and especially of higher skilled workers, could help close but will not eliminate gaps resulting from shifts in labor-force participation. Hispanic labor force levels have significantly increased from 13.1 percent in 2004 to 16.3 percent in 2014 and have been predicted at nearly 20 percent in 2024. The significant rise in the Hispanic labor force level can be attributed to the substantial population growth coupled with an extremely high labor participation rate (Toossi, 2015) more than legal and illegal immigration. Concurrently, the predicted share of the white non-Hispanic labor force is expected to continue to decline, as it has been over the past several decades. Recent research of public sector employment following the Great Recession of 2007-2009 shows concerning inequality impacts for black [U.S. data sources use the term African American] workers (Laird, 2017). More specifically, black public sector workers are concentrated in shrinking sectors of the economy and are more likely than white and Hispanic public sector workers to experience job loss. Until recently, there was little evidence of how the changed demographics of the new workforce could impact transportation planning, policy, and practice (Pisarski, 2018).

2.2 PUBLIC TRANSPORTATION INDUSTRY

The public transportation industry has been in a constant state of evolution over the past 15-25 years in response to an increasingly fast changing society. Changes of technology, the environment, demography, and legislature and compliance requirements have demanded substantial adjustment for the public transportation industry and its composite agencies and organizations (Hinkeldein, 2009; U.S. Dept. of Labor, 2007). In instances where the industry has had the capacity and malleability to evolve along with societal trends, public transportation agencies have created more sustainable and efficient operations, adopted new realms of technological possibility, and has identified the need to create a more sustainable and inclusive workforce. However, as the public transportation industry is keeping pace with changes in certain areas, it has been severely challenged and is losing ground in other areas. Specifically, the public transportation industry is in the midst of a severe and growing workforce shortage in which many agencies and the industry as a whole have reported substantial difficulty recruiting, retaining, and developing skilled workers. How public transportation organizations respond to the current workforce shortage will have severe impacts on the future of the entire industry as well as all areas of society impacted by the safe, sustainable, and cost-effective transportation system operation.

2.2.1 Public Transportation Workforce Changes

The retirement of the baby boomer generation is an especially acute problem within the public transportation industry as it is expected that 50% of the public transportation workforce will become eligible for retirement over a 10-year period (B. Cronin et al., 2011; Transportation Research Board, 2003). Though the public transportation industry is not alone in experiencing this extreme high level of retirement over a short span of time, it is more than double the rate for the nation's entire workforce (B. Cronin et al., 2011; Hartsig, 2017). A workforce turnover rate of this magnitude has the potential to create significant gaps in intellectual capital across public transportation organizations. As a way to help alleviate the loss of intellectual capital into retirement Cronin et al. (C. B. Cronin et al., 2017) has suggested that the public transportation industry invest in the development and implementation of knowledge management systems to ensure vital information is not lost from retiring workers. This is a critical area for future research.

Historically, public transportation organizations have struggled to achieve a diverse workforce that reflects the demographics of the local area or the larger labor force (C. B. Cronin, Alexander, Cronin, B., Riches, & Stern, 2013; U.S. Dept. of Labor, 2007). Ivey, Powers, and Clark (2019) recently outlined the reasons diversity is important in the transportation industry workforce as well as the factors that have made recruitment and retention of under-represented populations a challenge. Traditionally, tenure has been attained in the public transportation industry through seniority which has resulted in male Caucasians gaining promotion at a higher rate than other demographic groups (Cronin et al., 2013). In addition, promotion and managerial qualifications have relied heavily on technical skills versus people management skills. A lack of diversity and people management skills in senior positions have resulted in reported challenges with communication, knowledge transfer, and training and development within the industry (Cronin, 2013; U.S. Dept. of Labor, 2007).

As the available workforce continues to become more diverse, it is critical that the public transportation industry be deliberate and intentional in becoming a more inclusive and diversely represented industry. This can be achieved, in part, by adopting a more integrated and holistic workforce development model. For example, Bates and Redmann (2002) have created an integrated workforce development model that goes beyond simple tasks or skill development. This model expands upon traditional workforce development approaches by supplementing organizational specific development with non-organizational specific development to create a more sustainable and global workforce. In this context, non-organization specific development refers to fostering the development of basic skills such as literacy and overall career development for employees and non-employees (Bates & Redmann, 2002). Organizations often focus on strategic development plans for diversity and inclusion (Ivey, et. al, 2019) that target areas that are believed to be beneficial specifically for the organization or agency. However, the components of the generalized workforce development system posed by Bates and Redmann (2002) emphasizes the importance of an integrated, yet an interdependent system that seeks to connect and “help all individuals including students, job seekers, unemployed, underemployed, and others develop marketable job skills and find work” (p. 113). The consensus is that, in addition to establishing development programs aimed at maintaining their current internal workforce (e.g. employees), organizations can help improve the talent pool and overall workforce by promoting skill development in individuals outside of the organization and within the community. As such, components of a successful workforce development system should be responsive to individuals at all job stage and socioeconomic statuses, as well as the goals of the community at the economic and social level (Bates & Redmann, 2002). Figure 2 is a visual representation of Bates and Redmann (2002) workforce development model.

2.2.2 Urban vs Rural: Minnesota Public Transportation Agencies

The characteristics of rural and urban areas is known to have significant implications for workforce shortages in the public sector, with several studies focused on health care (Redford, 2019; Skillman, Palazzo, Keepnews, & Hart, 2006) and education (Sutcher, Darling-Hammond, Carver-Thomas, 2016). The characteristics of Minnesota public transportation agencies and their local workforce varies greatly between region, county, or town. Geographic location is an important factor to consider for the analysis of future workforce trends in Minnesota public transportation agencies (Parker et al., 2018). The specific geographic context differences between various agencies across the state are important to understand trends and strategies for workforce shortages. The Minnesota State Demographic Center 2017 report examined differences in urban vs rural demographic and workforce trends. This report goes beyond the commonly used “urban vs rural” dichotomy and utilizes a more nuanced perspective by breaking down the state into four categories: Urban, Large town, Small Town, and Rural. Minnesota, similar to many other states, has been experiencing a considerable migration from rural to urban population centers which has directly affected the local workforce in both areas. As of 2015, 73% of Minnesota’s population lived in an urban area, 11% in large towns, 7% in small towns, and 8% in more remote, rural areas (Minnesota State Demographic Center, 2017). The rate at which people are leaving rural areas has been steadily increasing. Between years 2000-2015 urban areas accounted for 80% of all Minnesota’s population growth where rural areas lost residents each year.

A closer examination of the different geographic areas and their population characteristics show demographic discrepancies that have direct impact on the future of the local workforce (Parker et al., 2018). More specifically and perhaps unsurprising, Minnesota’s average rural populations are much older and lack the diversity of more urban populations. As the entire nation is experiencing an ageing workforce, the effects are magnified within small towns and rural areas.

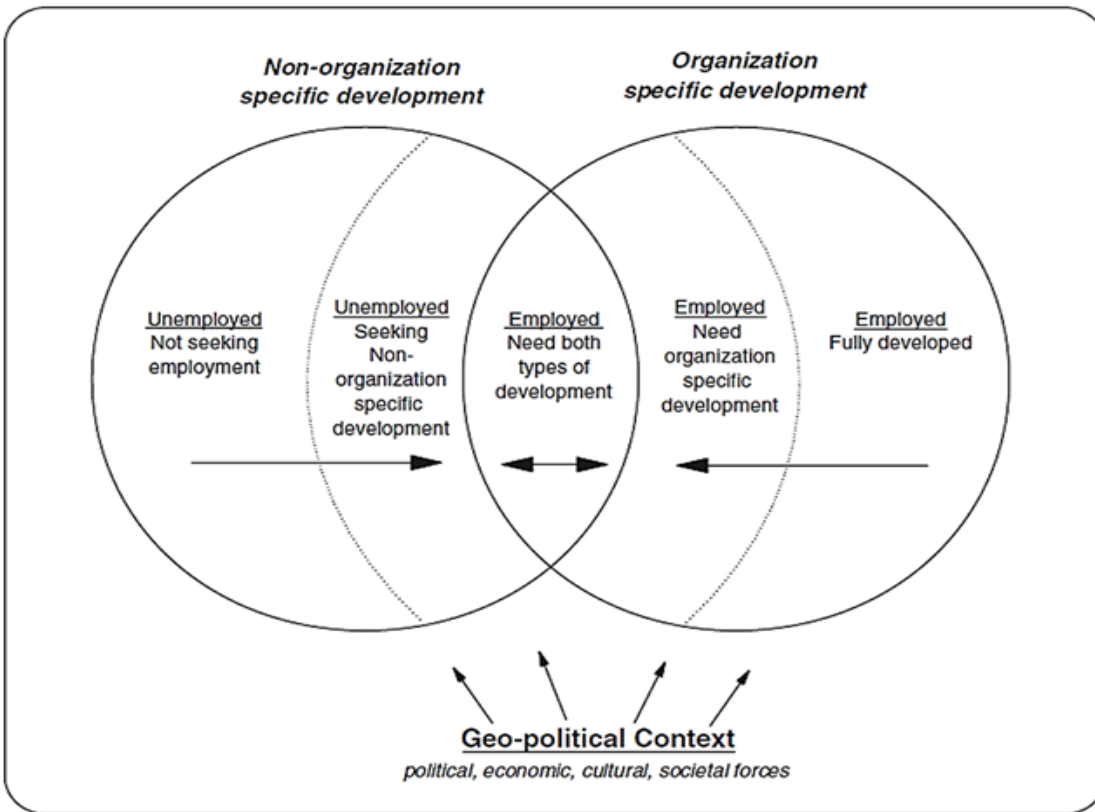


Figure 2: Workforce Development Model.

Reprinted from Bates, R. A. & Redmann, D. H. (2002). Core principles and the planning process of a world class workforce development system. *Advances in Developing Human Resources*, 4(2), 111-120.

In 2015, 44% of rural Minnesotans were over the age of 50 compared to only 32% in urban areas. Further, Minnesotans living in rural or small towns are twice as likely to be over the age of 80 (Minnesota State Demographic Center, 2017), this is especially so in many southern and western Minnesota counties. In regards to race and ethnicity, urban areas are made up of 79% white (non-Hispanic) residents while rural and small towns are over 90% white. Minnesota’s Native American populations are the one ethnic minority group that largely resides in rural areas. One of Minnesota’s greatest drivers of workforce growth, immigrants, reside 89% in urban areas. However, despite the large volume of geographic population data, there is a lack of consistent data, specific to public transportation workforce demographics, throughout the 87 counties in Minnesota. This makes geographic comparisons of public transportation agency workforce shortage impacts and strategies for recruitment, retention, and training difficult.

2.2.3 Competition in the Labor Market

Another important workforce trend related to labor shortages is the increased competition for employees. The public transportation industry has experienced a shrinking and more competitive labor pool over the past 15-20 years (Cronin et al., 2013; Lemer, 2019; U.S. Dept. of Labor, 2007). The “war for talent” (Patel, 2002) forces organizations to place greater emphasis on employee retention. Yet, many government agencies are constrained by procedures that limit recruitment, selection, and promotional practices in comparison to the private sector. A smaller labor pool has decreased the ability of the public sector to compete with private transportation agencies for skilled and certified workers. Warne’s (2003) study of public transportation agencies found that nearly 25 percent of employees were considering leaving their agency for work elsewhere. Promotional and developmental opportunities, along with higher salary, were considered two of the main incentives that impact recruitment and retention. Data over the past decade show there has been an influx of applicants for entry level and frontline public transportation work while concurrently a lack of qualified candidates for technical, skilled, and managerial positions (Cronin et al., 2013). Watson et al. (2002) listed engineers as a top-5 position in which public transportation agencies have difficulty in recruiting and retaining qualified employees. This shortage of engineers is magnified within the public transportation industry as studies have shown the growing discrepancy in wages between private and public sector workers (Munnell, Aubry, Hurwitz, & Quinby, 2011). Reese's (2003) study of young civil engineers found significant salary discrepancies between public and private sector engineers.

In recent years, data surrounding the public versus private sector wage gap has been inconsistent, with many believing the gap no longer exists or that it has shifted toward larger salaries for public employees. However, a study conducted by the Economic Policy Institute found that despite claims of public sector employees being over compensated, data suggests that “comparisons controlling for education, experience, organizational size, gender, race, ethnicity, citizenship, and disability reveal that employees of both state and local governments in Minnesota earn less than comparable private sector employees” (Keefe, 2011, p. 1). The report further states that “Minnesota public employees earn 7.9% less in total compensation per hour than comparable full-time employees in Minnesota’s private sector” (p. 2). Despite sound statistical findings that highlight wage discrepancies, it should be noted that wage gaps are dependent on several factors and more industry specific research is needed. Even so, when compared to wages in rural areas, compensation for state workers in Minnesota is generally higher for those employed in urban areas (Minnesota State Demographic Center, 2017). However, regardless of geographic location within the state, the median income of male workers in Minnesota is about \$10,000 or more greater than female workers (Minnesota State Demographic Center, 2017, p. 26).

The most glaringly obvious reason that qualified candidates might choose to work in the private sector is the notion of increased pay. However, other less obvious reasons might be due to the amount of autonomy that private agencies have. The public sector is bound by state regulations and the process of hiring a qualified candidate can be somewhat lengthy and may be difficult for certain positions. In the same vein, pay is capped for certain positions and it is widely understood that public agencies are not able to compete with the initial salaries offered by the private sector. A 2018 study of four state DOTs found that DOT employees reported “...retirement benefits, stable employment, health benefits,

appealing job position, vacation/leave benefits, public employment, and professional development opportunities” (Harper et al., 2018. p.22). as the top factors that influenced their decision to work for the DOT and their overall job satisfaction. The authors noted that competitive pay was not shown as a primary reason for working at a DOT, alluding to the idea that while DOTs might not be able to compete with salaries, they can capitalize on other factors to develop an overall competitive advantage for recruiting skilled workers. “This finding shows that DOTs, although different in many ways, have employees that realize the benefits of working for a DOT regarding health, retirement, and stable employment” (Harper et al., p.22). The job stability offered by DOTs has the potential to be the deciding factor for many skilled workers, especially during times of economic uncertainty. If DOTs learn how to promote their benefits, they may be able to help potential applicants see that their overall benefits packages are comparable to the private sector. It should also be noted that agencies in Minnesota’s rural areas may not have to compete with private companies at the same level as city agencies. According to the Center for Rural Policy and Development, the demand for private sector employees has declined in rural areas, but there is still a need for public transportation employees (Asche, 2018).

2.3 TRENDS IN RECRUITMENT METHODS

Organizational recruitment methods are essential to obtaining top human resource talent. A study of predictive workforce planning to identify future requirements for traffic management center operators highlighted the importance of the connection between factors impacting the supply of labor for the workforce and changes in the requirements of the job (Hinkeldein, 2009). The conclusion from this study was that selection of future recruitment, retention, and training strategies are dependent first on understanding the causes of shifts in workforce size and composition. In this digital era, job hunters rely heavily on web-based and Internet communications as part of the job seeking experience and it is imperative that organizations utilize modern mediums to reach qualified candidates. Frequently, the first point of contact between an organization and a potential employee comes in some form of online communication and therefore, it is necessary for organizations to be agile in developing sound recruitment strategies that utilize updated technology. Research has shown that placing an advertisement for employment in popular media or on an organization’s website has a limited probability of attracting the right candidates (Phillips & Gully, 2012). The rise in frequency of use and acceptance of E-recruitment and E-selection (electronic recruitment and selection) is noted as a significant trend in human resource management (Holm & Haahr, 2018). Further, the use of social media, especially LinkedIn, Facebook, and Twitter, has altered the strategies of job searchers and employers tasked with recruitment (Koch, Gerber, & de Klerk, 2018). Some research even indicates a strong association between the use of LinkedIn and the ability of an organization to identify and attract qualified applicants (Nikolaou, 2014). Overall, there are limited studies on new recruitment methods in the transportation industry, but it has been reported that nearly 90% of truck drivers complete job applications on a mobile device, yet only 40% of trucking companies have implemented a mobile friendly application process (HireRight, 2018, p.8). General recruitment tactics for the public transportation industry include posting job ads on social media or job boards, publicized career fairs, and on rare occasions, flyers are distributed (AGC of America, 2017). A comparative study of nine DOTs in US region 6 revealed that “finding out about a job through the internet is 10% more likely than finding

out about a DOT job through a college or university” (Harper et al., 2018, p. 45). This is interesting because “DOTs actively recruit from colleges and universities, so it is surprising that more people find out about DOT employment from the internet than from higher education” (p. 45). Regardless, a large portion of the transportation workforce consists of skilled laborers, such as technicians and maintenance workers, who may not have a social media presence; and as a result, job postings for technical or maintenance positions might not reach suitable candidates. The use of online recruitment in state DOTs is increasing, and this is generally a good way to reach younger workers, but it is necessary to utilize a combination of recruitment strategies in order to reach the largest candidate pool. According to the 2018 transportation spotlight report by HireRight, “Referrals continue to be the most effective way to find candidates and are used by 73% of survey respondents, most noticeably by medium- and large-sized companies” (p.8). Organizations seeking qualified job candidates often publicize incentives such as traditional benefits packages and signing bonuses. Mentions of an inviting organization culture as well as social and philanthropy initiatives are sometimes used to foster an image of a positive work environment. While these types of recruitment strategies are useful, they are not enough to reach and persuade, top talent to pursue a career in public transportation. Flexible work hours and PTO benefits may be highlighted as part of a job posting, but when pay is not competitive, recruiters are likely to shy away from mentioning salary on the initial job posting. Additional research has been published that instructs on social media strategies to hire talent (Hunt, 2010) and more specific strategies for talent acquisition and recruitment (Singh & Sharma, 2014). Ultimately, recruitment strategies aim to promote a positive image of the workplace in order to maximize the candidate pool.

2.3.1 Diverse Hiring

Ivey et. al., (2019) reported that more than 65% of job seekers indicate that workplace diversity is a critical factor in their decision-making process around accepting a job. Further, a study conducted by the U.S. Department of Commerce documented increased employee retention within organizations that had higher levels of diversity (Gore, 2000). This same study noted public agencies also saw the added benefit of diversity in the workforce in better alignment of agency service delivery with community needs. Public transportation has been traditionally viewed as a male dominated industry with the average worker being middle aged. It has proven difficult to recruit younger workers and those from non-traditional labor pools (e.g., women). This could be due to younger people not being made aware of job opportunities in the public transportation industry and the general emphasis on youth pursuing a college education rather than working in the labor market. Student recruitment plans and targeted career fairs have proven beneficial in gaining more talented workers (MnDOT, 2016).

2.3.2 Observed Challenges in Recruitment

Martin and Glenn (2002) reported findings from a leadership summit with Federal and State transportation agencies, academic institutions, labor unions, and other key stakeholders in the transportation industry. The findings concluded that: (1) potential employees do not perceive transportation as an attractive, rewarding career option; and (2) transportation offers inadequate opportunities for career development, making it difficult to retain qualified employees. Others have highlighted the need for engineering related professions to partner with higher education to increase

the visibility of career options, expand coordination with employers, and enhance recruitment and retention of students into engineering and related programs (Hubbard & Hubbard, 2009). Recurring challenges that are applicable to Minnesota’s public transportation industry are summarized below:

- Negative perceptions of the public transportation industry along with the idea that most jobs require long work hours and extensive time away from home when compared to other jobs with similar pay. In general, “a majority of both urban and rural residents express low levels of trust for Minnesota’s state government;” however, Minnesotans in rural areas have more negative perceptions about the ability of the state government “to act reliably in a manner deserving of their trust” (APM Research Lab, 2018).
- Wording of posted job descriptions may be a deterrent for non-male workers who may otherwise be qualified.
- Limited use of social media for recruitment.
- Difficult application process.
- Entry level pay might be somewhat low and the opportunities for raises are limited.

2.4 TRENDS IN RETENTION TECHNIQUES

While recruitment remains a challenge, retaining talent has proven to be equally difficult. Employee retention starts with the on-boarding (initial on-the-job-training and socialization period) process as many employees decide how long they will be with a company or organization during orientation (Maurer, 2015). Many public-sector employees are attracted to private sector companies because they are often able to offer better financial incentives and they are not bound by the same restrictions as government organizations. Consequently, when an organization cannot compete with financial incentives it is even more important to establish an effective onboarding process that highlights a positive organizational culture. Several public sector organizations may require employees to move into supervisory or managerial roles in order to receive a competitive salary, but the process for moving into such roles may not always be clear to candidates who apply for entry level roles. Perhaps developing a tiered plan for advancement with a relative increase in payment, would be useful in alleviating hesitation over an initial low way. If candidates have an idea of how long their pay will remain stagnant at a considerably lower wage than in the private sector (e.g. for a year or two), it could reduce uncertainty, hesitation, or fears of “getting stuck” in a low paying job. However, this would only be suitable if the organization was able to offer adequate advancement potential. As with most issues concerning recruitment and retention, a combination of approaches should be considered. Since private sector organizations may be able to provide more financial incentives and faster opportunities for advancement, there has been a shift in how the public transportation industry uses financial gains as a retention strategy. There is less focus on high salaries and raises with more attention on adding performance-based bonuses and/or other reward or benefit programs in order to effectively recruit and retain enough workers (HireRight, 2018, p. 10-11). Other retention initiatives include obtaining newer equipment, opportunities to work with the latest technology, rewards programs, other non-monetary benefits.

In 2017, MnDOT implemented a program aimed specifically at retaining skilled workers, referred to as MnROW: Retaining Our Workforce. MnROW was “established as an internal strategic retention program designed to retain top talent within the department (Minnesota Department of Transportation, n.d.).” Another MnDOT effort to attract and retain workers is the Seeds Program. The intention of this program is to provide a career path to attract minority college students, separated veterans, persons with disabilities, or those who are otherwise disadvantaged. In another attempt to strengthen the school-to-public transportation link, the agency’s STEM program was revamped to support teachers and education administrators by developing interactive programs to teach students about architecture, bridge design, and other forms of engineering. Yet, despite the success of these initiatives in developing the talent pool, MnDOT still struggles to achieve long-term retention of skilled workers.

2.4.1 Barriers to Retention

HireRight (2018) reported that there are four key reasons why employees are leaving the public transportation industry. 1) To make more money (52%): Pay is the number one reason workers leave the industry, 2) To spend more time at home/with family (41%), 3) For better benefits (27%), and 4) Because the job was not what they expected (26%). However, a short analysis of anonymous reviews posted on job boards revealed several challenges based on the personal experiences of those working in a technical position for MnDOT. Table 3 displays direct quotes from two popular job boards, Glassdoor and Indeed.com. The selected quotes are not intended to be critical of MnDOT or other public transportation agencies, but rather are illustrative and highlight some pertinent information, which identifies lack of advancement potential and feeling undervalued as issues that may reduce employee loyalty and impede retention of skilled workers.

2.4.2 Workplace Environment

Another area highlighted in existing literature that warrants further attention concerns the effectiveness of the workplace environment. There are various components of the workplace environment that have a significant influence on employee retention, work engagement, and overall job satisfaction. Ivey et al., (2019) recently noted that employee “engagement is the key to addressing recruitment and retention of diverse workers” (p. 25). Although literature on the public transportation industry has highlighted several areas that need improvement, the Society for Human Resource Management developed a general Effective Workplace Index (Galinsky, Pal, & Solis, 2016). As can be seen in Table 2, the Workplace Index details seven categories that contribute to an effective workplace: 1) Job Challenge and Learning Opportunities, 2) Supervisor Support for Job Success, 3) Autonomy, 4) Culture of Respect, Trust, and Belonging, 5) Work-Life Fit, 6) Satisfaction with Wages Benefits and Opportunities to Advance, and 7) Co-worker Support for Job Success. As evidenced by anonymous job board posts (refer to Table 3), public transportation agencies seem to be perceived by some employees as having opportunities for improvement in several of these areas. Figure 3 displays the overall impact of an effective workplace on selected job outcomes, which are noted for their importance to both organizational and individual employee performance. All of these factors impact an organization’s ability to retain skilled workers. Support from a supervisor, particularly for those in middle management, is essential to fostering an effective workplace. It is imperative that those in supervisory or managerial roles also have effective

communication skills, as they often serve as the point of contact between workers and upper management. In this regard, organizations should establish some form of communication training or benchmark assessment to ensure that supervisors and managers are able to effectively relate to, and when necessary, speak on behalf of their subordinates. Doing so might increase employee rationale and reinforce worker perceptions of supervisory support. It is equally important to show recognition when workers help the organization to successfully achieve its goals.

Table 2: Importance of Workplace Components for Positive Work Outcomes

Greater Engagement	Greater Job Satisfaction	Greater Probability of Retention
<ol style="list-style-type: none"> 1. Job Challenge and Learning Opportunities 2. Work-Life Fit 3. Autonomy 4. Co-worker Support for Job Success 	<ol style="list-style-type: none"> 1. Work-Life Fit 2. Satisfaction with Wages, Benefits and Opportunities to Advance 3. Climate of Respect. Trust and Belonging 	<ol style="list-style-type: none"> 1. Satisfaction with Wages, Benefits and Opportunities to Advance 2. Work-Life Fit 3. (Less) Autonomy 4. Climate of Respect, Trust and Belonging 5. Job Challenge and Learning Opportunities

Note: Galinsky, E., Pal, I., & Solis, C. (2016). SHRM'S effective workplace index: Creating a workplace that works for employees and employers. (Executive Summary). *Society for Human Resource Management*. Retrieved from <https://www.shrm.org/> Relative Importance of Effective Workplace Components in Predicting Positive Work-Related Outcomes

PERCENTAGE OF EMPLOYEES REPORTING POSITIVE WORK-RELATED OUTCOMES, BY LEVEL OF WORKPLACE EFFECTIVENESS

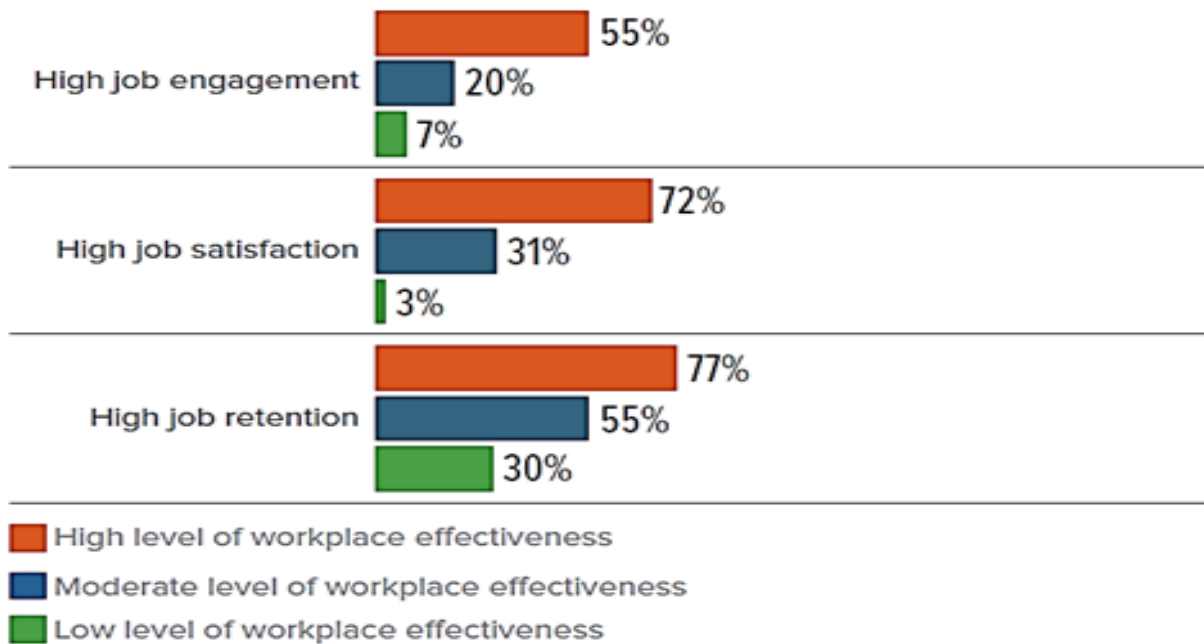


Figure 3: Percentage of employees reporting positive work-related outcomes.

2.4.3 Career Mobility vs Opportunity Mobility

In order to retain skilled workers, public transportation must adapt to the changing values of the current workforce. Employees from younger generations are more concerned about career advancement and less concerned about long-term commitment. The shift in worker values makes it extremely important for organizations to focus on career mobility, which “is directly related to job advancement, career development and personal satisfaction. It ensures that employees, over a period of time, move to job roles suitable to their skills, goals, and aspirations” (MBA Skool, n.d.). According to Giulioni (2017), “issues related to career mobility frequently immobilize organizations and undermine optimal engagement and results” (para. 2). Approximately 75% of American workers are dissatisfied with their career development and much of the frustration stems from the feeling of being “stuck” and “ready for something new”, yet the likelihood of a promotion or other inter-organizational move is perceived as unlikely or scarce (Giulioni, 2017, para. 3). When organizations are unable to offer internal job mobility, it is necessary to supplement the lack of mobility with opportunities that satisfy employees’ desire for growth and advancement. This can come in the form of frequently shifting or sharing job responsibilities. A report for the North Dakota Department of Transportation found that options for

¹ Reprinted from Galinsky, E., Pal, I., & Solis, C. (2016). SHRM’S effective workplace index: Creating a workplace that works for employees and employers. (Executive Summary). Society for Human Resource Management. Retrieved from <https://www.shrm.org/>

allowing “employees to choose between technical and management career options” were limited (Kalnbach, Jacobson, & Griffin, 2002, p. 7). One of the larger implications might be to develop a clear path for advancement, but this might not be feasible for some agencies. The size of the organization, tenure, and other forms of seniority can severely limit the possibility of moving into a management role. In some organizations, there is only room for one management role and when that is filled, the next person in line might have to wait 10-15 years for the incumbent to retire. Then, it is likely that multiple people are up for the same role with no guarantee that the person who waited 10 years would be selected for the job. In such cases, subordinates might choose to pursue opportunities at another organization rather than risk waiting. However, even if changing roles or transitioning to new positions might not be readily available, options for working on various projects, alternating roles, and working with different teams are inherently unlimited. “Or, more precisely, it’s limited only by the imagination and commitment of employees and leaders” (Giulioni, 2017, para.7). In a general sense, this logic can be applied to the public transportation industry. Giulioni (2017) noted that “advancement isn’t about landing in a box on an organizational chart but rather landing a new experience that expands capacity” (para. 8). She maintains that “opportunity mobility boils down to identifying activities designed to address an employee’s interests, passions, gaps and/or aspirations” (Giulioni, 2017, para. 9). The incentive would then be placed on having a friendly and fun place to work that pays the bills rather than a place that emphasizes pay as an incentive. As evidenced by anonymous job board posts, displayed below in Table 3, public transportation agencies in Minnesota need improvement in several areas highlighted in the SHRM Workplace Index, but there is a particular focus on the lack of advancement potential and communication between management and subordinates. It should be noted that excerpts presented in Table 3 are subjective and may not be representative of all public city or county agencies in the state of Minnesota. The selected quotes are not presented with the intention to be critical of MnDOT or other Minnesota public transportation agencies, but rather to illustrate and highlight some pertinent information regarding issues that may reduce employee loyalty and impede retention of skilled workers. Any mentions of pay discrepancies in the below excerpts are purely the opinions of the persons who wrote the reviews and no attempt was made to verify the accuracy of the statements. However, if taken at face value, the anonymous job postings do shed light on some of the issues that might be prevalent within Minnesota’s public transportation industry; and this falls in line with the current literature on the challenges associated with retaining skilled workers. It is also worth paying attention to employee feedback on job boards since anonymity provides employees with an opportunity to share their true attitudes about their agency or organization without fear of retaliation.

Table 3: Anonymous MnDOT Employee Feedback

Drawbacks	Advice to Management
<p>Caste system for engineers that thrive on the government work role. No merit system and no standard blueprint for other career fields to advance. Leaders create gimmicks and mobility assignments to appease some that desire a short-term change. In other words, many people stay if they prefer tenure in the same job or they don't have the confidence to leave. Also, too much focus on identity politics in the workplace. <i>June, 2017</i></p>	<p>Follow federal government system, where all career fields have pathways and mentoring for advancement, even if it involves interdepartmental transfers. <i>June, 2017</i></p>
<p>Career paths are not always clear. <i>Dec, 2018</i></p>	<p>Skills and education are not valued equally. <i>Dec, 2018</i></p>
<p>Hard for a non-engineer to advance. Sometimes engineers look down on non-engineers. Workloads are very high. There is a shift to using consultants to reduce government employees that causes quality problems and also increases workloads. Public opinion is often critical. <i>Dec, 2016</i></p>	<p>Try to interact with young engineers, have chats on other topics than work, try to get to know them, this will have a positive impact on your team. <i>Nov, 2016</i></p>
<p>Management in my office does not understand our jobs, nor do they have any desire to learn what we do. "I'm a manager, I don't need to know what you do" That attitude causes confusion and chaos when we try to adapt our daily requirements to their demands and creates a very negative culture to work in. Employees do not feel valued or respected. Hard work and experience only gets you more work, not promoted. <i>Sept, 2018</i></p>	<p>Learn the workload prior to coming in a changing everything around to suit your opinions. Understand and appreciate the complexity of the work this office does. Treat employees with respect and make them feel that you value their contributions. Appreciate and reward hard work, loyalty, and experience. Stay true to your word. <i>Sept, 2018</i></p>
<p>Due to state public agency and collective bargaining agreements, it is somewhat difficult, but not impossible to move to other jobs/offices within the agency. Hiring, as with many public agencies, takes longer than desired due to HR processes. <i>Nov, 2016</i></p>	
<p>*I have nothing great to say about working for the state. It's a job and unfortunately ran by Government. You need a two income house hold to make it. I like doing what I do, but it is very dangerous, extreme weather conditions. You have no life when you work nights which is a 99% chance you'll have starting and 5-6 years in. The pay is way less than County. City pays by \$7-\$10 more per hour and you max out very low. You work very hard and in extreme conditions. YES we fix guard rail, cable and the roads to make sure you are all safe every day along with making sure the roads are clear during the winter months. <i>Jan, 2019</i></p>	<p>Continue advancing mobility assignments to build up the secession plan which will be needed to pass on knowledge base of baby boomer generation that will be retiring en-masse in a few years. Find other ways to capture knowledge base, such as updating or creating manuals that can be used for future employees.</p>

***Not enough opportunity for advancement** or growth within a job. The unionized position classification structure and HR policies make it a good place if you just want job security, but productivity, innovation and quality are not rewarded. *March, 2018*

Nov, 2016

Note. Minnesota Department of Transportation Reviews | Glassdoor

*denotes excerpts from “Working at MnDOT: Employee Reviews | Indeed.com

2.4.4 Salary and Benefits

The human resource management profession increasingly uses a holistic approach to salary and benefits called ‘total compensation’. Judge et al. (2010) published a meta-analysis of 86 studies related to the relationship between pay and job satisfaction. Their results showed that "within studies, level of pay bears a positive, but quite modest, relationship to job and pay satisfaction" (p. 164). Their research concluded that the literature contains "contradictory conclusions regarding the importance of income to life satisfaction," and "though the data tend to indicate a small, positive correlation between income and subjective well-being, this conclusion cannot be proffered with much confidence" (p. 158). They summarize research on this topic by stating that despite the perception that high pay leads to high levels of satisfaction, results suggest that pay level is only marginally related to satisfaction.

Metropolitan Life Insurance Company’s 2019 employee benefits trend study found that organizations of the future will find success in “holistically” supporting their employees. Holistic support is to value and uplift the lives of employees at work, at home, and in their personal lives. As the lines between work and personal life continue to blur, it is imperative that organizations begin to “value employees’ whole selves and individuality” (p.2). If technological advancements and younger generations continue to shift how “work” is defined, then benefits, development, and pathways of support must evolve to coincide with new definitions of work. This study found that the “most important employee benefits have two things in common: 1) they play a central role in helping them achieve their person and work related goals and, 2) they address their main stressors, particularly around personal finances, retirement, and their family’s health” (p. 35). Through interviews and surveys, the Metropolitan Life Insurance Company (2019) found that the most highly regarded emerging benefits are: 1) unlimited time off, 2) wellness programs that reward healthy behavior, 3) phased retirement program, 4) paid sabbatical program, and 5) on site/free subsidized program (e.g., meals, gym, dry cleaning, hair). Historically, many of these benefits have been considered taboo or outside the concern of the employer. For today’s workforce these types of holistic support are no longer a pipe dream, they are an expectation. Organizations that can adapt to these new expectations will be reciprocated with more talented, engaged employees, higher retention, and a number of other positive outcomes. Again, there are challenges associated with implementing these types of programs or functions within the transportation industry. Unlimited time off may not be possible for some positions and sabbatical may not be offered to lower level employees. The goal should be to maximize the benefits that are able to be offered with the intention of strengthening such programs. When an organization is unable to provide one incentive, it should pool its efforts to perfect programs that can be offered. Essentially, having a few quality programs that add value to an employee’s time with an organization can increase job satisfaction for workers. Ideally, this would be

more beneficial than having several poorly developed programs to offer a little of everything, and still falling short in adding real value to the overall benefits package.

2.5 INVISIBLE ISSUES

Common themes and challenges have been revealed through a review of the literature, yet a more important issue deals with what is not frequently found in the literature. The general consensus for recruitment and retention is that employers in the public transportation industry should highlight the benefits of working specifically in the public sector. However, the benefits are not clearly understood and until concrete or tangible benefits are identified, it is likely that recruitment challenges, beyond the common shift in workforce demographics, will remain. Although some public agencies may offer flexible work hours, competitive benefits packages, and comparable compensation, these things may not be viewed as a top priority for qualified candidates who are more concerned about integration into new communities. Another constraint of employee retention is the divergence between what new prospects or employees think the job or work within the industry sector will be like versus the reality. In the public transportation industry, it is imperative for organizations to provide a realistically clear depiction of what it is like to not only work for the organization, but also what it is like to work in specific job positions.

2.5.1 Dichotomy between Engineers & Technical Workers

Though there are various job titles in state DOTs and other public sector transportation agencies there appears to be a breakdown between engineers and technical workers. Engineers are thought of as the “problem solvers” while technical workers are considered the “doers” who often follow the processes and procedures designed by engineers (NDT Resource Center, n.d.). On the surface, this might seem suitable as it relates to one’s level of education, but several problems can arise when formal education is prioritized over skilled experience. Differences such as salary due to education level could contribute to perceived social status within an organization. Understanding that formal education comes with certain legal certifications, it is expected that a professional engineer (PE) will receive a comparable salary. This means that organizations are not likely to hire multiple PEs and will instead utilize technical workers. As such, engineers and technicians should be complementary and avoid competition. Since engineers and technical workers are required to work closely, it is imperative to focus on how organizational culture can enhance this working relationship. Public review boards have highlighted perceived social injustices concerning the treatment of engineers versus that of technical worker within MnDOT, and this should be taken into consideration when aiming to improve employee loyalty. The role of the individual should be based, in part, on the work and responsibility they have and not merely on their level of education. Though it is difficult within a public agency, there is room for improvement on how field experience is translated into education requirements. For example, a technician who has 25 years of experience may be restricted in salary and a PE with 5 years of field experience may be granted a managerial role within the organization. This type of situation could cause strife between employees, but such issues might be dictated by government regulations. The most readily available option for organizations that face this issue would be to emphasize the importance of teamwork and knowledge transfer between engineers and technicians. Encouraging technicians to share their expertise, even without formal education, could

help alleviate some of the tension should any exist. Another area of concern between engineers and technicians really deals with the paradox of state agencies requiring the presence of a PE for oversight while paying them a high salary, but needing a technician to do the work at a lower wage. In many situations within public transportation, execution (i.e. doing) is what drives progress within organizations and agencies. Yet, even as one of the most important parts of the organizational structure, technical workers may not feel valued.

2.5.2 Implications of General Urban & Rural Demography

A report by the Center for Rural Policy and Development found that “education and health services, along with trade, transportation, and utilities employ nearly 50% of the labor force in most of [MN] counties no matter how rural,” and it concluded that “there is nothing significantly different in employment when comparing urban and rural areas” (Asche, 2018, Summary section para.4). However, there are some notable differences between urban and rural counties that warrant further attention when considering turnover intention and to consider all of Minnesota’s public transportation agencies and departments as the same, or similar, would be both short-sighted and inaccurate. According to the 2017 Ground Level Survey of Minnesotans, “urban residents are more likely to have completed advanced education than those who live in rural Minnesota” (APM Research Lab, 2018, p.2). A little more than half of Minnesotans in urban areas, ages 25 years or older, “hold a two-year (associate’s) or higher college degree, while the comparable figure is 34 percent in rural Minnesota” (APM Research Lab, 2018, p. 2). This is noteworthy because it could be a factor in the ability of county and city agencies, as well as MnDOT, to recruit qualified candidates within rural counties for technical jobs that require advanced degrees. The survey brief also states that “the likelihood of having close friends across racial (or ethnic) lines mostly mirrors patterns in one’s neighborhood, although inter-racial friendships are somewhat more common than inter-racial neighbors in rural communities” (APM Research Lab, 2018, p. 3). Similarly, “less than half (44%) of rural residents reported that they have at least some friends of a different racial background, compared with 70 percent of urban residents” (APM Research Lab, 2018, p. 3). Speaking specifically about qualified minority candidates, it may be more difficult for them to successfully integrate and develop close relationships or maintain social ties in rural counties. Given the importance of community integration, these statistics may present an issue for MN public agencies in rural areas that aim to recruit and retain talented workers who value diversity and care about the ability to develop close relationships within a community.

2.6 COMMON HR INITIATIVES

A list of common HR strategies include tailored orientation and onboarding processes, specialized training courses, benchmarking, and various types of performance measures appear well suited for adoption for public transportation agencies in Minnesota. Several state DOTs from across the US have implemented some form of mentorship as part of the onboarding for new hires (D’Ignazio, Rhodes, & Secret, 2015; National Academies of Sciences, Engineering, 2009; TRB, 2003), as well as customized learning and development programs (AGC of America, 2017). Further, additional longer workforce planning strategies to build the skilled technical workforce at a national and industry level is worthy of additional examination (National Academies of Sciences, Engineering, and Medicine 2017).

2.6.1 Recommendations

According to Lockwood and Euler (2016), transport and logistics companies should tailor their recruitment efforts and advertisements to highlight the type of flexibility that comes with certain job positions. MnDOT and other public transport agencies could go a step further and aim to create a realistic depiction of working in certain technical roles. Furthermore, as highlighted in an NDDOT report, “to transfer job knowledge from long-term employees to others in the organization, employees suggested keeping all employees involved as key players by further developing a formal mentoring program. They also suggested the creation of a formal succession planning process to ensure that gaps left by retirements will be filled expeditiously” (Kalnbach et al., 2002, p. 36). Creating a customized mentorship specifically aimed at promoting knowledge transfer with the possibility of advancement to new positions, will be beneficial (D’Ignazio et al., 2015). Also, given the importance of career and job mobility, public transportation agencies should consider improving their ability to recruit from within (Cronin et al., 2011). This highlights the importance of human resource management as well as human resource development. Based on the content of this literature review, the following recommendations were proposed.

- Create a specialized HR function to focus on development.
- Establish, expand, and promote Career Mobility and Mentorship opportunities.
- Create more noticeable opportunities to move up in the organization.
- Explore the possibility of an attainable rewards system, which can include monetary bonuses as well as other incentives.
- Align employee expectations with reality through multiple communication strategies.
- Weigh organizational culture against monetary benefits.
- Develop outreach programs and career fairs to inform people about opportunities at agencies at the county and city levels.

2.6.2 Conclusion

This literature review has provided an integrated summary of existing data, relevant studies, and public sector reports to provide an overview of the current state of knowledge on the labor market as well as recruitment and retention strategies to address workforce shortages. Although the final results of the overall report will be situated within the SCOPE framework, the SWOT analysis is suitable for evaluating current practices within the public transportation industry, without focusing on specific situations that might be individually contributing to an agency’s workforce shortage. Therefore, a SWOT analysis is presented in table 4 to summarize the findings of the initial literature review conducted in Task I of this research project. The SWOT analysis is a general representation for public transportation agencies and is not specific to any particular agency.

Table 4: General SWOT Analysis

STRENGTHS	WEAKNESSES
<ul style="list-style-type: none"> • Competitive Business Packages • Student recruitment and targeted career fairs • (Somewhat) Stable Employment 	<ul style="list-style-type: none"> • Aging Workforce with increased Turnover • Cannot Compete with Private Sector Wages • Limited Capacity for Advancement to upper level positions • Lack of Diversity Among Workers
OPPORTUNITIES	THREATS
<ul style="list-style-type: none"> • Networking • Re-branding perceptions of Public Agencies • Restructuring Positions to Improve Career Mobility 	<ul style="list-style-type: none"> • Internal Conflict between Engineers and Technical Workers • Negative perceptions of Public Agencies • Regulated Hiring Policies creating difficult and lengthy processes for entry level positions

Beyond the general causes of the transportation workforce shortage, it appears that Minnesota’s public transportation industry is being impacted by varying education levels for residents/applicants in urban and rural areas, a need for more diversity in rural areas, lack of advancement potential, a need for more transparency about job roles, somewhat outdated methods for recruitment, and a need for more managerial support.

CHAPTER 3: TASK II: SURVEY DEVELOPMENT & RESPONSE ASSESSMENT

3.1 SURVEY METHODOLOGY

The literature review was used to inform the development of a survey to better understand the nuances of opinions of current workers in Minnesota's transportation industry. The survey sought to explore job attitudes in relation to established links associated with performance and retention. Such links included employee engagement, perceived access/ support for training, job/ career choice satisfaction, and turnover intention.

3.1.1 Survey Design & Content Development

Subject matter experts aided in the development of a multi-item survey with open and closed ended questions, which were approved by the TAP. Survey items included human resource development concepts used to explore job attitudes with established links to performance and retention, such as employee engagement, perceived access/ support for training, job/ career choice satisfaction, organizational commitment (loyalty), and turnover intention. Lastly, the survey sought to determine the point in participants' education or work history when interest in transportation industry employment first emerged. Participants were asked about their organizational affiliation and to provide their thoughts on their current organization's recruitment strategies. It should be noted that the content of this survey was not intended to provide rich contextual analysis. Rather, it was developed to aid researchers in determining how to structure questions for the audio interviews, while still providing some foundational information about the sample. Validated measures included on the survey consisted of a 3-item Job Satisfaction scale ($\alpha = .877$) developed by Cammann et al. (1979), a 3-item Turnover Intention Scale ($\alpha = .844$) with two reverse scored items, and a 6-item Work Engagement Scale ($\alpha = .797$) developed by Shuck, Adelson, and Reio (2016).

3.1.2 Sampling

Unless participants elected to provide their contact information for follow-up participation, survey responses were anonymous. The survey was administered using the University of Minnesota's Qualtrics platform. Solicitation for participants included public transportation workers in job titles such as road engineer, county engineer, engineering technician, civil engineer, surveyor, and surveying technician. A pool of potential participants was developed with assistance from the TAP and members of the LRRB. Respondents were sought from a diverse sample with representation from counties in Minnesota as well as municipal, road/transit authorities, MnDOT, and private consulting firms. However, the nature of the survey did not provide verification on which counties or municipalities were actually represented in the sample of participants who completed the survey. All individuals participating in the survey were asked to answer a final question to solicit interest for a follow-up telephone interview. The survey was made available from September 2019 to May 2020. The first response was recorded on September 13th, 2019 and the last recorded response was May 8th, 2020. To maintain anonymity and protect confidential

responses, survey participants were not asked to specifically name the organization or agency for which they worked. We received a total sample of 161 responses with only 149 of those having a 100% completion rate.

3.1.3 Quantitative Data Analysis

IBM-SPSS 26 was used for quantitative data analyses. Missing scores for validated scales were imputed by utilizing the linear at trend point method. Survey responses with a completion rate of less than 25% were excluded from analyses. Such responses only clicked through the informed consent document and may have provided general demographic information but did not issue enough responses to make a valuable contribution to the data analysis.

3.2 ASSESSMENT OF DEMOGRAPHY AND PERVASIVE ATTITUDES

3.2.1 Sample Demography

The majority of respondents (93.2%) reported working in Minnesota's public transportation industry. The sample consisted of majority White, male respondents. Refer to Table 5 for more detailed information regarding age range, licensure, and current positions.

Table 5: Survey Demographics

		Frequency	Valid Percent
Gender	Female	36	24.2
	Male	107	71.8
	Prefer not to Respond	6	4.0
Race	Black, African, or African American	1	0.67
	Asian/Pacific Islander	1	0.67
	White or Caucasian	140	94.0
	Mixed or Biracial	1	0.67
	Mine is not listed. Please explain.	1	0.67
	Prefer not to Respond	5	3.4
Age Range	Born before 1952	3	2.0
	Born 1952-1962	27	18.1
	Born 1963-1972	38	25.5
	Born 1973-1982	53	35.6
	Born 1983-1992	24	16.1
	Born after 1992	4	2.7
Current Position	Administrative	53	35.6
	Technical	92	61.7
	Clerical	4	2.7
Professional Licence or Certification	Yes	114	76.5
	Maybe	6	4.0
	No	29	19.5

N=149, N_{MISS}=12

Table 6: Summary of Population Density in Survey

Population Density	Frequency	Valid Percent
Rural	33	22.1
Somewhere between Rural & Suburban	35	23.5
Suburban	15	10.1
Somewhere between Suburban & Urban	30	20.1
Urban	31	20.8
I am not sure	5	3.4

N= 149, N_{MISS} = 12

Table 7: Summary of Education Level of Survey Respondents

<i>Education Level</i>	Responses		Percent of Cases
	N	Percent	
High School	78	31.2%	52.3%
Certificate	18	7.2%	12.1%
Associate	31	12.4%	20.8%
Bachelor	82	32.8%	55.0%
Masters	33	13.2%	22.1%
Other	8	3.2%	5.4%
Total	250	100.0%	167.8%

N=149

*Percent of Cases determines how many people out of total sample (N=149) selected that choice

An item to assess job jurisdiction was added after the survey had been made available to participants. Of the 143 participants who responded to the jurisdiction item, 30.1% of participants reported working for the State, 28.7% reported working for the County, 25.2% reported working for the City, and 4.2% reported working in other jurisdictions. Nearly 12% of respondents worked for private consulting firms that do contract work with Minnesota's public transportation agencies.

Table 8: Summary of Jurisdiction Category of Respondents

<i>Jurisdiction Category</i>	Frequency	Valid Percent
State	43	30.1
County	41	28.7
City	36	25.2
Township	2	1.4
Private Consulting Firm	17	11.9
Other public	4	2.8

N =143, N_{MISS} =18

3.2.2 Recruitment Strategies

While a majority of participants reported that their organization or agency does implement some type of recruitment strategy, nearly 15% of respondents reported that nothing is being done to recruit workers. Refer to Table 9 for more detailed information.

Table 9: Percentage of different Recruitment Strategies

<i>Actionable Recruitment Strategies</i>	Frequency	Percent of Cases
Job Advertisements or Job Fairs	123	76.4%
Specific programs to strategically recruit the best candidates	50	31.1%
Professional networking	75	46.6%
Other	33	20.5%
Nothing	24	14.9%

N=161

*Percent of Cases determines how many people out of the total sample selected that choice

3.2.3 Perceptions of Minnesota’s Transportation Workforce & Strategies

Although the majority of respondents (87.6%) feel that there is a shortage of qualified people for available jobs in Minnesota’s transportation industry, it is interesting to note that more than 12% of respondents reported that there is not a shortage of qualified workers. Of the 141 persons who reported a shortage of qualified workers, only 21.3% consider the shortage to be severe.

Table 10: Respondents perception on shortage of workers

<i>Perception of Shortage Size</i>	Frequency	Valid Percent
There is a small shortage of qualified workers.	25	17.7
There is a moderate shortage.	86	61.0
There is a severe shortage.	30	21.3

N =141

3.2.4 Perceived Causes of Workforce Shortage

Nearly half of the respondents ranked lack of competitive salary as being the top contributor to the workforce shortage in their current agency or organization. Skill gap was also perceived to be a significant contributor to the workforce shortage, with 20% of respondents ranking it as number one. Interestingly, skill gap was ranked somewhat evenly as a cause of the transportation workforce shortage, with similar rankings among respondents for each level of impact (e.g. top, 2nd, 3rd, 4th, etc.). Competitive benefits packages and organizational culture were ranked as having the least contribution to the workforce shortage. Turnover was ranked by most as number 4 or 5 and Organizational culture was ranked as the number 6 cause by most respondents (25.1%).

Table 11: Respondents percentage for top perceived contributors to workforce shortage

<i>Contributes Most RNK</i>	Frequency	Valid Percent
Lack of Competitive Salary	73	47.7
Skill Gap	31	20.3
Insufficient Recruitment Strategies	16	10.5
Turnover	14	9.2
Organizational Culture	14	9.2
Lack of Competitive Benefits	5	3.3
Total	153	100.0

Table 12: Respondents percentage for least perceived contributors to workforce shortage

<i>Least Contributor</i>	Frequency	Valid Percent
Lack of Competitive Benefits	48	31.4
Organizational Culture	39	25.5
Skill Gap	26	17.0
Turnover	25	16.3
Lack of Competitive Salary	9	5.9
Insufficient Recruitment	6	3.9
Total	153	100.0

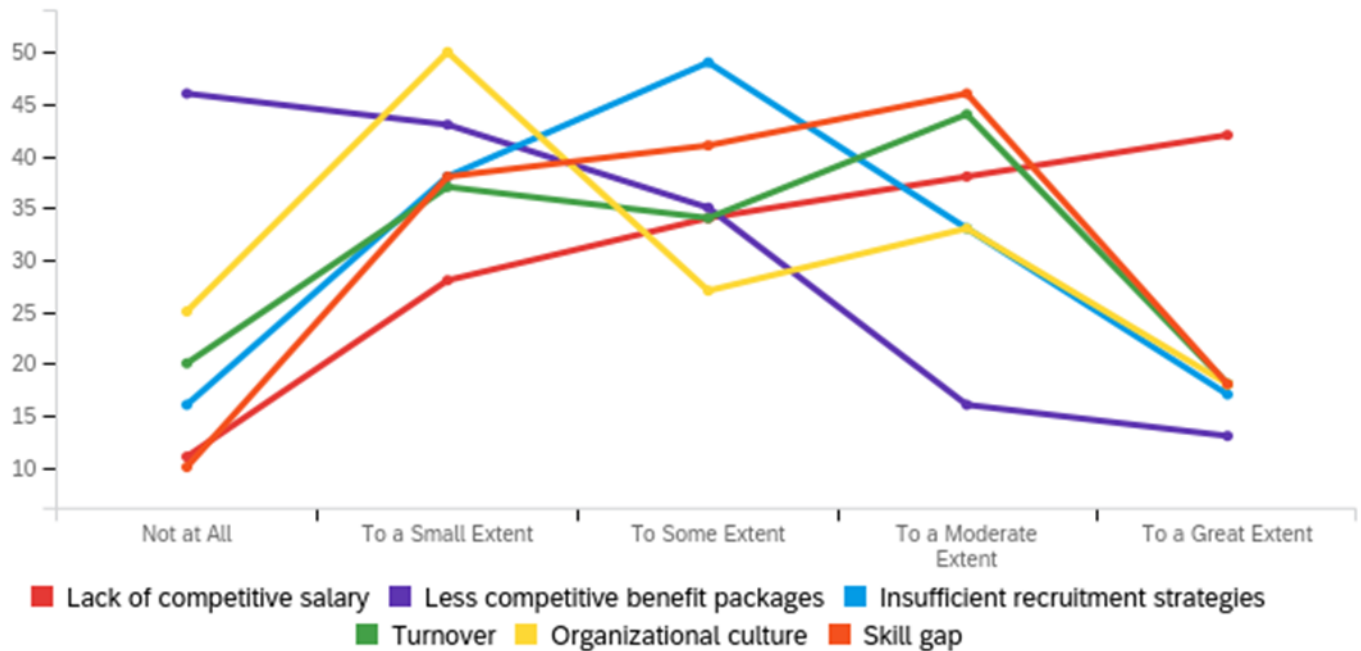


Figure 4: Extent of Contributions to Shortage

3.2.5 Motivation to Leave Current Position

Overall, increased pay was the top reason respondents gave when asked what would make them leave their current position. This observation supports the previous finding which shows that current workers perceive lack of competitive salary as a primary reason for the transportation workforce shortage.

Table 13: Top Reason to leave a current position

Reason to Leave	Frequency	Valid Percent
Increased pay	70	47.0
Advancement potential	33	22.1
Opportunity to Relocate	7	4.7
Freedom in choosing work schedule & tasks	25	16.8
Cultural support	14	9.4
Total	149	100.0

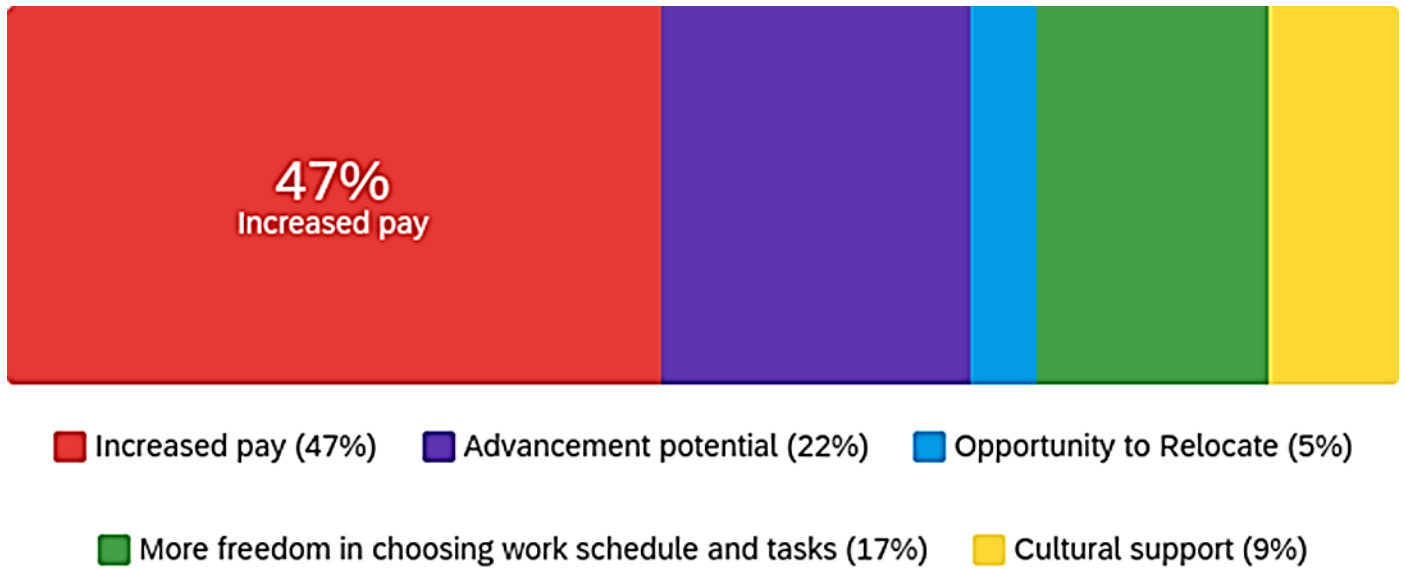


Figure 5: Top Reason to Leave Current Position

Increased pay is the top reason to leave the current position, irrespective of age. However, advancement potential was observed as the 2nd reason to leave for people born between 1963-1992, advancement potential and freedom in choosing work schedules was tied for the 2nd reason to leave for those born between 1963-1972, and freedom in choosing work schedules was observed as the 2nd reason to leave for those born between 1952-1962. Based on this sample population, it appears that older workers born between 1952-1963 place more emphasis on career flexibility, such as relocation and freedom in scheduling, while younger workers place more emphasis on advancement potential and cultural support.

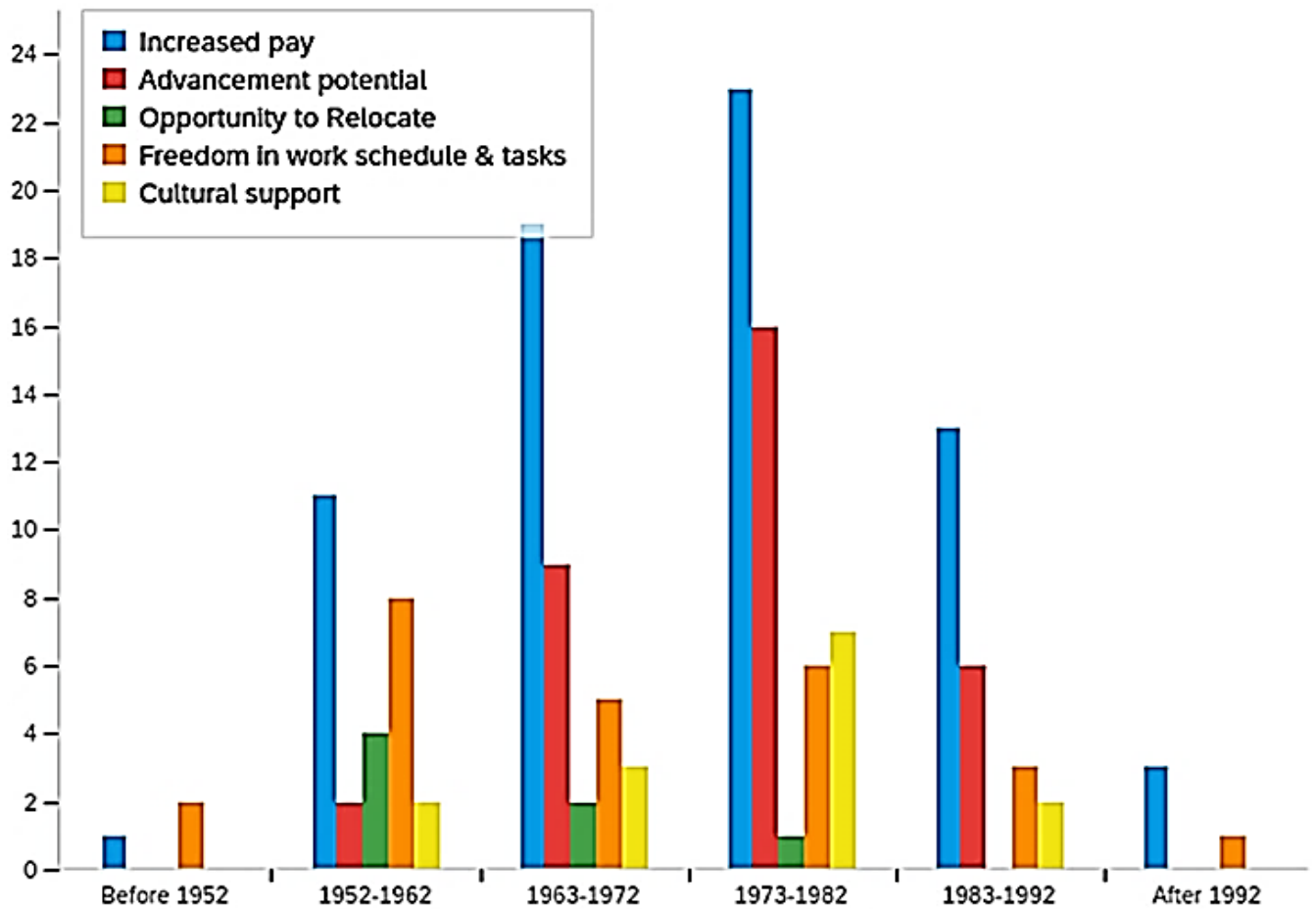


Figure 6: Top Reason to Leave Current Position According to Age

3.2.6 Comparing State vs. Their Organization/ Agency

When assessing how respondents view their organization in relation to the state on certain aspects, it was found that many respondents believe that working for the state offers more advancement potential than their current organization or agency. This is consistent with, and validates, the information provided from the public job forums presented in the literature review of Task I. Similarly, the majority of respondents hold the belief that the state, more so than their organization or agency, offers more resources for minorities and their families to integrate into the community. Generally, respondents have more positive perceptions of state agencies than their organizations. Refer to Table 14 for more detailed information.

Table 14: Comparison of State vs County or Local

		My Agency/ Organization	State of Minnesota
Offer Advancement Potential	Not at all	25.49%	5.88 %
	To some extent	58.17%	73.86%
	To a great extent	16.34%	20.26%
Creates an Atmosphere for Cultural Inclusion & Empowerment	Not at all	16.99%	9.80%
	To some extent	49.02%	58.82%
	To a great extent	33.99%	31.37%
Provides Resources for Minority Workers & their Families to Integrate into Communities outside of Work	Not at all	40.52%	15.69%
	To some extent	45.10%	60.78%
	To a great extent	14.38%	23.53%

N=153

3.3 DESCRIPTIVE STATISTICS FOR SCALE ITEMS

The 3-item Job Satisfaction scale ($\alpha = .877$) developed by Cammann et al. (1979), a 3-item Turnover Intention Scale ($\alpha = .844$) with two reverse scored items, and a 6-item Work Engagement Scale ($\alpha = .797$) developed by Shuck, Adelson, and Reio (2016).

Table 15: Updated Reliability Statistics

	Cronbach's Alpha	N of Items
Job Satisfaction	.877	3
Work Engagement	.797	6
Turnover Intention	.844	3

*N Responses = 149, N Missing =12

Table 16: Descriptive Statistics

	N	Range	Minimum	Maximum	Mean	Std. Deviation	Variance
Job Satisfaction	149	16	5	21	17.409	3.58679	12.865
Job Satisfaction_1	161	16	5	21	17.397	3.45039	11.905
Work Engagement	149	15	15	30	26.020	3.29305	10.844
Work Engagement_1	161	15	15	30	26.035	3.16817	10.037
Turnover Intention	149	12	3	15	6.571	3.33340	11.112
Turnover Intention_1	161	12	3	15	6.573	3.20599	10.278
Valid N (listwise)	149						

3.4 STATISTICAL INFERENCES

3.4.1 Bivariate Correlations

Findings revealed a positive correlation between job satisfaction and work engagement, which both have a negative relationship with turnover intention. This implies that as job satisfaction and work engagement increase, turnover intention decreases. In the same vein, high turnover intention usually implies that workers have low job satisfaction and report lower work engagement. Refer to Table 17 for correlations. While the relationship between engagement, job satisfaction, and turnover intention was expected, we assessed the relationship further by looking at correlations among jurisdictional groups. As can be seen in Table 17, turnover intention was shown to have a significant negative correlation with job satisfaction for all jurisdictions; however, work engagement was not shown to have a significant relationship with turnover intention for any of the groups. It is worth noting that the relationship between turnover intention and engagement for the jurisdictional category “city”, $r = -.338$, $p = .051$ barely missed the threshold for our desired p-value of $p \leq .05$ for statistical significance. This is noteworthy for Minnesota’s department of transportation because it highlights the importance of job satisfaction for all jurisdictions, while inferring that although work engagement is important, overall job satisfaction may hold more influence over other work outcomes, which include working engagement and turnover intention.

Table 17: Bivariate Correlations for Scale Items

Correlations

	Job Satisfaction	Engagement	Turnover Intention
Job Satisfaction	1	.415**	-.602**
Engagement	.415**	1	-.172*
Turnover Intention	-.602**	-.172*	1

** . Correlation is significant at the 0.01 level (2-tailed).

* . Correlation is significant at the 0.05 level (2-tailed).

N=149, No imputed scores

Table 18: Bivariate Correlations for Jurisdiction

		Job Satisfaction	Engagement	Turnover Intention
State, N=32	Job Satisfaction	1	.500**	-.445*
	Engagement	.500**	1	-.108
	Turnover Intention	-.445*	-.108	1
County, N=43	Job Satisfaction	1	.426**	-.558**
	Engagement	.426**	1	-.240
	Turnover Intention	-.558**	-.240	1
City, N=34	Job Satisfaction	1	.365*	-.687**
	Engagement	.365*	1	-.338
	Turnover Intention	-.687**	-.338	1
Other & Private, N=22	Job Satisfaction	1	.444*	-.522*
	Engagement	.444*	1	.001
	Turnover Intention	-.522*	.001	1

* Correlation is significant at the 0.05 level (2-tailed).

** Correlation is significant at the 0.01 level (2-tailed).

Total N=131 with imputed scores, 1 system missing item for grouping variable

3.4.2 Mean-Rank Differences Among Groups

To further assess perceptions of Minnesota’s transportation industry, we analyzed differences among jurisdictional groups (State, County, City, & Other). A Kruskal-Wallis H test showed that there was a statistically significant difference in perceptions on the extent to which a lack of competitive salary contributes to the workforce shortage, $\chi^2(2) = 19.912$, $p = 0.000$, with a M_{RANK} score of 68.67 for State, $M_{RANK} = 59.56$ for County, and $M_{RANK} = 36.37$ for City. To determine which groups were statistically

different, the Mann Whitney-U post hoc test (non-parametric equivalent to the independent samples t-test) was utilized. The test revealed that respondents who reported working for the county attributed lack of a competitive salary as a potential cause of the workforce shortage ($M_{RANK} = 46.83$) more so than those working for the city ($M_{RANK} = 29.10$, $U = 394.5$, $z = -3.54$, $p = .000$). Similarly, people working for the state had higher perceptions ($M_{RANK} = 42.78$) than those in the city, which implies that they view lack of a competitive salary as a contributor of the workforce shortage more so than those working in the city. In both instances, State and County workers appear to place higher emphasis on lack of competitive salary than those who reported working for the city.

3.4.3 Differences Among Population Density

A Mann Whitney-U revealed that there is a statistically significant difference between perceptions of adequate advancement potential within respondents' organizations for rural and suburban populations ($U = 168.5$, $Z = -3.88$, $p = .000$). Despite having a larger sample size, the rural population displayed lower perceptions of adequate advancement potential, cultural inclusion, and minority integration when compared to suburban population. However, the difference is only statistically significant for perceptions of advancement potential (See Table 19).

Table 19: Organizational Perceptions

	Population Density	Mean Rank	Sum of Ranks
Offers adequate advancement potential, $p = .000$	Rural	22.11	729.50
	Suburban	36.84	810.50
Creates an atmosphere for cultural inclusion and empowerment, $p = .154$	Rural	25.76	850.00
	Suburban	31.36	690.00
Provides resources for minority workers & their families to integrate into communities outside of work, $p = .017$	Rural	24.09	795.00
	Suburban	33.86	745.00

*Rural, N=33 and Suburban, N=22

3.4.4 Noteworthy Inferences for Future Exploration

Preliminary data appears to be consistent across groups regarding work engagement, job satisfaction, and turnover intention. Neither type of position (admin or technical), jurisdiction (state, county, city), or age category appear to have a statistically significant differences among M_{RANK} scores on the scale items. State workers appeared to have higher mean-ranked scores for engagement and job satisfaction than those who reported working for the city, but it was not statistically significant. Also, county workers had higher mean-ranked scores for turnover intention.

Although not statistically significant, difference in mean-rank scores for technical workers implies that they view organizational culture as a cause of the workforce shortage more so than those in administrative positions. This is noteworthy because it will help develop interview questions for the next phase of research. Additional mean-ranks are displayed in Table 20.

Table 20: Noteworthy Difference in Organizational Perceptions

Extent of... as a cause or contributor to the shortage	Position	Mean Rank	Sum of Ranks
Organizational culture, p = .116	Admin	54.78	2739.00
	Technical	64.59	4521.00
Insufficient recruitment strategies causes, p = .575	Admin	58.46	2923.00
	Technical	61.96	4337.00
Turnover, p = .253	Admin	64.68	3234.00
	Technical	57.51	4026.00
Less competitive benefit packages, p = .202	Admin	55.84	2792.00
	Technical	63.83	4468.00
Lack of competitive salary, p = .815	Admin	59.65	2982.50
	Technical	61.11	4277.50

Technical, N=70 & Admin, N=50

3.5 ASSESSMENT OF OPEN-ENDED SURVEY RESPONSES

While the open-ended qualitative survey questions yielded only a relatively small number of substantive responses, analyses revealed themes that can be categorized as 1) Generational perspectives, 2) Organizational perspectives, and 3) Diversity perspectives. Related to the first theme (generational perspectives), it is noteworthy that respondents across the generations represented in the sample provided similar responses regarding the cause of the workforce shortage. Subthemes appeared to be a perceived lack of awareness of public transportation careers and retirement of Baby Boomers. One respondent noted:

“...my impression is that there may have to be a bit of ‘catching up’ work to do. Many in the industry are within 5 (or 10) years of retiring and--while I think efforts to support individual career growth is slowly attempting to catch up with the resources available in other industries/private sector--there are some unnecessary institutional obstacles to career growth and advancement (e.g. rigid job classification structures, while simultaneously missing clear, attainable "career ladder" steps to pursue career advancement).”

Related to the second theme (organizational perspectives), several respondents communicated sentiments similar to one respondent's answer that, the workforce shortage is caused by "new workers not wanting to work long hours," while others pointed to factors such as a focus on hiring generalists as the root cause of the shortage. One participant provided the following example of a generalist approach.

"... Although a recently popular "thing" in engineering and transportation management circles, the reality is, what they are asking for typically does not exist (i.e. 10+ years of land surveying/project inspection/design tech/truck driver class A/ preferred with PE). Truck drivers are not professional engineers. Chief project inspectors are rarely PE's, Design tech aren't truck drivers. Advertise for realistic skill sets, and offer enough to make skilled persons want to move."

Finally, related to the third theme (diversity perspectives), there were significant differences of opinion regarding the role of diversity in the workforce shortage. One respondent described diversity as the answer to addressing the shortage: "The industry is also fairly male dominated and encouraging a more diverse workforce recruitment by race, gender and income levels during the middle school and high school years will benefit the industry." But other respondents described diversity as the cause of the shortage: "Qualified applicants get turned away in order for fair and diverse employee percentages." / "Diversity requirements in new hires. Failure to offer jobs to qualified workers in a timely manner, good workers find jobs quickly and go elsewhere." Pervasive thoughts about gender as a binary may spillover into organizational culture as it relates to perceptions of the importance and role of diversity. Two respondents answered the gender question with "other," instead providing the following responses: "They are all listed. All 2 genders. I am male." / "Only one or the other I'm male!!!"

3.6 SUMMARY OF SURVEY FINDINGS

The findings from the survey of Minnesota's public transportation workforce shows a general level of agreement for a shortage of qualified individuals. Generational differences in the context of the transportation industry appears to operate differently than in other sectors. Additional investigation is needed to further examine if difference in perceptions are more prominent at the industry or organizational level. The qualitative themes identified in this phase were explored further during the follow-up phone interviews. Likewise, when asked about recruitment strategies that are being implemented by their organization or agency, 17.4% of respondents reported that nothing is being done. This is something that should also be further explored.

3.6.1 Limitations

The survey sample was relatively small, and may not be fully representative of Minnesota's transportation workforce. Also, even after imputing data using the linear trend at point method, univariate outliers remained on several of the dependent variables. As is common with real-world data, the sample obtained in this study does not have a normal distribution, and therefore, violates the assumption of normality required to measure differences among groups through the commonly used Analysis of Variance (ANOVA).

CHAPTER 4: TASK III: PHONE INTERVIEWS

Following up on the information attained from the literature review and preliminary survey findings, audio interviews were conducted. Utilizing one-on-one, conversational style interviews is one of the most common methods for obtaining in-depth qualitative research. This approach is beneficial for gaining precise data about a phenomenon, such as the transportation workforce shortage, by offering opportunities for people to share their individual thoughts and experiences that might shed light on what contributes to the problem of concern. Audio interviews also enabled researchers to present findings that are directly tied to perspectives of those who work, in some capacity, with Minnesota's public transportation agencies.

4.1 INTERVIEW METHODOLOGY

To promote an atmosphere of openness, audio interviews were semi-structured, with the researchers utilizing an interview guide (see appendix E) that included several open-ended questions. The interview guide consisted of 13 primary questions, with several sub-questions to aid the researchers in asking more probing questions. As with many semi-structured interviews, there were instances in which the researcher allowed participants to freely express information that may not have been directly related to what was included in the interview guide. Such information was generally useful in understanding the participants' thought process in relation to the questions being asked, and for the researcher to observe the participants' attitude toward certain work related constructs. The participants' responses and the researcher's observations were used as meaningful data.

4.1.1 Interview Protocol

Preliminary analysis of the survey data was used to frame interview questions that more deeply explored key areas of concern. It should be noted that this portion of the research was conducted at the height of the COVID-19 pandemic, which may have impacted some responses to interview questions. The aim of the audio interviews was to explore the trends that emerged from the survey in greater depth and detail. Interview questions sought to examine the existence and magnitude of workplace shortages while probing for additional Minnesota and agency specific insights. Further, respondents were asked questions about organizational culture, recruitment, retention, and human resource development strategies currently in use by their organization. Interviewee participants were also asked about their opinions on the suitability and effectiveness of tactics from existing literature.

4.1.2 Data Collection

Audio interviews were conducted and transcribed using the Zoom audio platform. Several survey respondents provided their contact information to be solicited for audio interviews, and with the assistance of the TAP and LRRB, a list of possible participants was compiled with phone numbers and/or email addresses. Solicitation for interviews included word of mouth networking, referrals, and following up with those who provided their contact information on the online questionnaire. Utilizing the contact information obtained during the initial solicitation of participants, cold calls were made to assess

interest in continuing with the research and to schedule a time for the interview to take place. A total of 14 audio interviews were conducted. Interviews varied in length with the longest interview lasting nearly 45 minutes. This variation in length was partially due to the need to include additional probing questions as a way to gain information that was initially expected to be observed in subsequent focus interviews, which were canceled in response to concerns over COVID-19. During the scheduled Zoom interviews, participants were informed that the conversation would be recorded. They were then asked to acknowledge their understanding of their right to withdraw from the interview at any time, along with their freedom to decline to provide a response to any question. Participants were then asked to verbally provide their consent. Several interview participants were in senior and supervisory positions.

4.1.3 Interview Sample

Of the 14 audio interviews, there were 12 (85.7%) male and 2 (14.3%) female respondents, all of whom were identified as White or Caucasian. The interview pool consisted of workers associated with Blue Earth County, Crow Wing County, Dakota County, Saint Louis County, Nobles County, Jackson County, Carver County, and the cities of Bloomington and Edina. Since approximately 71.2% of interviewees reported working for a county level organization or agency, interview responses may be more indicative of perceptions associated with county employment more so than city or state agencies. Also, the majority of interviewees held senior level positions as engineers, directors, or other positions within the realm of upper management. One person held an elected position for a Minnesota Township, one respondent worked directly with their human resources department, and another served as a research professional for their agency. To maintain anonymity and confidentiality of responses, interviews were numbered in the order they occurred.

4.1.4 Data Analysis

Qualitative interview data was recorded and roughly transcribed by the Zoom platform automated transcription service. Transcripts of all 14 interviews were imported into Microsoft Word files and moderately cleaned to correct grammar and ensure accuracy. Where appropriate, repetitive stop words and phrases (e.g. “you know”, “so”, “um/uh”) were deleted. The audio files, along with the semi-cleaned transcripts, were assessed for patterns and collective themes. Upon further review of the transcripts and audio files, the researchers were then able to identify higher-order themes and pertinent sub-themes by utilizing relevant quotes from the interviews. Significant statements that truly exemplify the emergent themes were used to help form the narrative explaining the positive and negative aspects of working for Minnesota’s public agencies, which might be contributing to the workforce shortage.

4.2 THEMATIC FINDINGS

Although the findings include quotations and excerpts from the interviews, interviewees are referred to in general terms to maintain anonymity. Likewise, several of the larger excerpts have been mildly edited to remove information that might be traced back to specific agencies or people.

4.2.1 Emergent Higher-Order Themes

Analysis of the qualitative interview data resulted in 4 higher-order themes categorized as: 1) Benefits of working for a public agency, 2) The Challenges of a Bureaucracy 3) Nuances of Organizational Structure, and 4) Suggestions on how to reduce the workforce shortage. Higher-order themes encompass the key aspects of the data as a whole. Overall, interview participants expressed positive sentiments when specifically discussing their organization or agency, but were also very forthcoming about the limits placed on government workers. Organizational culture plays an important part role in the interviewees' decision to stay with the public transportation industry.

4.2.2 Theme 1: Benefits of Working for a Public Agency

The overall sentiment of this theme is that public agencies allow for more job stability and work-life balance than similar jobs in the private sector. Sub-themes under this category include general attraction to public transportation and reasons to stay.

4.2.2.1 Attraction to Public Transportation And Reasons to Stay

Many respondents stated that they sort of fell into a transportation career. Only one person really discussed having a “passion for traffic safety”. For most, there was not a specialized interest in the field, but opportunities were presented. One county engineer stated that he had the opportunity to work as an intern for MnDOT while he was in college, but he chose to go into the private sector after his graduation. During a recession in which a lot of private sector employees were being laid off, he chose to return to the public sector when an opportunity presented itself. He was offered a significant pay raise with more responsibility at a county agency, which impacted his decision to leave the private sector. In this situation, it appears that job stability and pay contributed to the attraction of public transportation work. Another interviewee chose to work in public transportation because he had spent years working a job that required 65-90 hours a week, but when he had children, he needed something with a 40 hour work week so he could spend more time with his family. He stated...

My motivation for changing careers was simply [that] I decided to get married and have a family and I chose not to miss the first 5-10 years of my kids' lives. I had to find something that was 40 hours a week. [It] didn't really matter what it was. And I had lots of technical and low end engineering skills when it came to civil engineering and I found a traffic engineer who needed an assistant traffic engineering, which is essentially what I function as and they are willing to spend some time to train me.

The emphasis on job stability and increased focus on work-life balance speaks to the first theme that highlights benefits of working in the public sector. Interviewees reiterated flexibility and organizational culture as reasons to stay at their current organization or agency. General sentiments of job satisfaction were expressed. One engineer described his entry into the field as having... “started with a summer job” and what got him to stay “was the variety of work” that he experienced on a daily basis. It was similarly stated by another interviewee that “...you get to do really neat and cool projects” and when deciding

whether or not she should stay at her current agency, she “struggled with trying to figure out where else [she] could go and still gets to do those really cool projects.”

4.2.2.2 Work is merely a part of life: Not Life Itself

The most prominent response for why people continue to stay at their current job has to do with their family-life. For example, an interviewee stated that he made more money working in the private sector, but wanted a job where he could be home by 3:00pm to spend more time with his kids. Of the interviewees, male engineers most often responded with “Wife” as the reason for them continuing on in the public sector. For some “work is a means to an end” with one respondent stating “I go to work so I can pay for the house that my family lives [in].

4.2.3 Theme 2: Challenge of Bureaucracy

There were several things that emerged as viable reasons for people to leave the public transportation industry as well as reasons why people might be hesitant to pursue the public sector over the private sector. Low pay, unrealistic depictions of job responsibilities, and opportunities for advancement were mentioned throughout the interviews. Based on sentiments expressed throughout all 14 interviews, these issues are either created or further complicated by the politics associated with a bureaucracy.

4.2.3.1 Difficulty Hiring because of Red Tape Policies

Even when skilled workers are available, working for a government agency presents several challenges for hiring. There are systemic and government mandated policies that require supervisors to complete a lot of paperwork and go through various steps before they receive approval to bring in a new employee. According to one senior level engineer...

One of the challenges that counties and/or cities have is that... let's say I hire a college student, and they've worked for us for a couple of seasons doing internship level work. Let's just say I'd really like to hire them. I don't necessarily have the flexibility that a consultant does to hire that employee and add them to our staff. Our staff are relatively locked in from a budgeting standpoint. And so for a county or city, you know, for me, specifically to add an additional employee to my department, even if there's a need... I have to submit a request at the beginning of the year that goes through administration and then goes to the county board. It's then considered as part of the county wide budget. It's a fairly arduous process to even be able to add another employee and obviously there's need within the county throughout all of the departments for additional staff so they have to be fairly judicious with it, and make some of those hard choices. So it takes away, perhaps some of the flexibility whereas if you are working for a consultant and they like you, and they have the workload, they can hire you without a lot of [paper work]. They've kind of got it built in to either be in growth mode or stagnant or reduction mode.

4.2.3.2 Pay: It really Matters

It was expected that ideas about pay would be a factor in deciding to stick with the public sector. According to one interviewee, skilled workers are “walking out the door because of minor things” like

“when [the company] can't give [workers] a \$3 an hour raise, so they can't go and buy their house, or they can't qualify for a loan.” From his perspective, the issue with pay is miniscule for organizations in the long-term.

It would make no difference in the long-term budgets and things of that nature, but somebody somewhere along the way made the decision that well... we can't do that. So then we lose really quality employees or people who have potential to be very high quality employees because they can go to this three letter company or that three letter company, or private organization or a different public organization that's offering them 3 or 4, or \$5 or more an hour, and better benefits. There's really no reason for them to stay, so that's a frustration.

Adding to the gap between laborers and engineers, it appears that some of Minnesota's public transportation agencies are unable to match wages specifically for heavy equipment operators, which is one of the skilled positions that have been impacted by the shortage. When asked about the role of management in addressing the workforce shortage, one interviewee provided the following.

The county board and the county administration department play a very critical role. Unfortunately, they get caught up in policy and other parameters that they set upon themselves and restrictions they put upon themselves.... There's certain positions that are hard to find and they pigeonhole people into classifications and when it comes time to hire the person they say, 'Oh no, we can't do that.' We can only offer this, we can only do that because everybody's got to be the same. And we have this pay plan and we have to stick with our pay plan. ... The markets are challenging for finding the right people so when you have a good person, they have multiple offers and you can't be competitive because you're locked into a pay plan. There's no flexibility in the system to allow you to hire the right person or a good person.

Some interviewees expressed difficulty in finding technical workers, while noting that engineers are easy to come by. The problem, however, appears to lie in the lack of applied training in the field. Even though pay does appear to be an issue for labors, one interviewee noted that during his tenure within his respective county, only two people left for reasons related to money. He went on to note that the one person who definitely left for increased pay, attempted to come back several times. The other person left for a combination of money and family reasons, with family needs taking precedent and money being a secondary incentive to leave.

4.2.3.3 Transparency: Providing a Realistic View of the Job

It became apparent throughout several interviews that overtime is expected in many of the technical positions and even for some of the chief inspectors. However, responses varied on whether or not potential applicants were made aware of the level over time required or the possibility that their tasks might significantly change without warning. For some county agencies, overtime is regulated such that only a hand full of people are allowed to get overtime. “Rather than spreading the overtime out there are three or four people that take the entire bunch, and that's why they don't last there either.” From the perspective of some interviewees, “It's very difficult to get anybody under the age of 40 to consider working a 75 and 70 and that's what the job requires.” When asked if workers are made aware of the fact that should an agency become short staffed, they might have to move into a new role completely,

as a somewhat forced promotion, responses were somewhat vague. However, one interviewee was very forthcoming, providing the following examples.

We had a surveyor quit and they came to us and said, all right, so one of you is going to volunteer to be a surveyor now.

They had a person quit from their inspection duties, so they went to one of the engineers and said, you are now a senior engineering specialist, which means you get paid over time and you're now going to be a Chief Inspector. So no that person did not expect what they got. That is, that is the choice in the management that I currently work.

When the researcher asked if workers have the autonomy deny a long term move into a new role outside of their initial expectations, the following response was provided.

Well we've been told there's lots of jobs out there, which is a non-committal way of saying there's a door if you don't like it. So there's very little flexibility when it comes to that. Now from a perspective of an executive employee that is trying to get programs delivered, I can see where there's a reason that they would try and do that because they're backed into a corner. People are leaving that they feel they can't replace. Or at least they can't replace [them] under the rules that they have to operate under.

4.2.4 Theme 3: Nuances of Organizational Structure

Echoed throughout the interviews was the reiteration of a lack of advancement potential and career mobility, particularly for senior level employees. There were common references to the need for someone to retire in order for a promotion. The structure of public agencies and government organizations limit opportunities for advancement potential because tenure and seniority have long standing value within the organizational structure.

4.2.4.1 The Role of Management

When asked how to fix the issues that contribute to the workforce shortage, a very telling perspective is that elected officials and policy makers may not be willing to make necessary changes to reduce the shortage. Organizational change is restricted by the disconnect between decision makers and workers. One interviewee responded shared an example of dialogue that experienced as a manager who tries to speak with elected officials about the challenges they face in the industry, the conversation goes something like this...

Official: We have to do [it] this way. This is the way we've always done it.

Manager: Yeah. But we're not fixing our problem.

Official: We understand, we'd like to really fix it, but we can't fix it with what we have.

Manager: So find a new way to fix it.

Official: No! no. Can we be thinking outside that box we always talk about, think outside the box, be innovative. 'But we really don't want to do any of it. We like to talk about it, but we really don't want to do any of that stuff.'

Manager's Thoughts: People tell you to think outside the box because most often that's not what they want at all. They just want an excuse for why things aren't happening.

In response to the challenges associated with the shortage, managers have taken different approaches. Some tend to partner with contractors rather than go through lengthy process for hiring. Others try to make do with the employees they have, while increasing the risk of burnout. One respondent noted seeing a shift in management styles with more managers adopting a “generalist approach” to managing subordinates. When probed, the generalist management style, as referenced by the interviewee, has a negative connotation. He described it as an attempt to,

... make every employee, especially your technical ones, a round peg. And if you pound hard enough, it'll go into any hole. And that's what we're seeing adopted at many public agencies currently. The executive employees all kind of decided that, 'hey, this is a great strategy. We'll just make everybody be able to do everything, which makes everybody generalists and nobody specialists.' And unfortunately, a lot of the people that I work with need to be specialists to do their jobs. We see that if they pound that round peg into a square hole that people conform and just suck it up, or they say, 'Yeah, I'm leaving see ya later.'

4.2.4.2 Perceptions of Current Recruitment

When asked, one respondent referred to current recruitment strategies as “antiquated” and another used the word “Inadequate”. Other interviewees emphasized the importance of word of mouth and networking, stating that it was the primary way for their organization to fill positions. Ads in newspapers, flyers, and internal communications were all stated as current practices within several agencies. Other interviewees stated that this is because “when a job comes up, there's so few people that do this stuff” and everybody who does already knows other people who can help them get hired when an opening comes. Agencies also recruit workers from other agencies across the state and counties. One interviewee went on to say that his county is a regional hub, which makes it a bit more lucrative and allows “additional resources that some of our surrounding smaller counties don't have”. For that reason, that particular county agency is “able to pay better... it's able to offer more opportunity than some of the surrounding counties.” Because of that, they're “able to take people from many surrounding counties, etc.”

4.2.5 Theme 4: Suggestions for Improvement

When asked what they would do to improve the workforce shortage, nearly all respondents made references to connecting with high school students, with some even stating that middle school students should be introduced to the transportation industry so they can grow up knowing about the different options available for career paths. A more in-depth assessment of current recruitment strategies dealt with how public agencies should help communities better understand the work and services that the agencies provide. The sentiment here is that public agencies need to truly sell themselves as beneficial to the community as a way to help potential applicants see value in the work being done. For example, the following was provided.

We need to sell that with construction, you get to be outside and inside. You get to build great things and change society and help mobility, whether it's for someone in a wheelchair or a family using a stroller or going on a bike path trip. I just think we don't sell ourselves well enough. Everyone appreciates that they have running water and that they can flush the toilet, but I don't think they know all the components of what goes into that.

Similarly, it was pointed out that public agencies could do a better job of training new people rather than relying on workers to already come with the necessary skill set. A general consensus is that there needs to be more focus on promoting trade jobs and helping students find value in a career that doesn't necessarily start with a college degree. However, in order for that to work, it is necessary to ignite the interests of students who are "18 or 19 when they're going to tech school or when they're going to college in the technical careers, which is where our gap is there is just nobody there."

Everybody and their brother is sending their kid to be an engineer, so we get all sorts of kids coming straight out of college with engineering degrees. ... What we're missing is anybody with technical ability or technical training. That is very difficult to come by. The problem is, unless you do a media campaign or something to try and get people to go to school for this stuff, they don't just magically appear.

While it is evident that Minnesota's public transportation industry could benefit from creating a better balance between the supply laborers and engineers, it should be noted that the presence of female engineers is lacking. The need for more technical workers also includes the need to market to more diverse candidates. One of the female interviewees reminisced about a time when she gave a presentation at a school in the south metro area.

There was a little boy who raised his hand and he goes can boys be engineers and that stuck with me because so often, it's the little girl who goes 'Can I be an engineer? And it was so neat to see the role reversal. So I would like to see a lot more outreach and stem in our school system.

4.2.5.1 Diversity and/without Inclusion (Researcher's Observations)

Responses to questions about diversity and inclusions were mostly positive and politically correct. Some attempts to attract a more gender and racially diverse workforce include reaching out to people in the communities being served. A few interviewees mentioned the need to acquire a workforce that could be more representative of the community demographics. As a young girl who might one day become interested in the field, "it would be really important to see a female in a role that's nontraditional... that you wouldn't think of in the field with construction and that sort of thing." This is also important for the inclusion of racial diversity.

You want to make sure that people can see... 'Oh yeah, that person looks like me.' It's not that you can't make that imagination or that leap if the person doesn't look exactly like you. It's just a little bit easier. So I would hope we would see workforce that reflects more of our demographics.

Since the majority of the interview sample consisted of White males, it is not unusual for interviewees to have had similar responses to questions regarding diversity and inclusion. In some instances, the

researcher's race may have impacted the responses provided by interviewees. One stated that he *doesn't see color*, just workers. Others were quick to gloss over the questions or had very little to say about it. It is noteworthy that the two female interviewees had much more to say about this topic. These types of observations could be indicative of an underlying problem. Also, having a diverse workforce is not likely if agencies do not work to ensure that different perspectives and backgrounds are accepted. This is inclusion part of diversity and inclusion. One of the female interviewees provided the following example.

I do remember one meeting, I think it was last week or something. And you could tell that... the white males in my organization have all had a similar life experience on this one topic. And it was a person of color and myself as female who were picking up a different perspective that I don't think its... They weren't trying to be mean or anything. They just... It had never occurred to them that there might be a different struggle because they're providing the lens that they've lived their life through. And you know, you're most comfortable in your own lens and it was hard for them to think, 'Oh yeah, there might be a different lens here.'

4.3 SUMMARY OF INTERVIEW FINDINGS

The benefits of working for public agencies include jobs stability, set work hours for some positions, and work-life balance. Constraints of working in the public sector largely deal with inflexible regulations, politics, and the complex barriers that managers have to go through in order to bring on new employees. Interviewees expressed overall satisfaction with their agency, but several noted problems that all go back to bureaucracy. Standard pay scales, preferences for seniority, and lack of transparency for job roles are believed to be a significant contributor to the workforce shortage. Interviews also revealed that the shortage stems from a lack of technical workers, not engineers. The general consensus on fixing the problem is to market the field to students in middle school as a way to show that people can have a nice career without pursuing a four-year degree. For a simplified snapshot of prevalent themes, refer to figure 7.

4.3.1 Limitations

Although this research project began before the widespread response to the novel Coronavirus-19 (COVID-19) pandemic, it is likely that participant responses to some interview items were influenced by their perceptions of how MnDOT and other agencies responded to the challenges presented as a result of the pandemic. This is evidenced by some respondents explicitly stating that their organization adapts well to large changes, with their reasoning based on the organization's swift transition to online work in response to the pandemic. It is common for qualitative inquiries of this nature to be impacted by the work conditions participants faced at the time of the study. Also, in comparison to the number of people working in Minnesota's public transportation industry, the sample of interview participants was relatively small and the collective themes that emerged from the interviews might not be representative of workers at different career levels. Regardless, the findings provide valuable insight into the complexity of issues impacting the transportation workforce.

4.3.2 Integrated Discussion of Findings

Generational differences in the context of the transportation industry appears to operate differently than in other sectors. Additional investigation is needed to further examine if the difference in perceptions is more prominent at the industry or organizational level. The initial survey presented questions about whether or not differences in perceptions were more prominent at the industry or organizational level. Based on holistic findings (literature review, survey, and interview data), it seems likely that perceptions of issues impacting Minnesota’s transportation workforce are more prominent at the organizational level. This is evidenced by responses that discuss the difficulty of hiring people in county vs city agencies, with several respondents in more rural areas noting that they have not been directly impacted by the workforce shortage.

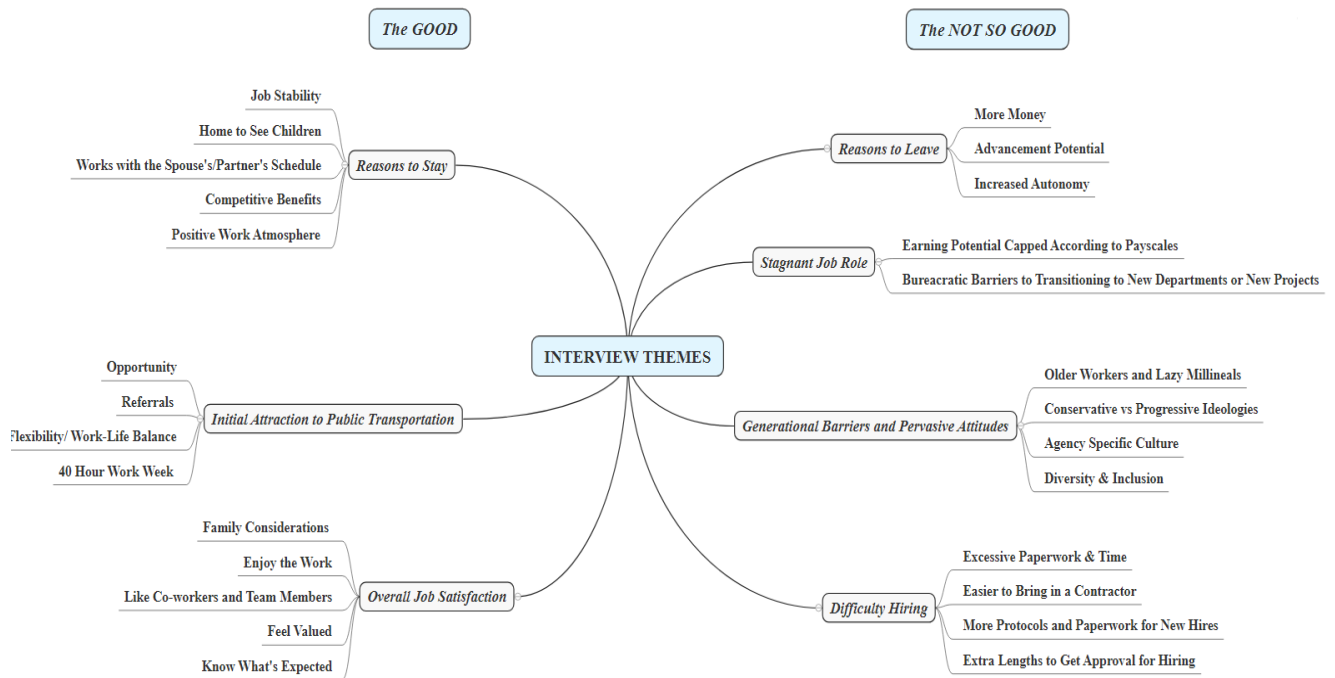


Figure 7: Snapshot of Interview Themes

CHAPTER 5: CONCLUSIONS AND RECOMMEDATIONS

As discussed in Chapter 1, the purpose of this task is to integrate and situate findings from the survey and audio interviews using the SCOPE framework. To expand on the proposed recommendations and present a cohesive review of the findings that are specific to situations occurring within Minnesota’s public transportation agencies, the SCOPE framework is presented as a usual tool for organizational leaders and those with human resource responsibilities. The SCOPE framework offers a multi-dimensional way to plan and assess past, present, and future conditions along with any advantages or disadvantages that may be caused by internal or external organizational factors. This is useful for presenting specific plans for addressing the workforce shortage in Minnesota’s public transportation industry. It is important to note that “situations” and “obstacles” are likely to shift as economic needs change with time. Also, understanding that urban and rural agencies or organizations may face different challenges, it might be necessary to provide recommendations for large, small, rural, and urban agencies.

Table 21: SCOPE framework of Minnesota’s Public Transportation

SCOPE of Minnesota’s Public Transportation
Situation: Employee turnover in public agencies has assumed greater importance as the monetary and non-financial costs of replacing and retraining employees are more thoroughly understood (Bartlett & McKinney, 2004).
Core Competencies: Positive organizational culture, competitive benefits packages, high perceptions of job stability during economic downturns
Obstacles: Red tape that limits advancement potential, inability to meet private sector pay for some technical positions, generational differences that may negatively spill over into daily work culture, undisclosed expectations of workers, aging workforce, outdated recruitment strategies in rural populations
Prospects: Knowledge transfer through mentorship and ability to use contract workers, as well as the ability to appeal to a broader diversity of potential workers
Expectations: Continued significant challenges to workforce issues were made more complex, urgent, and unpredictable due to the global COVID-19 pandemic. A commitment to strategic yet flexible approaches to planning for workforce issues, especially a potential state-level coordinated effort to recruitment, retention, and employee development

5.1 S – SITUATION

Rearview — pertaining to conditions that have a relevant and material impact on planning decisions with regard to internal or external environmental factors.

Due to the infrastructure of state governments, MnDOT can be described as a distributed model comprised of several sub-agencies, each having their own interdependent offices, departments, and divisions. The agency has several HR functions, which include clerical, administrative, training and development, and personnel selection. MnDOT's sub-agencies have local workforces that vary greatly between region, county, or town. This, along with changes in economic needs, an aging workforce, and bureaucratic policies, has contributed to inconsistent workforce shortages across agencies. Although Minnesota's public transportation industry operates as a collective system, the individual parts (e.g., agencies) are experiencing different conditions that impact their ability to function at an optimal level. This is further complicated by the blanket policies applied to all agencies, irrespective of the undue hardships that such policies create due to specific conditions outside of the agency's control.

5.2 C – CORE COMPETENCIES

Speaking specifically about recruitment and retention, Minnesota's public transportation industry does have some core competencies. As highlighted throughout this project, positive sentiment about job stability provides a strong incentive for skilled workers. The ability for government agencies to provide a competitive benefits package with standard paid time off (PTO), paid holidays, and options for health and retirement planning is a core competency that can be used to promote the positive side of working for a bureaucracy. When appropriately incorporated, positive organizational culture can be a core competency as well. Some of the core competencies highlighted for Minnesota's public transportation industry include:

- Job stability
- Competitive benefits packages
- Organizational culture (for some agencies)

5.3 O – OBSTACLES

Several obstacles impede efforts to attract and retain workers. Government constraints for hiring, job promotions, and redirecting job responsibilities appear to be a significant and recurring barrier to improving the transportation workforce. For some agencies, there is more incentive to maintain contractors rather than hire a full-time employee because there are fewer requirements involved when working with a contractor. In keeping with issues related to bureaucratic red tape, there appears to be a disconnect between politicians, senior advisors, and the workers who are tasked with completing projects. Generational differences, opposition to change, and general intolerance of differences contribute to a negative organizational culture, which can be an obstacle for agencies in locations with a less progressive demographic. Lack of advancement potential is another obstacle that consistently

appears across each phase of this research project. Uncertainty over career pathways and general displeasure with the work itself are also issues that contribute to increased turnover.

5.4 P – PROSPECTS

Current prospects include ongoing outreach programs for state agencies to attract high school and college students to the transportation industry. There is room for growth in this area, but targeted programs have shown to be beneficial for some agencies. More focus on developing lasting internships, creating pathways for more seamless transitions from intern to employee, and shifting emphasis from task-oriented to time-oriented might strengthen the current initiatives. Other prospects include developing mentorship programs and creating tailored programs to help ease knowledge transfer between older and younger generations. Additional prospects include the opportunity to highlight competitive benefits packages as comparable to those offered in the private sector. Holistically presenting pay and benefits, in terms of an overall monetary value, may be useful in helping potential applicants understand that the long-term value of working for a public agency is comparable, and in some cases more financially viable, than working in the private sector. One prospect to overcome the obstacle of advancement potential would be to offer lateral opportunities for career advancement. Perhaps rather than having workers wait to move into a new upper-level position with a monetary promotion, workers could be offered an opportunity to transition to different types of work. Such transitional projects would not necessarily be based on seniority and would not be considered a promotion in the traditional sense. The lateral route of career mobility could be structured such that new projects emphasize individual opportunities to develop expertise in a number of areas with options for working on a number of different projects that have varying degrees of difficulty and responsibility. In summary, Minnesota’s public transportation industry can continue to progress its prospects by:

- Strengthen pathways from school to work
- Providing a holistic view of pay and benefits in terms of long-term monetary value
- Encouraging lateral route to career mobility

5.5 E – EXPECTATIONS

It is often noted that future expectations are fraught with difficulty in predicting an uncertain future. As evidenced throughout this research project, the global pandemic of COVID-19 has created impacts to every sector of life with hopes for a return to a sense of normalcy increasingly more distant. However, it appears that expectations of ongoing and possibly greater levels of workforce issues as a potential source of stress and strain within the public transportation sector are likely. Existing talent shortages could become more critical with recruitment, retention, and development of employees in public transportation agencies needing a commitment to a strategic and flexible approach to planning. A commitment to strategic yet flexible approaches to planning for workforce issues, especially a potential state-level coordinated effort to recruitment, retention, and employee development could offer a greater level of insight into expectations of employees and agencies. Further, participatory planning approaches to workforce issues, such as scenario planning, could offer a systematic tool to identify possible outcomes as selected signals and characteristics emerge.

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APPENDIX A: SURVEY INFORMED CONSENT

SURVEY INFORMED CONSENT

You must be at least 18 years of age to take this survey. You retain the right to refuse participation in this research. Should you choose to take the survey, you may withdraw from this research at any time without consequence.

Purpose & Procedure

The purpose of this project is to examine causes of the workforce shortage in Minnesota's public transportation industry and identify appropriate human resource strategies in response. We ask that you take the survey at a time when you can complete it in its entirety (about 10-15 minutes); however, you may exit the survey at any time by closing your browser. This research has been approved by the University of Minnesota's Institutional Review Board and is sponsored in part by Minnesota's Local Road Research Board.

Confidentiality & Withdrawal

Survey responses are confidential and will not be tied to individuals. You may withdraw your consent to participate in this research at any time. If you choose to withdraw from the study before completing the survey, any responses you provided may still be used for research.

Questions about Participation

If you have any questions about this research, you may direct them to:
Dr. Kenneth Bartlett, by email: bartlett@umn.edu
Dr. Joshua Collins, by email: collinsj@umn.edu

Consent

I have read the above information and I agree to take part in this survey study as a voluntary participant.

- By entering this survey, **I am implying my consent.** (1)
- I do not consent to participate in this research. (2)

If selected (2): You selected that you do not consent to participate in this research. Please select the appropriate option below to provide your consent, or confirm that you do not wish to participate.

- By entering this survey, **I am implying my consent.** (1)
- I do not consent to participate in this research. (2)

APPENDIX B: INFORMED CONSENT FOR AUDIO INTERVIEW

INFORMED CONSENT FOR AUDIO INTERVIEW

As a reminder, anything we discuss in this interview will be anonymized to protect your identity and precise organizational affiliations. In other words, as the person conducting this interview, myself and the research team will know your identity, but your responses will be coded in such a way that your identity will not be revealed in the write up of our report or any subsequently published studies. No one from your organization will have access to your responses and they will not have any way of determining if you participated. Also, you are free to discontinue your participation in this study at any time. Do I have your consent to move forward with your participation in this portion of the research project, as well as your permission to record the remainder of this call?

APPENDIX C: RECRUITMENT GUIDES

RECRUITMENT GUIDES

Phone Script for Contacts Provided on Survey:

Hi... My name is Tasha Mrema and I, along with Dr. Collins & Dr. Bartlett in the department of OLPD at the University of Minnesota are conducting research on the workforce shortage in Minnesota's public transportation industry. This research is supported by MnDOT and the Local Roads Research Board. I am calling because you previously participated in this research by completing an online survey and you stated that you would be open to participating in a follow up phone interview about your thoughts on the workforce shortage. Do you have 15-30 minutes to discuss this? If not, what would be a better time for me to call?

Cold Calling Guide for Referrals:

Hi, may I speak with...

My name is Tasha Mrema and I, along with Dr. Collins & Dr. Bartlett in the department of OLPD at the University of Minnesota are conducting research on the workforce shortage in Minnesota's public transportation industry. This research is supported by MnDOT and the Local Roads Research Board. I am calling because you previously participated in this research by completing an online survey and you stated that you would be open to participating in a follow up phone interview about your thoughts on the workforce shortage. If you are still willing to share your thoughts, are you available next week for a 20-30 minute Zoom interview? If so, what days and times are you available?

Phone Script (CTS Contacts List):

Hi... My name is Tasha Mrema and I, along with Dr. Collins & Dr. Bartlett in the department of OLPD at the University of Minnesota are conducting research on the workforce shortage in Minnesota's public transportation industry. This research is supported by MnDOT and the Local Roads Research Board. I am calling because while at the CTS Joint Councils meeting, you expressed interest in participating in our ongoing research by sharing your thoughts in a short phone interview. Do you have 15-20 minutes to discuss this? If not, what would be a better time for me to call?

APPENDIX D: SURVEY ITEMS

SURVEY ITEMS

1. *Do you currently work for an agency/organization in the Minnesota Public Transportation Industry?
 - Yes (1)
 - No (2)

2. *Which of the following jurisdictional categories most closely describes your organization?
 - State (1)
 - County (2)
 - City (3)
 - Township (4)
 - Private Consulting Firm working within Minnesota's public transportation industry (5)
 - Other public (6)
 - Other (please specify) (7) _____

3. Research has shown that there is a workforce shortage in the public transportation industry. Which of the following statements best reflects your perception of the **MN transportation industry** workforce?
 - There is NOT a shortage of qualified people for available jobs. (1)
 - There is a shortage of qualified people for available jobs. (2)

Display This Question:

If Research has shown that there is a workforce shortage in the public transportation industry. Whic... = There is NOT a shortage of qualified people for available jobs.

- a. If there is not a shortage of qualified people, what do you attribute the workforce shortage to?

Skip To: Q5 If Condition: If there is not a shortage ... Is Displayed. Skip To: What is your current organization or

Display This Question:

If Research has shown that there is a workforce shortage in the public transportation industry. Which... = There is a shortage of qualified people for available jobs.

4. You selected that there is a shortage of qualified workers. Please select the following statement with which you agree.
- There is a small shortage of qualified workers. (1)
 - There is a moderate shortage. (2)
 - There is a severe shortage. (3)

4a. What do you attribute the workforce shortage to?

5. What is **your current organization or agency** doing to recruit skilled workers and other qualified candidates? Please select all that apply.
- Nothing (1)
 - Job Advertisements or Job Fairs (2)
 - Specific programs to strategically recruit the best candidates (3)
 - Professional networking (4)
 - Other. Please explain. (5) _____
6. To what extent do you think the following are causes or contributions to the current workforce shortage **in your current agency or organization.**

	Not at All (1)	Small Extent (2)	Some Extent (3)	Moderate Extent (4)	Great Extent (5)
Lack of competitive salary (1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Less competitive benefit packages (2)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Insufficient recruitment strategies (3)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Turnover (4)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Organizational culture (5)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Skill gap (6)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

7. Please rank the following according to which you believe contributes most to the public transportation workforce shortage in **your current agency or organization**. Drag each item to the appropriate level.

- Lack of competitive salary (1)
- Less competitive benefit packages (2)
- In sufficient recruitment strategies (3)
- Turnover (4)
- Organizational culture (5)
- Skill gap (6)

8. To what extent does your agency or organization **successfully** do the following in comparison to the state of Minnesota?

	The state of Minnesota			My Agency/ Organization		
	Not at all (1)	Some extent (2)	Great extent (3)	Not at all (1)	Some extent (2)	Great extent (3)
Offer adequate advancement potential. (1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Creates an atmosphere for cultural inclusion and empowerment. (2)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Provide resources for minority workers and their families to integrate into communities outside of work. (3)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

9. How often do you feel joy from completing the daily tasks of your work?

- Never (1)
- Sometimes (2)
- Always (3)

10. Please select your level of agreement with the following statements.

	Strongly Disagree (1)	Disagree (2)	Slightly Disagree (3)	Neither agree nor disagree (4)	Slightly Agree (5)	Agree (6)	Strongly Agree (7)
All in all I am satisfied with my job. (1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
In general, I don't like my job. (2)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
In general, I like working here. (3)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

11. Which of the following would be the top reason to leave your current position for employment elsewhere?

- Increased pay (1)
- Advancement potential (2)
- Opportunity to Relocate (3)
- More freedom in choosing work schedule and tasks (4)
- Cultural support (5)

12. Please select your level of agreement with the following statements.

	Strongly Disagree (1)	Somewhat Disagree (2)	Neutral (3)	Somewhat Agree (4)	Strongly Agree (5)
I intend to stay in this job for the foreseeable future. (1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I will probably look for a new job within the next year. (2)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I do not intend to pursue alternative employment in the foreseeable future. (3)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

13. Please select your level of agreement with the following statements.

	Strongly Disagree (1)	Somewhat Disagree (2)	Neutral (3)	Somewhat Agree (4)	Strongly Agree (5)
I am really focused when I am working. (1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I give my job responsibility a lot of attention. (2)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Working at has a great deal of personal meaning to me. (3)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I feel a strong sense of belonging to my job. (4)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I really push myself to work beyond what is expected of me. (5)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I work harder than expected to help my agency or organization be successful. (6)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

14. *Please describe the population density of the region where your current agency/organization conducts most of its work.

- Rural** (1)
- Somewhere between Rural & Suburban (2)
- Suburban** (3)
- Somewhere between Suburban & Urban (4)
- Urban** (5)
- I am not sure (6)

15. What is your age cohort?

- Born before 1952 (1)
- Born 1952-1962 (2)
- Born 1963-1972 (3)
- Born 1973-1982 (4)
- Born 1983-1992 (5)
- Born after 1992 (6)

16. Please select your Race/ Ethnicity.

- Black, African, or African American (1)
- Hispanic or Latino (2)
- Asian/ Pacific Islander (3)
- White or Caucasian (4)
- Mixed or Biracial (5)
- Native American/ American Indian (6)
- Mine is not listed. Please explain. (7) _____
- Prefer not to Respond (8)

17. Please select your preferred gender.

- Female (1)
- Male (2)
- Mine is not listed. Please explain. (3) _____
- Prefer not to Respond (4)

18. Do you hold any professional certification or license?

- Yes (1)
- Maybe (2)
- No (3)

19. Please select all levels of education that you have attained.

- High School (1)
- Certificate. Please list type. (2) _____
- Associates Degree (3)
- Bachelor's Degree (4)
- Master's Degree (5)
- Other (6) _____

20. Where did you receive your applicable education/training **for your current position**? Please select all that apply.

- Minnesota (1)
- Midwest (2)
- Other U.S. (3)
- International (4)

21. With which category does your current position align?

- Administrative (1)
- Technical (2)
- Clerical (3)

22. Are you willing to be contacted for a short (20 minute) follow up phone interview?

Confidentiality of survey responses will still be protected.

- Yes (1)
- No (2)

Display This Question:

*If Are you willing to be contacted for a short (20 minute) follow up phone interview?
Confidentialit... = Yes*

23. Please provide your name and a number at which you can be reached, along with your preferred day and time, for a follow up phone interview. **Confidentiality of survey responses will still be protected.** _____

Thanks for your Participation!

APPENDIX E: INTERVIEW PROTOCOL

INTERVIEW PROTOCOL

Demographic Items

1. What agency are you currently working for and what is your job title?
 - i. Do your tasks align with your job title?
 - ii. What does your typical workday look like?
2. Do you have any direct reports?
 - i. Yes/no. If yes, how many?
 - ii. If so, how would you describe your management style?
 - iii. In the daily management of your direct reports, what are some common issues that you come across?
 - iv. What do you believe is the role of management in addressing the workforce shortage?
3. How many agencies have you worked for within Minnesota's transportation industry and over how many years?
4. How did you find your way into a public transportation career and what motivates you to stay?
5. With what race do you identify?

Questions

6. As you may know, we conducted a preliminary survey about the workforce shortage and we found that 73% of those answering reported job fairs and advertisements as dominant recruitment strategies with nearly half of the respondents citing professional networking as a recruitment strategy. What are your initial reactions to how recruitment of employees is done – in your organization and in the public transportation industry in Minnesota?
 - i. Also 53% of respondents said they would be willing to leave their current organization/agency for increased pay. Other findings revealed perceptions that deal with a lack of advancement potential, career mobility, and confusion over career pathways. What are your initial reactions to these findings from the survey?
7. Ideally, what would the transportation workforce in your agency/organization look like to you? Can you describe in terms of the numbers of workers, their education, training, background, and demographics?
 - i. Do you see yourself represented in conversations about diversity and inclusion in your agency/organization? Why or why not? If so, how?
 - ii. When you think of the words diversity and inclusion what comes to mind?
8. How do you perceive the impact of having multiple workers from different generations present in your particular agency or organization?
 - i. Do you think different generations have an impact on the transportation workforce as a whole?

- ii. If so how and in what ways? Do you have a specific example you could share that shows how different generations in your organization have different attitudes toward work?
9. What efforts, if any, have been put in place to address the shortage and do you think they are working? Why or why not
- i. How long did it take to implement these efforts and how was the information disseminated throughout the organization?
10. If there has ever been a situation at your current organization that made you consider leaving, what led to your decision to stay?
- i. Can you describe a little more about the situation leading up to your consideration to leave?
11. If you were in a position of power, what would you do to solve the workforce shortage in the transportation industry?
12. If you had to describe the atmosphere of your job to someone you knew personally who wanted to apply for a vacant position, what would you tell them?
- i. Describe the culture of your organization as it relates to professional relationships with peers and supervisors.
 - ii. Describe the culture of your organization as it relates to including and interacting with people from different backgrounds.
 - iii. Describe the culture of your organization as it relates to flexibility of your job. For example, are there times you are permitted to work remotely, different hours, etc.?
 - iv. For example, if you have to leave work early or take time off for personal reasons, how receptive is your organization in understanding these types of issues? Do you feel comfortable approaching your superior to request time off when necessary?
 - v. Describe the culture of your organization as it relates to responding to changes both big and small.
 - vi. Describe the culture of your organization as it relates to expectations for employees to work overtime.
13. Based on the questions that we have asked you today, what are we missing that you think may be contributing to the workforce shortage?