Closing the Diversity Gap in the Infrastructure Industry

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This paper examines the diversity gap in the infrastructure industry, outlining a variety of statistics and indicators that show how women and racial minorities are underrepresented in leadership positions. The infrastructure industry consists of the government departments and private firms that together build large highways, transit lines, hospitals, water treatment plants, schools, recreation centres, courthouses, and prisons. It also includes the companies that are engaged in the rapid development of the next wave of smart-city technologies. This industry has not received the same level of scrutiny for its lack of diversity as high-profile sectors such as high tech, entertainment, business, and academia. Yet the infrastructure industry is a major source of employment, and the projects have a profound impact on the economic prosperity, equity, and environmental sustainability of the places in which they are built.

The current burst of urban infrastructure development around the world, as well as innovations in mobility, security, waste disposal, information technology, and smart-city infrastructure, will set cities on a path towards either inclusive prosperity or further social inequality. It is imperative that the leading decision makers in the industry are representative of the wider communities in which major infrastructure projects are planned, built, and operated. To this end, the paper identifies strategies to increase diversity in the administration of infrastructure, including increasing the pipeline of diverse talent, encouraging diverse hiring, changing workplace and industry culture to support diversity, and creating policies that support retention and promotion of a diverse workforce.
In recent years, there has been intense interest in examining the gender and racial diversity of the high-tech, engineering, business, academic, and media workforces. High-profile firms like Google and Uber have been strongly criticized for both the lack of diversity in their executive ranks and a male-dominated organizational culture.

The infrastructure industry, by comparison, has not received the same level of external media scrutiny, academic attention, or industry dialogue about diversity as other sectors. The infrastructure industry comprises the government departments and private firms that plan, build, finance, and operate major transportation, water, energy, education, health care, justice, cultural, and recreational facilities. Within government, it includes departments and ministries, agencies, boards, and commissions. In the private sector it is made up of the construction contractors, private facility operators, infrastructure investors, lawyers, financial advisors, consulting engineers, urban planners, and architects that together develop large public works. It also includes a new breed of urban tech firms developing digital platforms and smart-city technologies intended to revolutionize the way urban infrastructure is provided and used.

This paper examines whether women and visible minorities are represented in the leadership of the infrastructure industry in proportion to their representation in the overall workforce. As we will argue, identifying the diversity gap in the leadership of the infrastructure sector and the masculine culture that predominates in the sector is important. Like the wires, pipes, sewers, and tunnels that are largely out of sight and out of mind until something goes wrong, the infrastructure industry itself does not receive much public attention until failures occur. Yet the infrastructure industry is a major employer, responsible for developing projects and smart-city technologies that shape communities.

Extensive evidence shows that women, low-income households, and marginalized communities disproportionately bear the brunt of noxious infrastructure
such as garbage dumps, power plants, unsafe drinking water, and highways that bisect neighbourhoods. The current burst of innovations in mobility, security, waste disposal, information technology, and smart-city infrastructure will set cities on a path towards either inclusive prosperity or further social inequality. It is imperative that the leading decision makers in the industry are representative of the wider communities in which major infrastructure projects are planned, built, and operated.

In the next section, we explain why diversity matters in the leadership of the urban infrastructure sector, a key facet of city building. Then we present data on the current level of gender and racial diversity in the leadership of the global infrastructure and urban tech industry, and explain the existing diversity gap. Finally, we identify strategies to increase diversity in the administration of the infrastructure sector.

Why does diversity in the infrastructure sector matter?

Workforce diversity typically refers to the representation of people of different genders, races, ethnicities, sexual orientations, disabilities, and ages in the workplace. In addition to normative claims about basic fairness and equity in diverse organizations, workplace diversity is associated with positive outcomes that are particularly relevant for organizations that deliver large, complex infrastructure projects.

First, according to theories of representative bureaucracy, organizations with leadership teams that represent the gender, racial, and ethnic make-up of the populations they serve are more likely to make policy decisions that meet the needs of those populations. Women and people from marginalized communities have particular experiences with public infrastructure, including the fear of violence or harassment in public places, unequal levels of policing and surveillance, or physical access to public transit for those with diminished mobility. Increasing the diversity of the leaders and decision makers in the infrastructure sector can ensure that multiple perspectives are considered, leading to more equitable project designs, implementation, and operations.

Second, research on the “value of diversity” within organizations has been the subject of many high-profile reports and has attracted broad popular appeal. Diversity within organizations brings multiple perspectives, resources, and information to the table and can contribute to improved efficiency and better financial returns on investment. An important caveat is that organizational diversity is an asset only if it rises above the level of tokenism. When women or racial minorities make up less than 20 percent of an organization’s workforce, diversity can create divisions and diminish performance outcomes.

Third, many organizations in the notoriously male-dominated infrastructure sector are characterized by deeply masculine cultures that emphasize individualism, competitiveness, hierarchical leadership, aggressive risk-taking, and adversarial relationships. This macho industry culture may be an increasing liability in a world in which successful urban infrastructure projects require collaboration, empathy, shared risk, and networked governance among multiple stakeholders. To benefit from the value of diversity, the infrastructure industry requires a fundamental culture change that includes strategies to increase the presence of underrepresented groups in the workforce.

Fourth, a lack of diversity in the infrastructure industry can limit the pool of available talent, if highly qualified women and people from racial minorities do not see the sector as an attractive place to work. The World Economic Forum has noted that the infrastructure sector is growing and facing special challenges in recruiting a diverse workforce, which could lead to a future skills deficit in the industry. As postsecondary education programs that feed into the infrastructure industry, such as engineering, law, planning, and accounting, become more diverse in many countries, women and visible minorities present a largely untapped reservoir of talent for industries with diversity gaps. Finally, women and visible minorities in leadership roles within an organization and industry serve as role models that support increased diversity at all levels.

How big is the diversity gap in the infrastructure sector?

The “master builders” associated with the great urban infrastructure mega-projects that define certain cities have historically always been men: Baron Georges-Eugène Haussmann in Paris; Robert Moses in New York City; R.C. Harris and Frederick Gardiner in Toronto; Pierre L’Enfant in Washington D.C.; Oscar Niemeyer in Brasilia; Jørn Utzon in Sydney. Similarly, men have been credited with inventing the infrastructure technologies that enable contemporary urban living, including the elevator, the...
The infrastructure industry also has an especially thick glass ceiling for women reaching senior leadership positions. It has the smallest share of female CEOs (2 percent) after the energy sector, as well as the lowest share of women in senior (9 percent) and mid-level positions (13 percent) compared with other economic sectors studied by the World Economic Forum. The low share of women in the infrastructure industry stands in contrast to recent World Bank figures showing that women make up 39 percent of the global labour force.  

Urban infrastructure projects are also disproportionately planned and administered by men. Johnson and Crum-Cano identify a significant gender gap amongst American urban planners working in the infrastructure sector. According to their research, the overall workforce in the urban planning profession in the United States is trending towards gender parity. However, the three highest-paid specialties within the planning profession – infrastructure and facilities, transportation, and planning law – continue to be the most male dominated. Additionally, the most recent census data show that 81 percent of all planners in the United States are white.

A recent study by Siemiatycki provides more detail on the diversity gap in the infrastructure industry workforce. The study is based on an analysis of the gender and race of more than 2,800 infrastructure industry leaders from 250 public- and private-sector organizations in more than 90 countries. It also includes information on 75 national politicians responsible for infrastructure in their country. Data was collected from the names and pictures posted on the website of each organization.

The data show that racial minorities in the country in which they work make up only 8 percent of the top managers and board members in the largest infrastructure companies worldwide. Racial minority women are particularly underrepresented in senior leadership within the industry, as are Black executives working in the Global North. Public-sector organizations are more gender diverse than their private-sector counterparts, partly as a result of long-standing employment equity policies in the civil services of many countries. Boards of directors have greater gender and racial diversity than senior management. With respect to political leadership in infrastructure, fewer than 10 percent of the national ministers of infrastructure worldwide are women compared with 35 percent of health ministers. This further reinforces the gendered lens through which infrastructure is seen compared with other spheres of public policy.

Urban innovations face similar challenges. Richard Florida recently identified a sharp rise in “urban tech” companies that attract billions of dollars in venture capital to support innovations that transform the way infrastructure is provided and used in transportation, mapping, sustainable
As Table 1 shows, the founders of some of the most successful recent urban tech start-up firms focused on infrastructure are overwhelmingly male and from the racial majority group in the country in which they live.

The inventor Elon Musk is the archetypal male tech entrepreneur working in the urban domain, with his ambitions to bring about revolutions in electric vehicles, solar energy, tunnel boring, and intercity travel with the hyperloop. The demographics of the leading urban tech innovators are typical of the tech sector more broadly, where male entrepreneurs have garnered the largest share of venture capital funding. This means that men from the racial majority are defining the service gaps and urban innovations that will shape cities and their urban infrastructure landscapes throughout the 21<sup>st</sup> century.

Among global thought leaders in the infrastructure sector, the high-profile city planners, star architects, and intellectuals who shape public and professional discourses on urban infrastructure are overwhelmingly men, with a few exceptions. A review of 450 speakers at 10 major conferences in 2016 focused on infrastructure public-private partnerships shows that women made up 21 percent of all speakers.
Where data were available, the review also found that 16 percent of the speakers were racial minorities in the country in which the conference was held. Additionally, of the 10 conferences examined, only one had a session in the main program focused specifically on issues of diversity in the industry. The male perspective dominates key public forums in which infrastructure issues are discussed, and there are relatively few role models to inspire the next generation of women and minorities that it is possible for them to reach senior leadership positions.

In sum, while certain women and members of minorities have reached the upper echelons of the infrastructure and urban tech industry, most of the influential decision makers in infrastructure and urban development are men.

The impact of the diversity gap

The yawning diversity gap in the leadership of the infrastructure industry has profound impacts on the decision-making processes and organizational cultures that dominate the sector and shape project outcomes. It is necessary to understand how the lack of diversity in the leadership of the infrastructure industry translates into distinctly masculine cultures of practice.

Recent data collected by Pye show the implications of a lack of diversity at the boardroom table of infrastructure organizations. For this study, she analyzed the publicly posted videos of all the 2017 board of director meetings of major transit agencies in three large, highly diverse North American cities: Metrolinx in Toronto, TransLink in Vancouver, and the Metropolitan Transportation Authority (MTA) in New York City. In total, 20 board meetings together lasting more than 45 hours were coded. This research explored whether women and minorities are included at the highest level of regional transit decision-making, and how the lack of diversity in boardroom environments impacts the types of issues that receive attention.

Pye’s findings reveal that men speak more often at public meetings, and tend to speak with greater assuredness than their female counterparts. The degree of assuredness was measured by voice volume compared with the chair’s volume and the use of qualifying statements. In all three boards, women speak in lower volumes more frequently than their male counterparts and use more qualifying statements when asking a question or putting forward an opinion than male speakers do. Even when highly accomplished women and visible minorities are included at the boardroom table, these groups speak less frequently, are interrupted more, and are less likely to participate in certain topics of discussion.

As Figure 1 shows, across all three boards, white men hold 59 percent of the board seats but speak 76 percent of the time. The MTA in New York has the least board diversity: with 75 percent white men on the board speaking 86 percent of the time. At Metrolinx in Toronto, the former board chair who presided at the 2017 meetings, as well as the chair of the MTA in New York, are both white men. They dominated the meetings, speaking for 32 percent and 35 percent of the time, respectively. In comparison, the chair of TransLink in Vancouver is a white woman, who speaks for only 16 percent of the time. This finding may reflect a variety of factors, including a difference in leadership style, structure of the meetings, or variations in business culture in the city. The leadership style of TransLink’s chair may have a beneficial impact on the meeting, as there are fewer interruptions in comparison with the other board meetings (23 interruptions of 167 total interruptions compared with 76 interruptions at MTA and 68 interruptions at Metrolinx). Throughout all the board meetings, men initiate 83 percent of all interruptions, 43 percent of which are men interrupting men, and 40 per cent of which are men interrupting women. Men interrupt women 74 times, whereas women interrupt men 15 times and other women 4 times.

The voices of minorities and people with physical disabilities are rarely heard at board meetings, even though they are significantly impacted by transit policies, service operations, and investment decisions. For all boards, the most discussed topics are budget, followed by project progress, procurement, and committee reports; these discussions are all dominated by white men. In addition, white men tend to dominate board discussions on topics such as project finance and technical decisions regarding engineering and facility design. Even in highly diverse cities, the board compositions as well as the viewpoints of white men are playing a disproportionate role in decision-making.

The nature of project work in the infrastructure sector combined with a masculine culture at many major firms in the industry affects the recruitment, retention, and promotion of a diverse workforce. Interviews with 28 women working in senior leadership roles in the Ontario...
infrastructure industry by Chang revealed that many feel that as they progress through the ranks their perspectives and expertise are not as widely valued as those of their male counterparts. Numerous interviewees reported feeling that they had to work twice as hard as their male counterparts to gain the trust and attention of their bosses, and were held more directly responsible when failures occurred. Balancing work and family responsibilities posed a significant challenge to promotion. Maternity leave and policies supporting families with young children were not always available, and often minimally supported by senior leadership. In an industry in which time-sensitive and short-term projects are the norm, women reported that taking maternity leave or requiring job flexibility for family reasons was perceived by superiors as a lack of career commitment.

Finally, a masculine business ethos characterized by an aggressive winner-takes-all approach has come to dominate the strategic decisions of many start-ups seeking to innovate in urban areas. Some leading recent start-ups, such as Airbnb and Uber, used confrontational strategies to enter cities, creating a loyal customer base, but also eliciting backlashes from local communities, competitors, and regulators. And smart-city companies have not always sufficiently considered or responded to the negative externalities of their products.

For instance, the Waze travel navigation app has faced complaints from neighbourhood residents for directing traffic onto typically quiet side streets. Marginalized communities have raised concerns about the privacy implications of ShotSpotter placing live microphones in neighbourhoods that are at risk of violence to identify sources of gunfire. In San Francisco, a private security robot patrolling in front of an office building without a permit faced opposition from the local community and city officials after it was accused of being used to remove homeless people from the street.

The entrepreneurs that are leading the current wave of urban innovations have not merely disrupted the activities of their competitors; their model of product development, their approaches to new markets, and their engagement with impacted communities has often been antagonistic rather than collaborative.

**Strategies to diversify the infrastructure industry**

Responses to the diversity gap in the infrastructure industry leadership to date have focused primarily on strategies for fostering the advancement of individual employees. In Canada, the United States, the United Kingdom, Australia, and New Zealand, leading female workers within the sector have founded “women in infrastructure” networking groups to create opportunities for women to advance their careers through networking events, gain recognition for their accomplishments, and participate in mentorship programs. Some conference organizers have identified diversity as a key value and have implemented measures to support the inclusion of more women and visible minorities in high-profile speaking roles.
While these are worthwhile initiatives, they place the onus on women and visible minorities to be the agents of change. To date, there has been no significant industry-wide movement to address systemic and structural barriers to greater workforce diversity in infrastructure. This includes a limited pipeline of diverse talent in certain sectors of the industry, implicit bias among hiring managers, explicit bias and discrimination against women and minorities, the aggressive macho culture that permeates much of the infrastructure and tech start-up industry, the double burden of family responsibility that women often face, and cultural norms in some countries that still favour masculine leadership styles. The infrastructure industry still faces challenges recruiting, retaining, and promoting women and minority candidates.

Moreover, as in other sectors, such as police or judicial reform, an approach to diversity that simply adds more women or minorities into existing masculine workplace cultures will not on its own lead to transformative organizational change. Minorities in leadership positions are often under immense pressure to act like the majority group to fit into the workplace or industry culture and achieve results. Indeed, the deeply embedded masculine culture of the infrastructure sector is a barrier to formal strategies to increase diversity. The individual worker operates within a broader social context, therefore a comprehensive strategy to support greater diversity in leadership roles requires a multi-pronged approach.

### 1. Increasing the pipeline of diverse talent

Achieving a diverse workplace begins with a diverse pool of available talent. Starting at a young age, the promotion of infrastructure, technology, city-building, and construction activities to children is often highly gendered. Toys with a science, technology, engineering, and math (STEM) focus were three times as likely to be aimed at boys, according to a recent study by the Institution of Engineering and Technology. This early socialization can have an effect on future career choices. There is a need to create toys, entertainment, and outreach programs for youth focusing on construction, engineering, and infrastructure that appeal to girls as well as boys and to minority or marginalized communities.

In postsecondary education, proactive programs and policies are necessary to recruit, welcome, and retain a range of different students to fields associated with infrastructure. Such measures should recognize the intersectional dimensions of diversity, including gender, race, ethnicity, sexual orientation, and physical ability. Once students are in postsecondary education, there is a need to better promote infrastructure as an exciting and rewarding career path, as students in fields such as engineering, finance, accounting, economics, architecture, and law may not be aware of infrastructure as a career option. City-builder career fairs on campuses could be an opportunity to expose students from diverse backgrounds to the range of professions in the infrastructure sector.

Business incubators and accelerators can also nurture urban innovation start-ups, and these institutions should undertake proactive recruitment efforts specifically targeted at women and minority entrepreneurs. Business incubators have long struggled with attracting diverse candidates to their programs. Strategies identified to reverse the pattern include employing outreach coordinators, hosting offsite events in diverse communities, and participating in local events to build awareness.

### 2. Encouraging diverse hiring

At the firm level, public- and private-sector organizations in the infrastructure sector have tended to follow one of two paths to increase leadership diversity, according to research by Hicks. One approach is to set policies and goals for leadership diversity, and then proactively recruit diverse candidates when positions open up. This approach is commonly enshrined in government policy and followed in the upper levels of the public sector to increase gender diversity; it has resulted in some government infrastructure departments and agencies having gender-diverse leadership teams. Such policies have not, however, been as widespread or effective at creating racially diverse leadership teams.

A second, more organic, approach that is more common in the private sector, is to establish aspirational vision statements about supporting diversity, inclusivity, and meritocratic hiring. Companies may also implement diversity and implicit-bias training to create inclusive workplace cultures and attempt to ensure that minority applicants are not explicitly disadvantaged during hiring and promotion processes. In the absence of proactive measures to recruit and retain diverse candidates, however, this organic approach has a mixed record of bringing about leadership diversity in the infrastructure sector.
An approach that we recommend to complement either proactive or organic strategies is to value diversity as an asset. By recognizing lived experience and diversity as a qualification alongside more traditional measures of educational or work experience, more visible minorities and other marginalized groups can be considered for leadership positions.

3. Retention and promotion

Policies supporting work-life balance and flexible work arrangements can help retain and promote diverse candidates. Maternity leave and family-supportive policies are important to women in the infrastructure sector, as women often bear the greater load of child and elder care. Parental leave policies must also be available and encouraged for men, so that any workplace stigma associated with taking a leave is not disproportionately borne by women.

While these policies may be available in many organizations, making use of them is informally seen in some organizations as a sign of a lack of commitment and can stymie promotion. In order to reverse this perception, senior executives can lead by example and take advantage of maternity, paternity, or family leaves.

Additionally, flexible work policies such as part-time employment, home-based work where possible, or job-sharing can support employees re-entering the workforce following family leaves and women who typically bear the double burden of work and family care responsibilities. Finally, setting up diverse project teams can foster peer support and mentorship, and offer role models for junior conference participants.

4. Changing workplace and industry culture

Changing the workplace culture of the infrastructure industry is critical to attract more women and minorities in the sector and retain them, and also to ensure that their perspectives are meaningfully integrated into decision-making. In parts of the infrastructure sector, from construction sites to urban tech start-ups, sexism, boorish behaviour, and discrimination have been implicitly tolerated as part of the culture of the workplace. It is time for organizations to develop and enforce zero-tolerance policies that explicitly outlaw and punish actions that make women, transgender people, and minorities feel threatened and unwelcome.\(^\text{25}\)

Implicit bias is another form of insidious discrimination that can challenge the hiring and promotion of women and racial minorities, especially in sectors in which these groups have not traditionally been present in large numbers. Organizations have used a variety of strategies to address implicit bias, including employee diversity training and recruiting in which names and identifying information from resumes are removed during the evaluation process. These strategies have had mixed results.

Men in senior roles should reflect on the extent to which they dominate, even unintentionally, speaking time in the forums in which decisions are made and reorient their personal practice to make room for other speakers. In meetings of all types, it is critical that those in leadership positions control interruptions and prevent discrimination to provide space for all perspectives to be heard. Those in positions of power must be aware of gendered interruptions and traditional power dynamics that shape major infrastructure decisions. By being aware of the lived experience that women and minorities face from the boardroom or regular meetings, and advocating for those who are interrupted, issues can be considered from a wider range of viewpoints.

Closing the diversity gap in the infrastructure industry will require that senior leaders and project managers embrace gender equity and welcome diversity, creating space for new voices and leaders.

Beyond strategies for running meetings more effectively, research shows that having more women and minorities on boards and in senior leadership teams is critical to having members of these groups speak more at meeting.\(^\text{24}\)

Conference organizers should make explicit efforts to invite diverse speakers and attendees to their events. Major industry conferences are key forums to share ideas and network. Having diverse speakers increases the variety of perspectives being heard and provides role models for junior conference participants.

Conclusion

The enduring diversity gap in the urban infrastructure sector should be of deep concern to governments and the private sector. There is a vast body of research attesting to the value of diversity within organizations. Leadership diversity can drive innovation and financial performance within organizations. Hiring diverse candidates increases the size of the talent pool in an industry that is competing vigorously for the best and brightest leaders. And diverse leaders can act as agents of change and encourage greater diversity in the rest of the organization.

Closing the diversity gap in the infrastructure industry will require that senior leaders and project managers embrace
gender equity and welcome diversity, creating space for new voices and leaders. To attract, retain, and promote women and minority candidates in the infrastructure sector, organizations must implement policies and initiatives to overcome the structural barriers that prevent change.

Endnotes

1 Visible minority is the term used by Statistics Canada to refer to “persons, other than Aboriginal peoples, who are non-Caucasian in race or non-white in colour.” It is used in this paper to refer to people of a different race and colour from the majority in the country in which they work.


