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Building a Business Case for Increasing Diversity in the Transportation Workforce

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Above: Students learn about transportation careers at the Choosing Transportation Summit's Transportation Expo.

Transportation agencies and contractors have often struggled in their efforts to achieve goals for gender and ethnic diversity reflecting society's recognition of shared aspirations and expectations. Despite progress, statistics continue to show how much more there is to do, and demographic projections suggest the situation will not be resolved by inaction. More importantly, however, recent studies show that organizations with the most diverse workforces realize better decision-making and more efficiency, innovation, and profitability than do their less-diverse peers.

Demographic trends shaping the nation's workforce—the large millennial population, the rise of neurodiverse workers, and dramatically increased ethnic diversity—mean that increasing diversity in the transportation business not only is essential to agency mission achievement but also can be a force for improved performance. With the ever-changing impacts of technology, it is crucial to attract a highly skilled and diverse workforce to ensure the nation remains at the forefront of innovation.

Why Focus on Diversity?

Nationally and globally changing demographics mean that organizations that want to remain competitive and innovative must create a culture that is supportive of diversity (*1–2*). A diverse workforce is a critical way to supply the variety of perspectives and skillsets needed to successfully solve complex, future global challenges (*3*). By definition, diversity encompasses not only traditionally recognized measures—gender, race, and ethnicity—but also age, socioeconomic status, veteran status, orientation, neurodiversity, experiences, and a host of other characteristics.

For the first time in the nation's history, five generations soon will be engaged simultaneously in workplaces. As the number of baby boomers in the workforce begins to decline, millennials now make up the largest portion of the adult pop-

ulation, with the number of members of Generation Z rapidly growing (*4*).

Women's representation in the workforce (47%) is nearly equal to that of men (53%); the number of women in the workforce has grown by 12% since 2000 (*5*). Racial and ethnic diversity also is increasing; projections indicate that by 2055, for the first time in U.S. history, no single ethnicity will hold a majority (*6*).

Neurodiversity also has received more attention, particularly given recent estimates that 1 in 59 children in the United States have autism (*7*). Based on these statistics, it is imperative to attract diversity into the transportation industry simply to ensure that enough workers required to design, operate, and maintain transportation systems are engaged in the workforce.

IMPROVED ORGANIZATIONAL PERFORMANCE

A much more important reason for agencies to achieve diversity and inclusion, however, is increased organizational performance. Studies show that organizations with the most diverse workforces see significant increases in efficiency, innovation, and profitability along with improved decision-making (*1, 8*). Research from McKinsey & Company shows that ethnically diverse and gender-diverse organizations are 35% and 15% more likely, respectively, to achieve above-average financial returns (*9*).

The impact of diversity is significant at both extremes. Thus, a critical mass of diverse perspectives—not simply tokenism—is required for an organization to derive benefits (*10*). These benefits also are not exclusive to a particular type of diversity. A 2016 Boston Consulting Group study found a statistically significant positive relationship between innovation—defined as increased revenues from innovative products and services—and the diversity of companies' management teams, in terms of members' industry backgrounds, countries of origin, career paths, and genders (*11*). Specifically, companies with higher-than-average levels of diversity composition in management teams generated 19% more innovation revenue than those with average or low levels of diversity.

Photo courtesy Ivey et al.

Participants of U.S. DOT's Women and Girls in Transportation Initiative program at Florida Memorial University.

DIVERSITY IN LEADERSHIP

The study also found that for diversity to make a difference in innovation performance, at least 20% of an organization's leadership must be female; even with broad gender diversity among all employees; benefits are not fully realized without females in leadership roles. These findings are important for transportation agencies in which performance measurement have become a standard business practice; increased innovation and efficiency is essential in the age of automated and connected vehicles, Vision Zero, the Internet of Things, and big data.

NEURODIVERSITY

Recent recognition of the added dimension of neurodiversity leads to further examination of its impacts within an organization (*12*). Neurodiversity arises from the inclusion of individuals with atypical neurological expression in the workplace, which is important given that an estimated 2% of the U.S. population is neurodiverse (*7*). Autism, attention deficit–hyperactivity disorder, dyslexia, dyspraxia, and a range of other conditions lead to differences in the ways individuals think, learn, and communicate.

Although on the surface these differences may seem to create barriers to efficient workplace operations, they can be very beneficial. Neurodiverse individuals not only may have areas of very high ability—particularly in mathematics, computer applications, and other areas in high demand with transformative technologies—but, because they approach a problem differently, may develop more innovative solutions and recognize patterns and root causes more readily (*13*). Neurodiverse workers also tend to be more loyal than other workers are and are highly productive when job tasks are matched to their skillsets (*14*).

RECRUITMENT AND RETENTION

Not only does diversity lead to better performance and bottom lines, but it also is important to recruitment and retention. More than 65% of job seekers indicate that workplace diversity is a critical factor in their decision-making process around accepting a job (*8*). A study conducted by the U.S. Department of Commerce

Photo: Metropolitan Transportation Authority

New Metropolitan Transportation Authority station managers pose for a group photo. More than 65% of job seekers place high importance on workplace diversity.

documented increased employee retention within organizations that had higher levels of diversity. Public agencies also saw the added benefit of diversity in the workforce in better alignment of agency service delivery with community needs (15).

In a recent global survey of more than 10,000 human resources leaders and other high-level executives from a diverse range of organizations, 81% noted that talent acquisition and 69% indicated that diversity and inclusion were top priorities for organizational agility and growth (16). These same companies also reported a significant gap in achieving goals related to both priorities, however.

Another study, conducted across North America by PwC Global, found that 87% of organizations ranked diversity and inclusion as a top priority but more than 40% indicated that it was a significant challenge to organizational progression (17). Thus, diversity and inclusion are the focus of an increasing amount of current discussion related to organizational management. Achieving representation of diverse groups within an organization's workforce is fraught with challenges, however.

Diversity Challenges

Within the transportation workforce, representation of women and minorities varies by mode and occupation (see Table 1, at right). Although women's representation in the workforce has grown dramatically over the past 50 years, women still make up a small fraction of workers in

transportation occupations (18). African American and Hispanic workers are even less represented than women are in many key transportation-related jobs, particularly those in science, technology, engineering, and mathematics (STEM) fields. Women and minorities also are significantly underrepresented in engineering and computer occupations, both of which are extremely important to the increasingly complex, technology-enabled, and data-driven workplace.

The lack of diversity in these occupations is magnified the higher up the ladder one travels. It is not only STEM and other traditionally male-dominated fields in which diversity is a challenge at higher levels: across all occupations and industries, women are significantly underrepresented in leadership positions. This trend holds true for ethnic diversity as well. African American and Hispanic workers are disproportionately represented in lower-wage occupations and men of color make up even less of the managerial workforce than do women (18).

Additional Challenges for DOTs

State departments of transportation (DOTs) face even greater challenges, with a general lack of awareness of job opportunities and many misperceptions about transportation careers at these agencies (19). Additionally, the positive impact of transportation professionals on communities goes largely unnoticed, particularly for those in public-sector roles (20–21).

These challenges pose a particular problem in recruiting from traditionally underrepresented groups, as one of the

TABLE 1 Representation of Women and Minorities in Selected Transportation-Related Occupations, 2017

OCCUPATION	TOTAL JOBS[a]	PROJECTED GROWTH 2016–2026[b] (%)	WOMEN[a] (%)	BLACK OR AFRICAN AMERICAN[a] (%)	HISPANIC OR LATINO[a] (%)
Civil engineers	461,000	11	14.4	6.4	10.7
Construction and building inspectors	89,000	10	10.2	9.8	11.2
Construction managers	1,081,000	11	7.4	4.9	12.4
Computer systems analysts	554,000	9	38.9	9.7	7.2
Electrical and electronics engineers	284,000	7	12.3	3.5	9.0
Engineering managers	129,000	6	8.7	8.3	6.2
Engineering technicians	375,000	—	20.0	8.9	10.3
Information security analysts	105,000	28	20.2	15.6	4.6

[a] U.S. Bureau of Labor Statistics. *Labor Force Statistics from Current Population Survey.* January 18, 2019. https://www.bls.gov/cps/cpsaat11.htm.
[b] U.S. Bureau of Labor Statistics. *Occupational Outlook Handbook 2018.* April 12, 2019. https://www.bls.gov/ooh/home.htm.

key motivating factors for these workers is recognition of how they can make a difference in their community and the world. This is significant, given that public-sector jobs often pay less than equivalent private-sector positions; therefore, a value proposition must be created to attract the highly skilled and diverse workers for whom many organizations compete.

Specific occupations important to DOTs may be subject even more to gender and ethnic imbalances than others. For example, construction and maintenance roles are predominately filled by men and are plagued with other issues that pose barriers to diversity, such as limited exposure of underrepresented groups to specific construction-related skills, hostile work environments, and work schedules that may not be compatible with family responsibilities (*22*).

Other occupations like engineering are also male-dominated, with nonwhite workers significantly underrepresented. Special strategies for attracting and retaining women and persons of color in these roles are required (*19, 23*).

Achieving Diversity and Inclusion

Achieving diversity goals requires examination of both recruitment and retention practices. It is not enough to hire diverse workers; strategies must also be deployed to create an environment of inclusivity for a culture of diversity to develop. At the outset, an organization must define the value system and motivation for addressing diversity and inclusion.

STRATEGIC APPROACH

It is not enough to place emphasis on increasing diversity—to be successful, organizations must articulate the value behind this decision clearly (*16, 20*). This requires that leadership understands the role of diversity in the organizational structure and in the strategic plan (*1*). One approach to ensuring clear leadership is through including diversity and inclusion specialists as part of the human resources team or in a diversity and inclusion division. Organizations such as Indiana DOT and Missouri DOT have moved to these models.

Photo: Missouri DOT

Missouri DOT interns explore career options.

A workplace's culture must be supportive of diverse professionals (*20*). Otherwise, an agency may be effective in recruiting workers from varied genders, ethnicities, and abilities but will not be effective in retaining these workers long-term. Organizations must examine hiring practices to ensure there is not unintentional bias or job steering, which results in underrepresented groups being passed over for jobs for which they are qualified or being underemployed. Additional strategies are required to address perception issues, implicit bias, stereotype threat, and other factors impeding progress in diversity goals (*24*).

ENGAGEMENT

Engagement is the key to addressing recruitment and retention of diverse workers. For transportation agencies to be successful in attracting and retaining diverse workers, they must first examine current practices through a lens that considers the individuals they are trying to recruit, by working closely with diverse groups of current employees to examine current practice and develop more innovative approaches designed specifically for a more diverse audience (*15, 20*).

For example, Minnesota DOT includes employee resource groups focused not only on providing support for the employees themselves, but also on helping the department achieve its mission in employee development, recruitment, retention, and outreach. Minnesota DOT also has established diversity and inclusion committees within all its divisions.

For organizations with limited diversity, working with community organizations that serve populations of interest can help provide needed insight and may lead to partnerships that strengthen the pipeline of diverse applicants. This can include direct partnerships with K–12 and postsecondary institutions.

Pennsylvania DOT offers an example of this type of partnership through targeted and structured outreach to high schools with diverse populations. The agency developed the School to Employment Program (STEP), providing academic-year internships to high school seniors. STEP has been successful not only in exposing students to career opportunities, but also

in attracting them to Pennsylvania DOT either through immediate employment or through a college internship program.

COLLABORATIVE INITIATIVES

Partnerships and collaboration across the industry are critical given the scale of the workforce issues in transportation. This is demonstrated by the number of organizations prioritizing workforce development initiatives that focus on collaborative approaches. The Federal Highway Administration (FHWA) operates the Center for Transportation Workforce Development out of the Office of Innovative Program Delivery, focusing on children ages K–12 through adults of working age, through a series of programs that engage a variety of stakeholders.

In 2014, FHWA also established the National Network for the Transportation Workforce (NNTW) via five regional centers of excellence charged with developing 100 strategic workforce partnerships engaging public- and private-sector stakeholders, disseminating best practices, and coordinating initiatives across regional and national footprints.
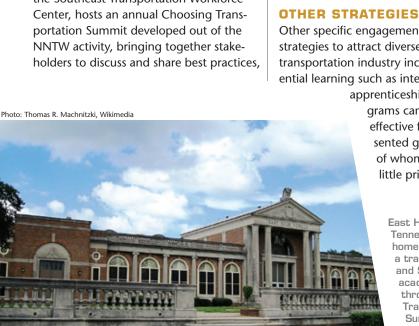
One of the five regional centers, the Southeast Transportation Workforce Center, hosts an annual Choosing Transportation Summit developed out of the NNTW activity, bringing together stakeholders to discuss and share best practices,

Photo: Thomas R. Machnitzki, Wikimedia

East High in Memphis, Tennessee, is home to T-STEM, a transportation- and STEM-focused academy developed through the Choosing Transportation Summit.

key challenges, and strategies that can improve workforce outcomes. The summit also facilitates engagement among transportation professionals and high school and college students to increase awareness of and interest in transportation careers. Outcomes from the summit have included many students choosing to pursue transportation-related majors and career paths; several grassroots pilots addressing specific workforce challenges, such as increasing the number of women in the industry; and a new transportation- and STEM-focused high school (*25*).

The transportation systems management and operations (TSMO) subdiscipline provides another example of productive partnerships leading to workforce best practice. The National Operations Center of Excellence (NOCoE) is a partnership of the American Association of State Highway and Transportation Officials, the Institute of Transportation Engineers, and the Intelligent Transportation Society of America, with support from FHWA. The purpose of NOCoE is to develop innovative workforce strategies collaboratively and to provide a one-stop shop for resources supporting TSMO professionals.

OTHER STRATEGIES

Other specific engagement-focused strategies to attract diverse workers to the transportation industry include experiential learning such as internships and apprenticeships. These programs can be particularly effective for underrepresented groups, members of whom may have little prior knowledge

Photo: Washington State DOT

A Washington State DOT study found the agency was projected to lose nearly half of its current engineers to industries that pay more competitively.

of these fields and may lack confidence that traditionally white, male-dominated roles are a good fit for them. U.S. DOT is among several federal agencies that boasts a rich history of promoting apprenticeships. Codified as law and policy and related to transportation funding, opportunities for individuals to gain workplace skills are well established throughout the agency's operating administrations, such as FHWA or the Federal Motor Carrier Safety Administration.

In addition to recruiting a diverse workforce, employers must develop programs to retain employees and must fully recognize that being competitive in a global economy requires full utilization of the skills and talents of all employees. Pennsylvania, Minnesota, and Missouri DOTs all have found mentoring programs to be effective for improving employee retention.

When considering neurodiverse individuals, strategies for retention include creating supportive environments, such as offering quiet spaces, allowing noise-cancelling headsets, using soft lighting, and more; providing very specific and intentional training on workplace practices; and providing well-trained mentors and team buddies (*1, 13*).

Additional ideas to consider when creating an inclusive culture and retaining workers include paying a fair market wage,

considering the location of physical office buildings, creating flexible work arrangements to address work–life balance, and making sure the pay scale is equitable. A recruitment and retention study by Washington State DOT revealed that its compensation for engineering and technical workers is significantly under market (*26*). This disparity needs to be addressed because the agency is projected to lose nearly 45% of its current engineering workforce in the next 5 years. The percentage of employees at Washington State DOT are satisfied with their work; however, people continue to leave for better pay. The percentage of employees who leave the agency for better pay elsewhere is approximately 15% (*26*).

Conclusion

At any organization, employees are both its largest investment and its greatest asset, and thus must be protected. Workforce solutions of the future must be much more tailored than in the past, given national demographic trends. Practices must consider a wide spectrum of diversity and cannot be one-size-fits-all. Approaches to recruitment and retention should emphasize the individual in order to achieve the greatest level of success, both in attracting and retaining employees and in helping them achieve their full personal and professional potential.

Many strategies that are successful for recruiting and retaining underrepresented groups also are effective for all workers, so agencies can expect to see improvement in workforce outcomes across the board by designing diversity and inclusion practices to target varied populations. Although there are many examples of successful practices for achieving diversity and inclusion goals, more targeted research and case studies are needed to provide in-depth understanding and specific organizational guidance, especially in the case of neurodiversity.

REFERENCES

1. Sanchez-Appellaniz, M., and R. Triguero-Sanchez. Leveraging Workforce Diversity Through Human Resources Management Initiatives. In *Handbook of Research on Workforce Diversity in a Global Society* (C. L. Scott and M. Y. Byrd, eds.), Business Science Reference, Hershey, Penn., 2012, pp. 368–385.
2. Cohn, D., and A. Caumont. *Ten demographic trends that are shaping the U.S. and the world*. Pew Research Center. March 31, 2016. www.pewresearch.org/fact-tank/2016/03/31/10-demographic-trends-that-are-shaping-the-u-s-and-the-world. Accessed Sept. 2018.
3. Hunt, V., D. Layton, and S. Prince. *Why diversity matters*. McKinsey & Company. Jan. 2015. www.mckinsey.com/business-functions/organization/our-insights/why-diversity-matters. Accessed May 2019.
4. Cilluffo, A., and D. Cohn. *Six demographic trends shaping the U.S. and the world in 2019*. Pew Research Center. April 11, 2019. https://pewrsr.ch/2Gaolyp. Accessed May 2019.
5. U.S. Bureau of Labor Statistics. *Women in the labor force: a databook*. Report 1065. April 2017. www.bls.gov/opub/reports/womens-databook/2016/home.htm. Accessed Sept. 2018.
6. Modern Immigration Wave Brings 59 Million to U.S., Driving Population Growth and Change Through 2065. Pew Research Center: Hispanic Trends. Sept. 28, 2015. www.pewresearch.org/hispanic/2015/09/28/modern-immigration-wave-brings-59-million-to-u-s-driving-population-growth-and-change-through-2065. Accessed Oct. 2018.
7. Baio, J., L. Wiggins, D. L. Christensen, et al. Prevalence of Autism Spectrum Disorder Among Children Aged 8 Years—Autism and Developmental Disabilities Monitoring Network, 11 Sites, United States, 2014. *Morbidity and Mortality Weekly Report: Surveillance Summaries*, Vol. 67, No. 6, April 27, 2018, pp. 1–23. http://dx.doi.org/10.15585/mmwr.ss6706a1.
8. Guide to Diversity and Inclusion in the Workplace. Glassdoor, Inc., 2017. https://resources.glassdoor.com/diversity-inclusion-in-the-workplace.html.
9. Hunt, V., S. Prince, S. Dixon-Fyle, and L. Yee. *Delivering Through Diversity*. McKinsey & Company. Jan. 2018. www.mckinsey.com/business-functions/organization/our-insights/delivering-through-diversity. Accessed Dec. 2018.
10. McMahon, A. Does Workplace Diversity Matter? A Survey of Empirical Studies on Diversity and Firm Performance, 2000–09. *Journal of Diversity Management*, Vol. 5, No. 2, 2010, pp. 37–48.
11. Lorenzo, R., N. Voight, K. Schetelig, A. Zawadzki, I. Welpe, and P. Brosi. *The Mix that Matters: Innovation Through Diversity.* Boston Consulting Group, April 6, 2017. www.bcg.com/en-us/publications/2017/people-organization-leadership-talent-innovation-through-diversity-mix-that-matters.aspx.
12. Faragher, J. Why employers should be hiring with neurodiversity in mind. *People Management*, Jan. 25, 2018. www.peoplemanagement.co.uk/long-reads/articles/employers-hiring-neurodiversity. Accessed Nov. 2018.
13. Austin, R. D., and G. P. Pisano. Neurodiverse as a Competitive Advantage. *Harvard Business Review*, May–June 2017. https://hbr.org/2017/05/neurodiversity-as-a-competitive-advantage. Accessed Nov. 2018.
14. Jacob, A., M. Scott, M. Falkmer, T. Falkmer. The Costs and Benefits of Employing an Adult with Autism Spectrum Disorder: A Systematic Review. *PLoS ONE*, Vol. 10, No. 10, 2015, e0139896. https://doi.org/10.1371/journal.pone.0139896.
15. Gore, A. *Best Practices in Achieving Workplace Diversity*. U.S. Department of Commerce. Washington, D.C., 2000.
16. Schwartz, J., L. Collins, H. Stockton, D. Wagner, and B. Walsh. *Rewriting the rules for the digital age: 2017 Deloitte Global Human Capital Trends*. Deloitte University Press, 2017.
17. Diversity & Inclusion Benchmarking Survey: North America Data Sheet. PwC Global, 2017. www.pwc.com/gx/en/services/people-organisation/global-diversity-and-inclusion-survey.html. Accessed Sept. 2018.
18. U.S. Bureau of Labor Statistics. *Labor force characteristics by race and ethnicity, 2016*. Report 1070. BLS Reports, Oct. 2017. www.bls.gov/opub/reports/race-and-ethnicity/2016/home.htm. Accessed Sept. 2018.
19. Ivey, S., M. Golias, P. Palazolo, S. Edwards, and P. Thomas. Attracting Students to Transportation Engineering: Gender Differences and Implications of Student Perceptions of Transportation Engineering Careers. *Transportation Research Record: Journal of the Transportation Research Board*, No. 2320, 2012, pp. 90–96. https://doi.org/10.3141/2320-11.
20. Godfrey, J., and R. Bertini. *Attracting and Retaining Women in the Transportation Industry*. Report WP 19-01. Mineta Transportation Institute, San José, Calif., 2019.
21. Corbin, J., and S. Ivey. Transportation Workforce Issues and Initiatives. Presented online by ITE Transportation Safety Maintenance & Operations and Transportation Education Councils.
22. Wilkinson, L., and M. Kelly. *(Still) Building a More Diverse Workforce in the Highway Trades: 2016 Evaluation of the ODOT/BOLI Highway Construction Workforce Development Program*. Final report. Oregon Bureau of Labor and Industries and Oregon Department of Transportation, 2016.
23. Ivey, S., A. Hall, L. Allen, and P. Bridson. West Tennessee STEM Hub: Cradle to Career Collaborations for STEM. *Critical Conversations: An Interdisciplinary Journal*. Vol. 1, No. 2, 2015, pp. 214–233.
24. Heckman, D., S. Johnson, M.-D. Foo, and W. Yang. Does Diversity-Valuing Behavior Result in Diminished Performance Ratings for Non-White and Female Leaders? *Academy of Management Journal*, Vol. 60, No. 2, 2017, pp. 771–797.
25. Job Needs and Priorities Report: Phase II. Southeast Transportation Workforce Center, 2016. www.memphis.edu/setwc/job_needs_and_priorities_report/index.php. Accessed Sept. 2018.
26. The PFM Group. *Washington State Department of Transportation Recruitment and Retention Study: Final Report*. June 27, 2016. www.wsdot.wa.gov/publications/fulltext/Leg Reports/15-17/RecruitmentAndRetention Report.pdf.