FP ANALYTICS

WOMEN AS LEVERS OF CHANGE

UNLEASHING THE POWER OF WOMEN TO TRANSFORM MALE-DOMINATED INDUSTRIES

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Executive Summary

Today, a number of well-established legacy industries are facing growing pressure to innovate and transform to remain competitive in the global economy. Increased governmental regulation; intensified global competition; and rising consumer, employee, and investor concerns over the environment, human rights, and global health are pushing companies to improve business practices and products. Failure to address and surmount these challenges could compromise these industries' survival and may even render some companies obsolete.

Increasing gender diversity in traditionally male-dominated industries can be an effective means to address escalating challenges as well as facilitate and accelerate progress toward global sustainable development. Representing half of the global labor force and half of new graduates with higher education each year, women are a major—but often overlooked or neglected—source of talent. Increasing women's participation could not only enhance companies' human resources, but also boost their innovation and organizational performance.

Amid growing global advocacy movements for gender equality and diversity, evidence has emerged demonstrating significant business, economic, and social benefits associated with increasing women's participation. Crucially, however, a major knowledge gap remains as to how women are advancing organizational and industrial transformation, and what can be done to unleash women's potential as changemakers. Without this understanding, efforts to increase gender diversity may devolve into superficial numbers games that fail to tap into women's talent and institute concrete, meaningful change at scale.

To address this research gap and contribute to the ongoing discourse, FP Analytics (FPA) conducted a pioneering study of fourteen legacy industries, which are among the most male-dominated and have wide-reaching environmental, health, and social impacts. Through data analysis of over 2,300 publicly listed companies around the world and more than 160 in-depth, one-on-one interviews and follow-up surveys, this study illuminates the current levels of gender inequality in these legacy industries; examines the relationships between gender diversity and corporate financial, environmental, and social performance; identifies the many ways that women can advance or are advancing positive change; pinpoints factors preventing gender diversity; and highlights best practices that companies and advocates are taking to address them.

Across the fourteen legacy industries studied, women on average represent just over 20 percent of the employees hired by publicly listed companies, constitute only 18 percent of executive management, and hold a mere 13 percent of board seats. However, despite being substantially under-represented, women of different occupations and seniority levels are still advancing significant, positive organizational and industry changes by:

▷ **Contributing to profitability and competitiveness:** FPA analysis found that the companies with the highest percentage of women in management were, on average, 47 percent more profitable than those with the lowest. Women interviewed for this study detailed how they are leading their organizations down new revenue-generating paths, advancing innovation in inertia-prone industries, , advocating for harm-reducing practices, and increasing transparency to build stakeholder trust.

▷ **Reducing environmental impacts of business practices and products:** Companies with greater gender diversity on boards were found to have better environmental performance, and those with increased gender diversity over time also demonstrated higher likelihood of improvement in this area. For example, companies with improved gender diversity on boards from 2013 through 2018 were 60 percent more likely than those without it to reduce energy consumption. Mission-driven women are also helping their organizations respond to regulatory pressure and societal backlash against pollution by advancing greener production processes and innovating environmentally sustainable alternatives.

▷ **Pushing their organizations to proactively address corporate social responsibility:** FPA's data analysis found a positive correlation between gender diversity on corporate boards and companies' performances with regard to social responsibility. Women are implementing socially responsible practices within their industries by protecting safety and labor rights, integrating community development into business strategies, and building local capacity and empowering women.

FPA analysis found that the companies with the highest percentage of women in management were, on average, **47 percent more profitable than those with the lowest.**

▷ **Creating inclusive corporate and industry cultures:** Workforce homogeneity and gender-based discrimination and harassment limit the recruitment and retention of women and other minority groups in these industries. In response, women are creating more diverse and inclusive workplaces by leveraging leadership positions to create top-down change and pushing corporate leaders to institutionalize gender equality and inclusivity through practical policies and initiatives.

Meanwhile, women are still facing a variety of barriers to entry and advancement in these industries, which limit their potential to drive organizational and operational changes. While many of the barriers are common across all industries, they can be particularly severe in male-dominated legacy industries. However, many leading companies are striving to reap the benefits of gender diversity as other stakeholders and advocates take targeted actions to remove these barriers and support women's contribution to business growth and transformation, including:

▷ **Building the pipeline of female talent:** The persistent gender gap in science, technology, engineering, and mathematics (STEM) education and negative industry reputations contribute to significant under-representation of female talent in the professional pipelines of these male-dominated industries. Successful interventions, led by non-profit organizations and grassroots networks of women, are reaching out to women at all stages of their careers, providing education, training, and job opportunities, and increasing their familiarity with industries and occupations. Additionally, companies are implementing inclusive hiring practices in order to proactively increase gender diversity within their organizations.

▷ **Creating inclusive workplaces:** Gender-based discrimination and harassment, lack of supportive policies and facilities, and lack of female role models represent three main barriers to success that can drive women out of the workplace. Effective practices to create inclusive workplaces, including removing gender-based pay gaps and providing mentorship and sponsorship programs for women, are emerging from companies that are committed to diversity from the top-down, and are taking a holistic approach to workplace gender equality with clear targets and explicit roadmaps.

▷ **Connecting female professionals:** In male-dominated industries, female professionals are at higher risk of isolation from other women, including peers and role models, and exclusion from professional networks. Women's organizations within and external to corporations are playing a significant role in supporting female professionals by expanding networks, facilitating their access to educational and professional resources, and increasing their visibility within industries and to the public.

▷ **Supporting female entrepreneurship:** Female entrepreneurs in male-dominated industries struggle, even more so than in other business ecosystems, to access funding and build their business capacity. Public and private organizations are stepping up efforts to support them, including through gender-lens investing and business incubators and accelerator programs, but more needs to be done.

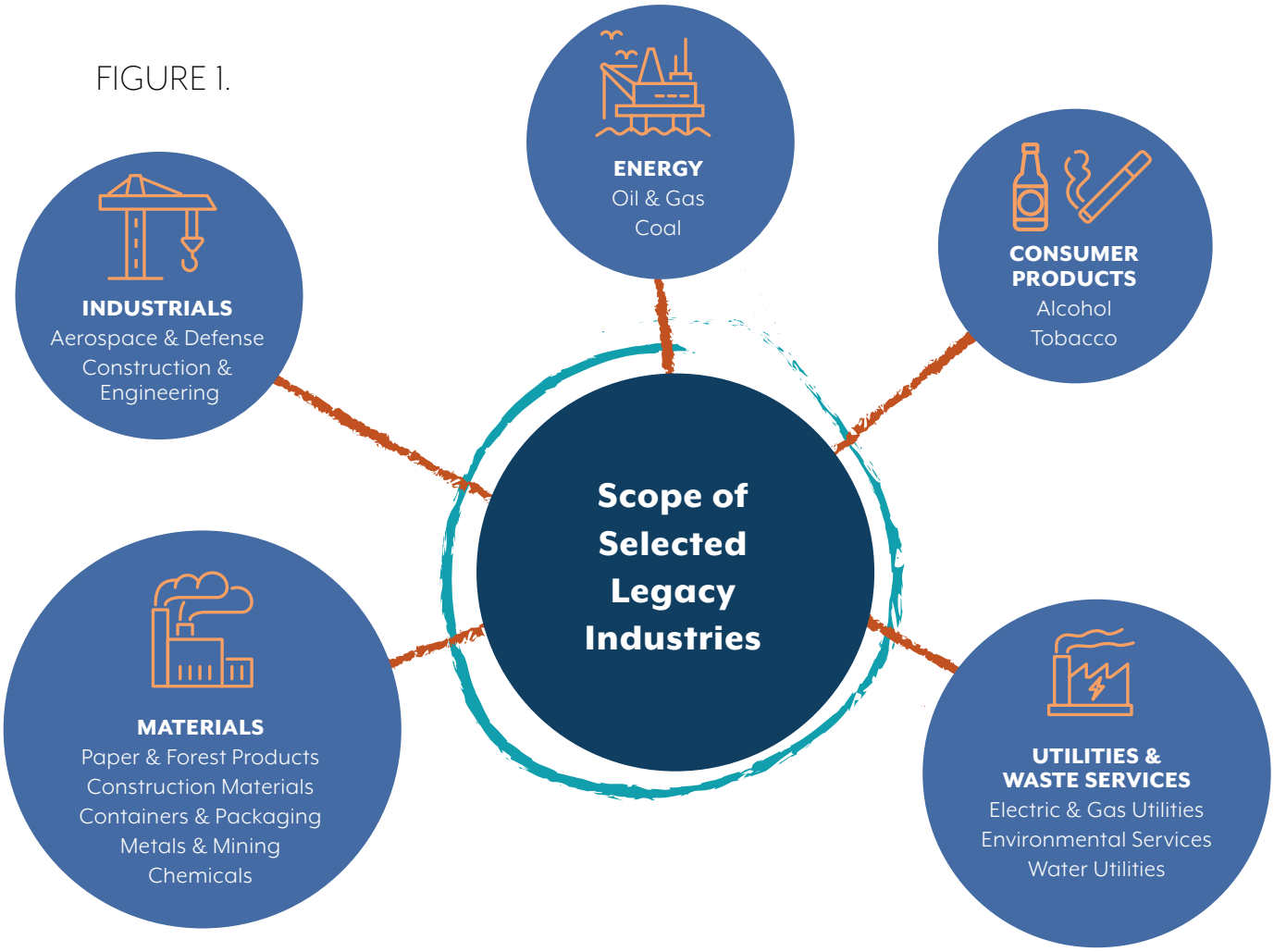
Failure to increase the representation of women across these male-dominated, legacy industries will limit their potential to innovate and transform for positive global impacts and to reap the financial and organizational dividends of a gender-diverse workforce. Meaningful progress will require a concerted effort from a variety of stakeholders, including policymakers, companies, investors, industry associations, and NGOs. It is only through the concurrent and collaborative work of these actors that gender equality and the associated benefits can be achieved, and this study sheds new light on the concrete actions each of these groups can take to meaningfully accelerate change. ◻

Part I. **Introduction**

Today, legacy industries[1]—from conventional power and minerals producers to energy-intensive industrial and consumer goods manufacturers—are facing growing pressure to innovate and transition toward more sustainable and socially responsible products and practices, if not radically transform their operations. The pressure that these legacy industries and other businesses face stems from an evolving global economic landscape as well as emerging social, financial, and regulatory trends—and the pressure is intensifying.

Consumers, notably millennials and younger generations, are putting greater importance on the environmental, social, and health impacts associated with their consumption. They are paying close attention to the degree to which companies employ responsible practices and are incorporating these factors into their purchase decisions. The pressure to transform also stems from the financial community, where sustainable investing is moving beyond a niche industry to pension funds and major investors increasingly integrating environmental, social, and governance (ESG) factors into their investment decisions. Shareholders are increasingly intervening in companies they invest in—having material impacts on businesses that are unable or unwilling to transform their practices. Younger workers are also vot-

FIGURE 1.



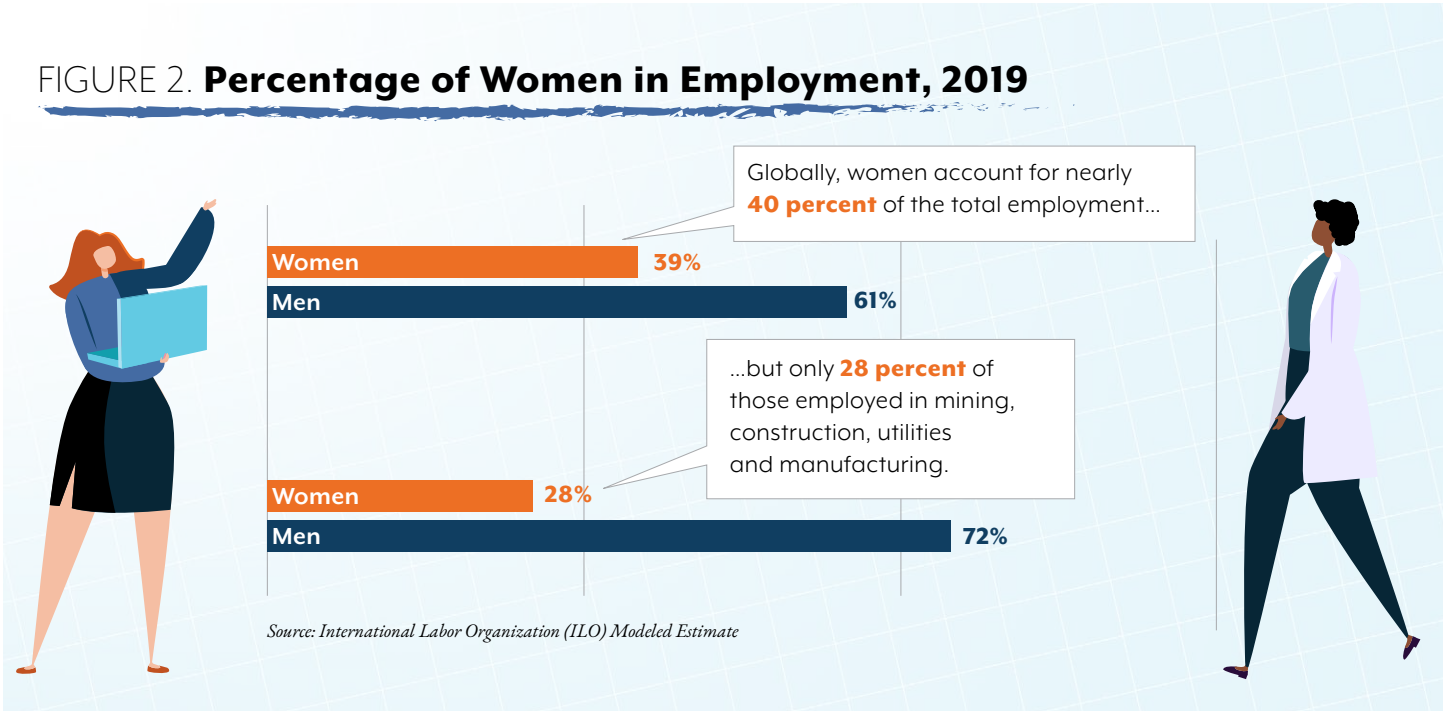
ing with their feet, with a growing number refusing to work for companies that don't align with their values. Failure to respond to these trends and to address associated challenges could result in consumer and investor backlash and legal liability, which could undermine these industries' competitiveness, while also increasing the risk of leaving associated environmental, social, and health issues unresolved.

While several companies within these industries are taking isolated measures to address these challenges, many approaches overlook the value of gender diversity, particularly in traditionally male-dominated industries. However, increasing demographic diversity within legacy industries could provide a means to facilitate and accelerate constructive change. Women account for half of the global labor force[2] and half of new graduates with higher education each year,[3] therefore representing a major source of talent, which is key to innovation and competitiveness of all industries. Yet, male-dominated legacy industries have traditionally failed to tap into this talent pool. For example, women account for less than 30 percent of those employed in manufacturing, utilities, mining, and construction combined (*Figure 2*).[4] Increasing women's representation could not only enhance the human resources of these industries, but also boost innovation in support of cleaner, more sustainable output and organizational performance.[5, 6, 7, 8]

At the global level, international institutions and multilateral organizations have made gender equality an increasing focus of their work, demonstrating the links between women's empowerment and key development outcomes, including poverty reduction, access to education, and sustainability. While early initiatives, such as the United Nations' (UN) 1995 Beijing Dec-

At the global level, **international institutions and multilateral organizations have made gender equality an increasing focus of their work,** demonstrating the links between women's empowerment and key development outcomes, including poverty reduction, access to education, and sustainability.

FIGURE 2. **Percentage of Women in Employment, 2019**

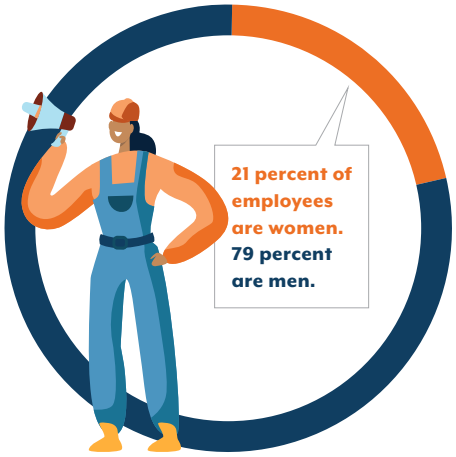


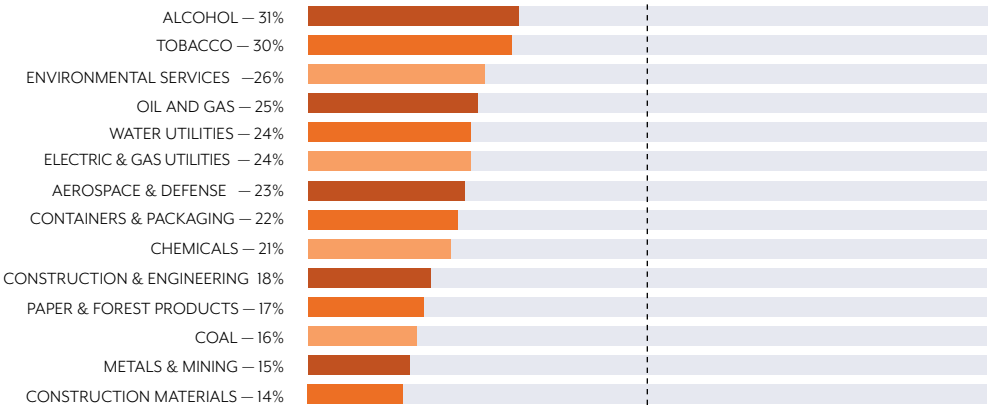
Source: International Labor Organization (ILO) Modeled Estimate

FIGURE 3. **Average Percentage of Women in Selected Legacy Industries, 2017–2018**

Percentage of Women in Employment

Across the 14 legacy industries, which are among the most male-dominated and have wide-reaching environmental, health, and social impacts, women on average represent slightly over 20 percent of the employees hired by publicly-listed companies.

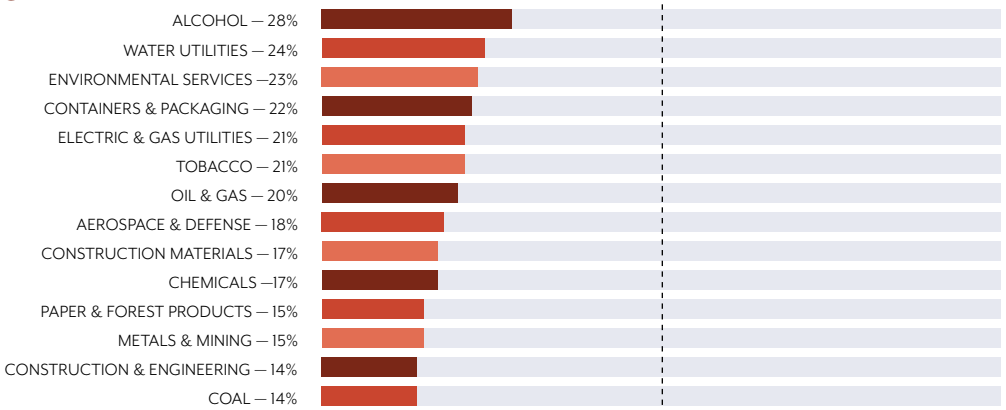




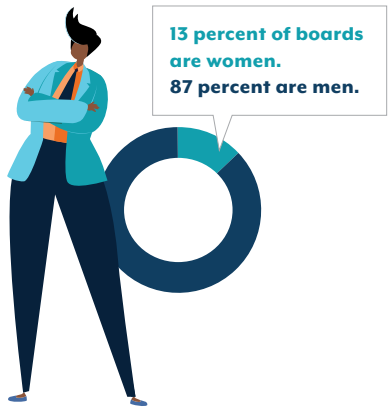
In Leadership

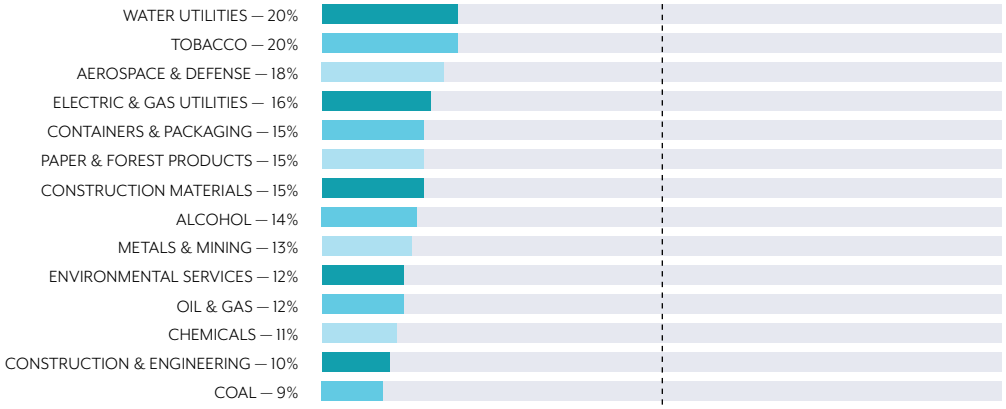
While underrepresented in overall employment, women's representation drops further in leadership roles, including both on boards and in executive management.

Percentage of Women in Management



Percentage of Women On Boards





Note: The analysis was based on over 2,00 publicly-listed companies, data for which were retrieved from Bloomberg in May 2019. The sample size varies by women metric, due to limited data availability, and is 2,371, 290, and 808 for the percentage of women on boards, in management, and in overall employment respectively.

Though gender equality has gained traction in the business world in recent years — attributable in part to the #MeToo movement and calls for action from prominent businesswomen such as Ellen Pao, ex-CEO of Reddit, and Marillyn Hewson, CEO of Lockheed Martin— **more needs to be done to pinpoint effective means of increasing, sustaining, and valuing women's roles in the workplace.**

laration and Platform for Action,[9] raised the profile and importance of gender, they yielded limited results. However, the new millennium has ushered in a host of proactive and eagerly adopted initiatives introduced at the supranational level that are developing tools to facilitate change. Among the most prominent are the World Economic Forum's annual Global Gender Gap Report, launched in 2005, which measures countries' progress toward total gender equality,[10] and the UN's Sustainable Development Goals, which are designed to facilitate measurable progress at the national level before 2030 and apply across all seventeen goals.[11] These initiatives, coupled with the upcoming thirty-year anniversary of the Beijing Platform, provide an opportunity for stakeholders to turn their attention to persistently male-dominated legacy industries and take action.

Though gender equality has gained traction in the business world in recent years — attributable in part to the #MeToo movement and calls for action from prominent businesswomen such as Ellen Pao, ex-CEO of Reddit, and Marillyn Hewson, CEO of Lockheed Martin— more needs to be done to pinpoint effective means of increasing, sustaining, and valuing women's roles in the workplace. A range of research studies have been undertaken by international organizations, think tanks and research institutions, nonprofit and civil organizations, and leading corporations to make the economic and business cases for gender diversity and equality, but there has remained a major gap in the research and literature regarding how women are advancing organizational and industrial transformation. Without that understanding, the effort to increase gender diversity could easily turn into "diversity washing," failing to effectively tap into women's talent and institute concrete, meaningful change at scale.

To address this gap and contribute to the ongoing discourse, FP Analytics (FPA) conducted this pioneering study focusing on fourteen legacy industries (*Figure 3*), which are among the most male-dominated and have wide-reaching environmental, health, and social impacts. Through data analysis of over 2,300 publicly listed companies and more than 160 in-depth, one-on-one interviews and follow-up surveys with women at all stages of their careers, this study:

- Illuminates the state of gender inequality in the legacy industries as well as some major industry-wide challenges;
- Quantifies the relationship between gender diversity and corporate financial, environmental, and social performance;
- Identifies and showcases how women are already advancing, and can advance, industrial and organizational transformation;
- Pinpoints factors that inhibit women from making an impact; and
- Highlights best practices that are supporting women to realize their potential and concrete measures that companies and advocates can take now to contribute to industry growth and transformation.

The research in this field is still nascent, and more data and cross-sector collaboration are needed; however, the risks to businesses are clear: failure to increase representation of women in these industries will prevent them from capturing the material financial and organizational benefits that women's skills, experience, and ingenuity can bring to bear for these industries and positively impact the communities in which they operate. This study aims to aid industries in that effort and lay the foundation for external stakeholders to advocate for change: the time to act is now. □

Part II. Women's Transformative Impact

As legacy industries face intensified pressure to innovate and transform, improving gender diversity could provide a means to facilitate and accelerate change. FPA's company-level data analysis identified a positive correlation between women's representation in senior management and corporate profitability, and between women's representation on boards and corporate performance in managing and disclosing environmental, social, and corporate governance (ESG) matters.[12]

Insights shared by both female and male interviewees echo the data findings from FPA's analysis and other related studies done to date.[13, 14] Interviewees shed light on how women across occupations and seniority levels are advancing, or can advance, positive organizational and industrial changes. In addition, they outlined the ways in which they contribute to business competitiveness, environmental sustainability, and corporate social responsibility, as well as help build more inclusive corporate and industry cultures. Given the myriad pressures facing legacy industries, actions aimed at increasing women's representation in overall employment and in leadership could help unleash their potential and enable companies to reap the gender-diversity dividend.

SECTION A. CONTRIBUTING TO PROFITABILITY & COMPETITIVENESS

A variety of market challenges are straining the bottom lines of a host of legacy industries. Changing global market conditions and increased regulatory and consumer pressures are intensifying competition among long-time industry rivals, while innovative new entrants shake up established business models. Global trends, such as slowing growth in major markets,[15] are hitting commodity producers and manufacturers particularly hard, with oversupply hurting producers in the iron and steel[16] and natural gas[17] industries, squeezing their margins. Digitalization, globalization, and the democratization of technology, among other factors, are opening the door for new entrants and facilitating market disruption, as experienced by the aerospace and defense industries.[18] Moreover, substitutions or alternatives—such as renewable energy, which is becoming increasingly cost-competitive—are eroding the market share of conventional industry players. Together, these factors are pushing companies to improve productivity and efficiency while evolving their business models toward addressing today's critical environmental, social, and health challenges.

Compounding these pressures are changing trends in consumer preferences and behavior. Consumers, particularly millennials and younger generations, are becoming more health-conscious and increasingly factoring environmental, social, and corporate governance considerations into their purchasing decisions,[19, 20] demanding less-harmful products and more sustainable corporate practices. As a result, companies in the alcohol, tobacco, chemicals, mining, and energy industries are facing escalating pressure to innovate and develop new, less-harmful products and market them responsibly. They are increasingly challenged to respond to consumer and investor demands for greater transparency and accountability and to provide associated data to prove they are making changes.

Considering these market challenges, increasing gender diversity could provide a means to respond to such pressures and enhance competitiveness and profitability. FPA's company-level analysis reveals that a higher percentage of women in executive management is associated with higher profitability. In fact, the top-quartile companies with the highest percentage of women in management were, on average, 47 percent more profitable than those in the bottom quartile (*Figure 4*). In addition, companies with at least one woman on the board were, on average, nearly one-third more profitable than those with none.

These findings are consistent with other evidence that promoting gender diversity can benefit businesses' bottom line. For example, according to a 2019 report by the International Labour Organization (ILO), which surveyed nearly 13,000

FIGURE 4. **Corporate Profitability by Quartile of Women's Representation**

The top quartile companies with the highest percentage of women in executive management roles, on average, are 47 percent more profitable than those in the bottom quartile.

N=264

Note: Profitability is measured by earnings before interest and taxes (EBIT) margin as of 2018 or 2017 (when data unavailable for 2018). Data were retrieved from Bloomberg in May 2019. To incorporate the impact of profitability variance between industries, data of individual companies were adjusted relative to their industry peers.

enterprises worldwide, 74 percent of enterprises promoting women in management reported a profit increase of between 5 and 20 percent.[21]

Echoing the empirical analysis, FPA's interviews with women across industries, occupations, and levels of seniority revealed their commitment to enhancing legacy industries' profitability and competitiveness by generating new revenue, advancing innovation, and building trust among business partners, consumers, and other stakeholders.

Generating New Revenue

To weather intensified competition from legacy rivals and new competitors, many companies are exploring new avenues to generate revenue. FPA's interviews revealed that empowered women can be major forces leading their organizations into new markets, expanding business practices, and growing new revenue streams. This was observed in the utility industry in particular, where traditional business models have been disrupted by the emergence of renewable energy, the advancement of digital technology, and market deregulation. **Cara Olmsted**, Director of New Business Development at ConEdison Solutions, has been leading cross-functional teams to develop and deliver new business initiatives covering distributive generation, micro-grids, battery storage, and energy efficiency services, among other plans, which substantially contributes to the energy company's continued efforts to expand business portfolios.[22] **Laurie Wiegand-Jackson**, Chair of the Board of Directors at the Council for Women in Energy & Environmental Leadership and a veteran in the utility industry, also

"When it comes to seeing what the opportunity is and saying, 'Yes we can do that,' I'm absolutely fearless."

— Cara Olmsted, Director of New Business Development at ConEdison Solutions

recounted her successful experience in leading new business development with regard to demand-response and energy-efficiency solutions at her previous employers.[23]

Increasing the representation of women in sales and business development can also help drive revenue. Research from the Center for Talent Innovation (CTI)[24] and the American Sociological Association (ASA)[25] shows that increased gender diversity improves a company's market growth and sales revenue. According to CTI, companies with two-dimensional (2D) diversity— such as gender and race, and diversity of employee experiences—were 45 percent more likely to report expanded market share in the past year and 70 percent more

"The lever of change is the person who is willing to stand for what they believe in and take the risks associated with it. I think that we [women] are willing to take those risks."

— Laurie Wiegand-Jackson, Chair of the Board of Directors at the Council for Women in Energy & Environmental Leadership

likely to have entered a new market. Further, an ASA study by Cedric Herring found that for every 1 percent rise in a workforce's rate of gender diversity, there is a 3 percent rise in sales revenue. Yet, women are traditionally most under-represented in sales roles at all levels across industries.[26] According to CEB Global, the sales function, after the supply chain, has the second-largest gender gap in leadership positions.[27]

In addition, both men and women interviewed in this study agreed that women have the potential to be as good as—or even better than—male peers at sales and business development, citing that women tend to be more empathetic and good communicators, characteristics critical to these roles. According to Christophe Bauer, an experienced business-development professional in the aerospace and defense industries and a member of the board of directors at Women in Aerospace, "Business development has a strong requirement for a high level of emotional intelligence. It's not just about the facts; it's also about being able to read the nonverbal [messages]. I've seen women among the best business development people who were really good at interacting with people."[28] Interviewees also cited that gender-diverse teams may be able to better understand and reach customers and consumers. This is confirmed by a study by the CTI, which found that teams with one or more members who represented a target end-user are as much as 158 percent more likely to understand that target and market to them effectively.[29]

Advancing Innovation

Innovation is key to companies' ability to maintain a competitive edge and financial viability over the long term. However, innovation in legacy industries can be particularly challenging. According to William Bonvillian and Charles Weiss, authors of *Technological Innovation in Legacy Sector*s, the established paradigm involves ingrained technology systems and social institutions that create serious obstacles to change.[30]

Women interviewed for this study, particularly those from the metal, paper, and construction industries, shared similar observations of company- or industry-wide inertia inhibiting the development or integration of new technologies that could enhance efficiency and more readily enable their respective companies to evolve and adapt to changing market conditions. They further contended that male dominance and a lack of diversity within these industries have reinforced such inertia. Carissa Schutzman, Ph.D., a researcher at Thomas More University who studies women in manufacturing, says, "The male perspective and experience in manufacturing is the default. Women are always seen as 'others,' and the way they do things can be different. Unfortunately, the male leadership often look at it as difference, rather than difference is bringing diversity and a new perspective on how the work could be done. The

male default is what is common but not necessarily what is best."[31]

Such inertia can carry costs to organizations by limiting their innovative potential. Numerous studies have shown a positive correlation between gender diversity and innovation within an organization.[32] According to a 2019 ILO report, when enterprises promote gender diversity, the probability of achieving greater creativity, innovation, and openness is 59 percent.[33] Interviewees for this study echoed that women expand dialogue and perspectives pertaining to business challenges and prompt new ways of thinking, helping to avoid groupthink.[34]

Sita Sonty, a former American diplomat and Vice President of International Business at Sierra Nevada Corporation, a U.S.-based aerospace and defense company, recounted how her foreign affairs expertise and integration of new global risk factors into the company's review of international contracts helped secure new business and increase profit margins.[35] **Nicolette Skjoldhammer,** Managing Director of Betterect, a South African firm focused on steel fabrication and erection, also shared how she challenged the default or "can't do" mentality within her division and prompted an effort to innovatively remold obsolete equipment for new functions, introducing greater efficiency into company operations, cutting costs, and helping to strengthen the company's bottom line.[36] **Flora Okereke**, Senior Director of Government Affairs and International Policy at Reynolds American, noted that women in the tobacco industry, particularly those in R&D and product-innovation departments, are playing an important role in pushing their companies to focus on harm reduction and develop new products to reduce health risks, despite potential risk to profits in the short run.[37]

In addition, multiple interviewees highlighted how women's penchant for communication helped facilitate the exchange of information and ideas within teams, increasing the chance of making better-informed decisions. In fact, over 80 percent of male interviewees and 60 percent of female interviewees considered "good communication" as an important attribute enabling women to advance positive organizational and industrial transformation. This argument is echoed by a 2018 study by Development Dimensions International, a human resources management company, which shows that companies with higher levels of gender diversity are twice as likely to have their leaders work together to create new solutions, and 1.5 times more likely to work across an organization's silos and exhibit a growth culture.[38]

While some women are advancing new ideas and practices within an organization, others are doing so through their own businesses. **Zoe Coull**, Founder of ICE Dragon Corrosion, a Canada-based consultancy specializing in corrosion risk management, is pioneering anti-corrosion practices and technology in the mining industry; though widely adopted in other industries, such as oil and gas, they have been traditionally overlooked by mining companies. By reducing corrosion risk in mining project design and development, the company helps its clients to reduce losses from corrosion failures while improving production safety.[39] Another example is **Vanessa Clark**, CEO and Co-Founder of the U.S.-based startup Atomos Space, who is leading the company's venture to develop innovative solutions that reduce the cost of sending satellites to high orbits and lower the overall launch cost for satellite operators.[40]

"Women have come into the industry and work in science and product innovation departments that are moving the business in a new direction of reduced risk products. [Based on what I've seen], women are naturally more open to managing risk. If there is something that could be done to reduce the health impact of the products, emotionally we are more attuned to working towards it."

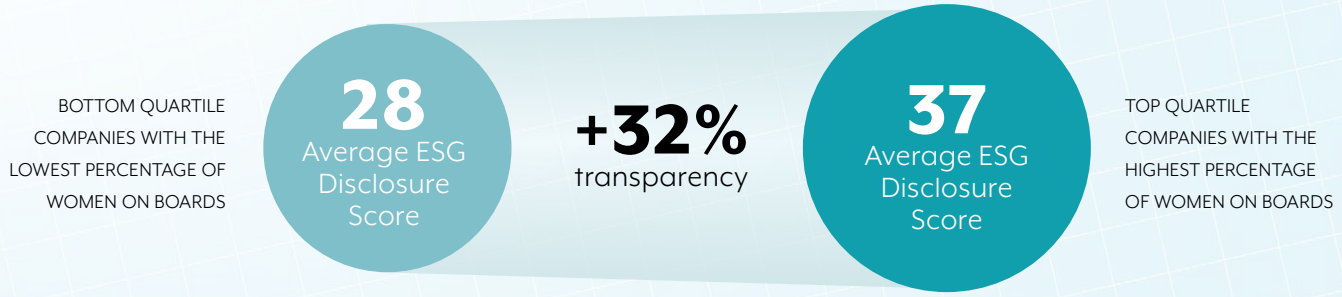
— Flora Okereke, Senior Director of Government Affairs and International Policy at Reynolds American

Building Stakeholder Trust

Building trust across stakeholder groups, including employees, consumers, regulators, and investors, among others, is vital for legacy industries that are working to evolve their business models, improve regulatory compliance and performance, and respond to consumers' changing needs. Building stakeholder

FIGURE 5. **Corporate Transparency by Quartile of Women's Representation**

The top quartile companies with the highest percentage of women on boards, on average, are 32 percent more transparent in terms of ESG information disclosure, compared to those in the bottom quartile.



N=1,496

Note: Transparency is measured by Bloomberg ESG Disclosure scores (on the scale of 0.1–100) and based on the amount of environmental, social, and corporate governance related information a company reports publicly, for 2018 or 2017 (where data unavailable for 2018). Data were retrieved from Bloomberg in May 2019.

"We're bringing adjacent technology and risk management approaches from other sections into mining. There is a big and invisible corrosion risk in mining that we know causes fatal failures, production losses, and environmental releases. It's an area where we can really make an impact."

— Zoe Coull, Founder of ICE Dragon Corrosion

trust can be particularly important but also challenging for certain industries such as tobacco, defense, and oil and gas, which have been stigmatized due to their long-standing associations with negative health, environmental, and social impacts, and aversion to regulation.

Transparency is vital to building stakeholder trust, and increasing the representation of women throughout an organization can be a key enabling factor—particularly if women are more active and visible among leadership. FPA's company-level data analysis revealed that a higher percentage of women on boards is associated with greater transparency. The top-quartile companies with the highest percentage of women on boards, on average, are 32 percent more transparent in terms of ESG information disclosure, compared to those in the bottom quartile (*Figure 5*). In particular, companies with at least one woman on the board are 17 percent more transparent than those with no female board members.[41]

This finding did not come as a surprise to the interviewees. Though such traits are certainly not exclusive to women, interviewees again cited women's propensity toward, and relative strengths regarding, authenticity and communication as possible contributing factors. **Caroline Alting**, Head of Engineering and Projects at Maersk Drilling, a Danish drilling rig operator, commented: "In their aspiration and drive to establish a purposeful, profitable, and socially responsible business, companies with a diverse composition will be more successful. With the way we [women] communicate, the way we think, and the need we have for authenticity, we can definitely make a great impact."[42] Interviewees also noted that improved diversity alone would signal an organization's commitment to

transformation that could enhance reputation to stakeholders, although they emphasized that this must be accompanied by other, complementary measures to affect real change. According to the ILO, when enterprises promote gender diversity, the probability of company reputation being enhanced is 58 percent.[43]

SECTION B. **CONTRIBUTING TO ENVIRONMENTAL SUSTAINABILITY**

Many of the legacy industries included in this study are primary energy and natural resource users and face considerable pressure to minimize pollution and their impact on the environment. The energy-intense industries of chemicals, metals, non-metallic minerals, and paper and pulp—together with food—consume about one-quarter of energy worldwide[44] and have a substantial environmental footprint. Collectively, they are major sources of air and waste pollution: Across OECD countries, the energy, construction, waste management, and manufacturing industries in general account for more than 40 percent of greenhouse gas (GHG) emissions;[45] in Europe, these industries produce about 60 percent of hazardous waste.[46] Pollution is now the largest environmental cause of death worldwide, killing more people in 2015 than AIDS, tuberculosis, and malaria combined, and pollution-related diseases and deaths are disproportionately suffered in the poorest parts of the world. Nearly 92 percent of pollution-related deaths occur in low- and middle-income countries.[47] In addition, some conventional products from these industries, such as toxic chemical pesticides and single-use plastics, damage water, soil, and other natural resources and pose other threats to the ecosystem. While responsible for a significant share of the environmental challenges facing the world today, they are also well-positioned to develop and implement solutions.

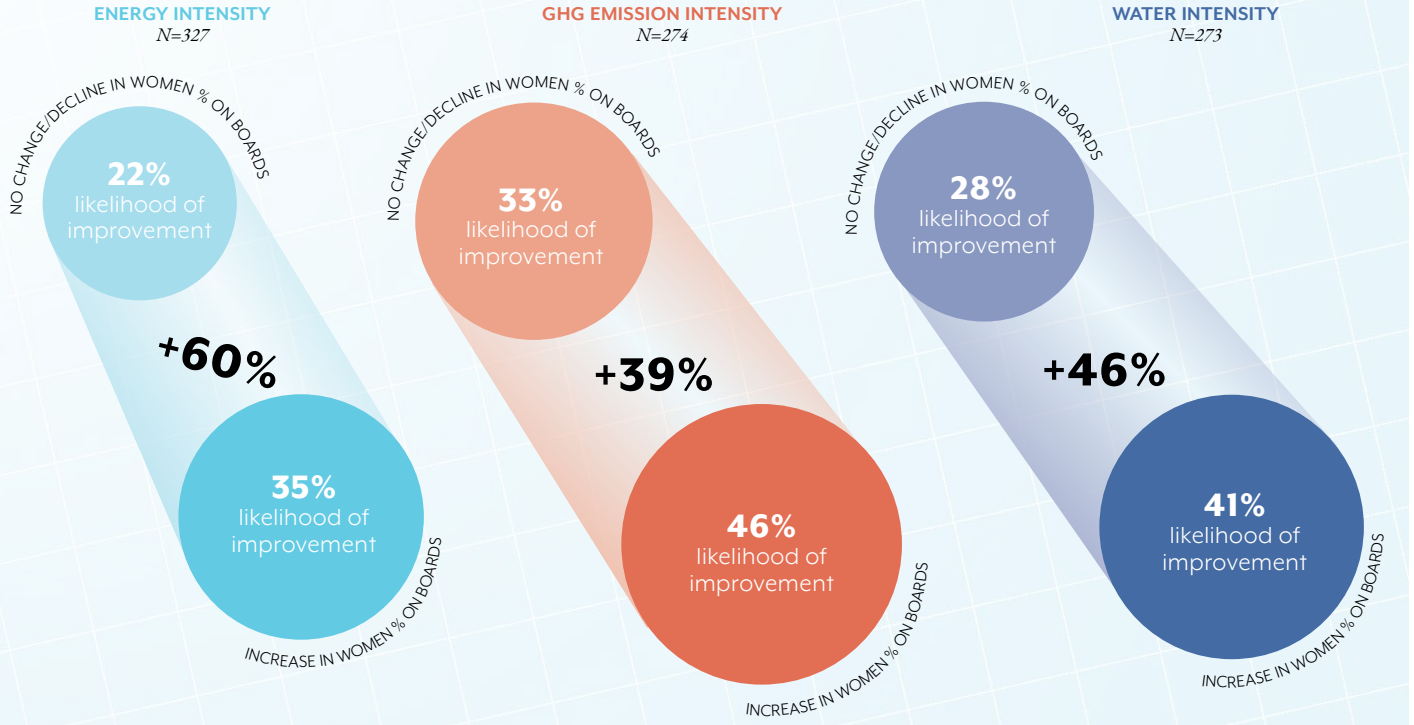
In the meantime, regulatory compliance and improved environmental performance are becoming essential to companies' competitiveness in these industries. As consumers increasingly factor environmental considerations into their purchasing decisions, and the public sector strengthens environmental regulations, how well a company manages environmental impacts directly affects its revenue, legal compliance costs, and long-term financial viability. Moreover, these industries are facing intensified pressure from investors to transform and become more environmentally responsible. Sustainable investing has gained significant momentum over the past decade, as investors increasingly integrate ESG factors into their investment decisions and intervene in the operations of companies in which they are invested. For example, in 2017, just over 50 percent of shareholder resolutions filed in the United States were focused on environmental and social issues, up from 33 percent over the period from 2006 through 2010.[48]

Greater gender diversity has the potential to facilitate the transformation that enables these legacy industries to become more environmentally responsible while retaining competitiveness. Echoing a number of existing studies,[49, 50] FPA's data analysis shows a positive correlation between the percentage of women on boards and a company's performance in managing environmental matters, based on ESG ratings by Sustainalytics—a data provider and research firm focused on ESG.[51] In fact, the top-quartile companies with the highest percentage of women on boards, on average, have an environmental rating 36 percent higher than those in the bottom quartile. FPA's analysis of a range of environmental metrics also reveals that companies with improved gender diversity on boards over time are 60 percent, 39 percent, and 46 percent more likely than those without to reduce the intensity of energy consumption, GHG emissions, and water use, respectively (*Figure 6*).

The positive relationship between gender diversity and re-

FIGURE 6. **Likelihood of Decreased Environmental Impact by Change in Gender Diversity on Boards**

Companies with improved gender diversity on boards from 2013 through 2018 were 60 percent, 39 percent, and 46 percent more likely than those without to reduce the intensity of energy consumption, GHG emission and water use respectively.



Note: Likelihood is measured by the percentage of companies experiencing improvement in environmental metrics based on whether there is a positive or negative/no change in women's representations on boards over the period from 2013–2018. Data were retrieved from Bloomberg in May 2019.

"The initiative has really helped to focus companies in the industry on the same endpoints. They're all accomplishing their individual goals in different ways, but everyone is rowing in the same direction. We not only talk the talk, but we walk the walk."

— Donna Harman, former President of American Forest & Paper Association

duced environmental impact is consistent with findings from a number of studies indicating that women are more likely than men to be concerned about the environment and the adverse impacts that climate change will have on them personally and on future generations, based on the populations included in the study.[52] Interviewees shared insights on how women advance changes to reduce business' environmental impact through 1) advancing greener production processes and practices; and 2) innovating environmentally sustainable alternatives.

Advancing Greener Production Processes and Practices

Legacy industries have the potential to reduce their environmental impact by transforming production processes and advancing greener practices. According to the Intergovernmental Panel on Climate Change's latest Mitigation of Climate Change report in 2014, the industrial sector, including manufacturing, construction, water, and waste management, could

directly improve energy efficiency by 25 percent, compared to the current level by upgrading processes, replacing equipment, and deploying best-available technologies. In addition, they can significantly improve energy efficiency and reduce GHG emissions by improving the efficiency of material use, recycling and re-use of materials, and products.[53] FPA's interviews revealed that women in these industries are driving progress by both improving companies' environmental performance on the ground and promoting industry-wide sustainable practices and standards.

IMPROVING ENVIRONMENTAL PERFORMANCE ON THE GROUND

At the company level, women in these legacy industries, particularly those with STEM backgrounds and working within related occupations, are active in reducing the environmental impact of production processes by promoting advanced environmental management systems, practices, and technology that help reduce environmental harm. One example is **Carolina Bengochea**, Environment Director of Tenaris, a global manufacturer of steel pipes. While based in Argentina, she leads and coordinates a diverse team of environmental specialists across the company's production plants around the world, defining and implementing internal procedures to improve environmental performance. Thanks to their effort, 92 percent of the company's industrial sites have ISO 14001 certifications—a voluntary international standard that provides a framework for organizations to improve environmental performance through more efficient use of resources and reduction of waste.[54, 55]

Another example of a woman improving environmental sustainability comes from the oil and gas industry. **Soma Chakraborty**, Technical Program Leader at Baker Hughes (BHGE), is working to support the energy technology company's commitment to minimizing waste and pollutant emissions in the industry. One focus of the company is replacing the conventional, hazardous chemicals used in oil production with more environmentally friendly alternatives, and recently Soma led a team to develop a game-changing approach to economically removing hydrogen sulfide, a harmful gas.[56]

PROMOTING INDUSTRY-WIDE SUSTAINABLE PRACTICES AND STANDARDS

While women at the forefront of operations are focusing on environmental improvements in day-to-day production processes, other women—particularly those heading major industry associations—are leveraging their unique positions and influence to promote sustainable practices and standards on a broad scale.

For example, building and construction account for more

"The R&D side of the aerospace industry doesn't always create things that can or will be used by the actual commercial operators. We're striving to ... build something that they will actually use ... and incrementally roll out innovation so it fits their risk tolerance but also pushes the envelope in terms of what is possible technologically."

— Vanessa Clark, CEO and Co-Founder of Atomos Space

"From an environmental or a broader sustainability point of view, it is extremely important that we have the trust of the community where our facilities are located. We have to not only comply with legal requirements, which is basic, but go beyond that to understand the expectations of the community and continuously improve our performance to meet those expectations."

— Carolina Bengochea, Environment Director of Tenaris

than 35 percent of global final energy use and nearly 40 percent of energy-related CO_2 emissions.[57] **Victoria Kate Burrows**, who leads the World Green Building Council's (WorldGBC) Advancing Net Zero initiative, has dedicated her career to improving sustainability in the construction and engineering industry. The initiative, which was launched in 2017, aims to achieve net zero carbon emissions in buildings by increasing energy efficiency, reducing energy consumption, and using renewable energy for operations. Capitalizing on WorldGBC's global network, Victoria works closely with national Green Building Councils and their members around the world to develop the certifications and promote new industry standards focused on actual carbon emissions and energy-efficiency performance, with the ultimate goal of 100 percent of buildings operating at net zero carbon by 2050.[58]

In the paper industry, female leaders have also taken the initiative to steer the sector toward sustainable improvement and push for industrial transformation by setting specific goals and targets. **Donna Harman**, the former President of the American Forest & Paper Association (AF&PA), dedicated her service at the association to prompting the industry to achieve sustainable resource consumption and production along the entire value chain. Under her leadership, AF&PA launched the Better Practices Better Planet 2020 initiative in 2011, which established an extensive set of sustainability goals covering energy efficiency, paper recycling, and GHG emissions, among others. She led the association to work closely with major industry players, government agencies, communities, and other stakeholders to set up ambitious but achievable goals and employ advanced practices to help achieve them. By 2018, the industry had surpassed two out of the six goals ahead of schedule and had made significant progress on the remaining four.[59, 60] Harman's successor, Heidi Brock, another female manufacturing leader, is planning to build upon the initiative's success and update the goals for years beyond 2020.[61]

In less-developed economies, some women leaders are spearheading efforts to balance economic growth and sustainable development. In Zimbabwe, where tobacco cultivation accounts for over one-tenth of the national GDP,[62] **Dr. Dahlia Garwe**, a molecular biology scientist and CEO of the Tobacco Research Board (TRB) Zimbabwe, leads the state-backed research organization to maximize economic value from sustainable and responsible tobacco cultivation. She focuses on promoting greener farming practices among tobacco growers, including the introduction of biological control technology that helps reduce the use of pesticides and their negative impact on the environment. Additionally, the TRB utilizes waste material from the timber industry to manufacture a successful plant-growing medium that has also been adopted by the horticultural industry.[63]

FIGURE 7. **Corporate Social Responsibility Performance by Quartile of Women's Representation**

The top-quartile companies with the highest percentage of women on boards, on average, have a rating of their social responsiblity performance 74 percent higher than those in the bottom quartile.

N=391

Note: Provided by Sustainalytics and measuring a company's percentile rank (on the scale of 0-100) based on its social responsibility performance score relative to its industry peers for 2018 or 2017 (where data unavailable for 2018). Data were retrieved from Bloomberg in May 2019.

Innovating Environmentally Sustainable Alternatives

In addition to reducing environmental impact through production processes, some legacy industries, such as the chemical industry, are facing intensified pressure from consumers and civil society organizations regarding environmentally harmful products. The chemical industry has most recently witnessed growing social concerns and boycotts over single-use plastics, which have had extensive adverse impacts on soil, water, and wildlife.[64] There has also been longer-term pressure to shift away from petroleum-derived products to more sustainable alternatives, such as bio-based products.

To address these and other environmental concerns, female scientists and entrepreneurs have been active in innovating and developing environmentally sustainable alternatives to existing products. Among these trailblazers is **Pamela Marrone**, Founder and CEO of Marrone Bio Innovations. Pamela was a pioneer in the development and commercialization of biopesticides in the 1980s and has since dedicated her career to developing effective and environmentally responsible bio-based products for pest management and plant health, which help to reduce toxic chemicals for pest control. A serial entrepreneur, she has the ambition to turn her latest venture, Marrone Bio Innovations, into the largest ag-bio company.[65]

Additionally, a new generation of leaders is disrupting legacy industries with their greener innovation. **Fanya Ismail**, a British scientist and entrepreneur, has created a technology

"We are trying hard to educate [tobacco] growers to grow the crop in as green a manner as is possible. [By doing so] we are saving on water, fertilizers, and chemicals, and achieving the goal of sustainable cultivation."

— Dr. Dahlia Garwe, General Manager of Tobacco Research Board in Zimbabwe

based on non-fossil-fuel-based chemicals to create more sustainable alternatives to plastic. With her invention of a paper coating technology to replace the plastic liner in coffee cups, she was presented a "Women in Innovation 2019" award by Innovate UK, a government-backed body focused on supporting business-led innovation.[66]

SECTION C. CONTRIBUTING TO CORPORATE SOCIAL RESPONSIBILITY

Today, corporate social responsibility has grown to include a broad scope of issues, including labor rights in the supply chain, occupational safety and health, gender equality in the workforce, and companies' impact on local communities, among others. Legacy industries are no exception and have the potential to bring about far-reaching, positive social impacts—and women can be an important force to drive these changes.

Many of these industries, including construction, mining, oil and gas, utilities, chemicals, and metals, involve high-risk occupations where workers operate large, heavy equipment and are exposed to hazardous chemical, physical, or biological agents that could harm their health. In Europe, these industries[67] account for more than 40 percent of annual fatal accidents at work and nearly one-third of non-fatal injuries.[68] In addition, the risk of contributing to supply chain labor abuses is especially high for companies in the tobacco, mining, and oil and gas industries, which often source raw materials and inputs from low- and middle-income countries where laws and regulations are, in some contexts, not as strictly or rigorously enforced. These companies risk detrimentally impacting communities in which they operate if they do not comply with labor, natural resource, and other international standards.[69, 70, 71]

Mismanagement of these issues—and failure to implement responsible practices—could lead to significant costs related to legal compliance and damage businesses' reputations with both consumers and investors. Additionally, costs from the latter could grow over time, particularly given increasing consumer consciousness about businesses' social impact and the growing movement of socially responsible investing. To mitigate these risks, companies in these impactful industries can and should effectively manage safety and labor practices in the supply chain, engage with local communities, and improve the quality of life of workers and local residents.

Women have great potential to drive positive social change. FPA's data analysis found a positive correlation between gender diversity on corporate boards and companies' social responsibility performance: Based on ESG ratings by Sustainalytics, on average, the top-quartile companies with the highest percentage of women on their boards have a rating of their social responsibility performance 74 percent higher than those in the bottom quartile (*Figure 7*).[72] In addition to these quantitative findings, women interviewed for this study provided numerous, first-hand accounts of their efforts to protect safety and labor rights, integrate community development into business strategy, and build local capacity and empower women.

"I want to prove that we can really transform agriculture with products that work as well as chemicals … and really have an impact on growers, improving their bottom line while at the same time providing sustainability for future generations."

— Pamela Marrone, Founder and CEO of Marrone Bio Innovations

Protecting Worker Safety and Labor Rights

While corporate safety and labor policies should conform to, and be consistent with, international standards and national laws, building a culture of safety and effective implementation is equally important, if not more so. FPA's interviewees revealed that women are playing an important role in both areas.

INTEGRATING SAFETY CULTURE WITH POLICY DESIGN

Safety culture consists of the attitude, beliefs, and values that employees share with regard to safety in the workplace.[73] According to the International Labour Organization (ILO), one key element for occupational safety and health management is the promotion of a culture of prevention within the enterprise. A positive safety culture is essential to reducing occupational injuries and diseases and enhancing organizational performance.[74]

Workers at production plants and operations sites, in particular, are exposed to disproportionate and different risks,

including various safety risks. Women, in some contexts, have a disproportionately high risk of workplace injuries due to operating machinery and equipment built for male proportions. For example, in the paper industry, manufacturing activities can be hazardous due to massive weights failing, rolling, and/or sliding pulpwood loads, and the misuse of equipment.[75] In the United States, there are over 10,000 workplace injuries reported every year.[76] Understanding the risks, **Cathy Slater**, Senior Vice President at International Paper, has made a name for herself as a champion of safety in the industry. Throughout her career, she has approached occupational safety as a key component of corporate social responsibility and integrated people-centric culture into safety policy. While supervising the Grande Prairie Mill in Alberta, Canada, in 1999, Cathy created an innovative health and safety policy, focusing on true accountability to individual physical well-being rather than treating health and safety as an exercise in compliance and bureaucracy. The policy was so successful that the mill was officially recognized with the Safest Mill award by Pulp and Paper Canada in 2000.[77] Cathy has continued to use this holistic strategy of safety culture throughout her career, creating an expectation of care for all members of their workplace community. This effective approach has been widely adopted across the paper industry.[78]

Enforcing Labor Practices Standards in Supply Chain

In addition to companies' commitment to the well-being of their direct employees, more and more companies are extending their commitment to workers in their supply chains. International agencies and nonprofit organizations, such as the United Nations, International Labour Organization, and Business for Social Responsibility, have called upon businesses to uphold international labor standards in their supply chains by eliminating child labor, discrimination and harassment, excessive work hours, and other labor abuses;[79, 80] failure to do so could adversely impact companies' performance, public image, and ability to attract investors.

With respect to improving companies' management of their social impact across supply chains, women are playing important roles on the ground to enforce labor rights standards and ensure compliance. For example, **Maria Reymao** is the Agriculture Labor Practices (ALP) National Manager at Mozambique Leaf Tobacco, a subsidiary of a global tobacco merchant, overseeing local contracted farmers' compliance with international and national standards on labor practices. Based in northern Mozambique, she manages a team that trains farmers on good agricultural labor practices, monitors their compliance, and takes action to address any identified compliance issues. She and her team work closely with contract farmers to make sure they have the resources needed to meet compliance requirements; failure to do so would result

"The chemical industry is not immune to disruption. I can see this disruption coming — people are becoming more aware of climate change and the impact of products on human health, marine life, and the environment. This leaves the industry more prone to disruption, and there's no reason why it can't be disrupted by a woman."

— Fanya Ismail, Founder and CEO of SGMA

"It's about individuals, and people's unique need to know that somebody cares about their safety and that there's nothing we do [in the workplace] that's worth getting hurt."

— Cathy Slater, Senior Vice President at International Paper

"That's what we're trying to show them: there's really no way they can stay with us if they aren't going to comply."

— Maria Reymao, Agriculture Labor Practices (ALP) National Manager at Mozambique Leaf Tobacco

"The steel industry has been very low-profile [in Argentina], and we need to communicate more with the public—not only about process improvements, but also all the benefits steel can have for society. I started to realize that maybe we should focus more on construction and on social housing, because those are the needs of our country."

— Flora Otero, Sustainability Manager at Acero Argentina

in severing of the farmers' contract. Putting contracts on the line has sent a strong message that the company takes human rights issues seriously, and Maria's work has produced positive behavioral change and established a clear incentive for operators to improve their labor practices.[81]

Integrating Community Development into Business Strategy

Incorporating the needs of local communities—both in remote and urban areas—into business decisions can enable legacy industries to contribute to local and regional development while growing their business. Women interviewed by FPA highlighted how they are effectively integrating local communities into their business operations and cultivating strong relationships with local communities by supporting social-development programs.

INTEGRATING LOCAL BUSINESSES & WORKERS INTO SUPPLY CHAINS

By the very nature of their businesses, mining, oil and gas, and utilities companies have close interaction with local communities where they conduct extractive activities or construct infrastructure, very often located in remote areas or in lower-income countries. Through direct and indirect employment and procurement, coupled with local capacity building, these companies can enhance value chain management and have positive, iterative economic impacts by integrating local workers and suppliers into their supply chains, and supporting the inclusive and sustainable development of local communities.[82, 83]

In the mining industry, **Monica Ospina**, based in Toronto, Canada, is pioneering ways in which companies can more effectively integrate community development into their strategic planning and business activities. With over fifteen years of specializing in corporate social responsibility and managing social risk, Monica's extensive experience in community engagement led her, through her socioeconomic development firm, O Trade, to design solutions for Land Access in exploration, and the Local Community Procurement Program (LCPP) in operation. In 2012, the LCPP was recognized by the World Bank as an innovative sustainable supply chain model that enables companies to maximize project efficiency and meet social investment goals while ensuring the participation of local stakeholders. The LCPP brings together both private and public procuring entities, local communities, governments, and industry associations in order to identify opportunities where local businesses may be suitable suppliers. When such opportunities are identified, LCPP provides the necessary training to enable local enterprises to enter the supply chain.[84] Monica is currently providing consultant services to mining companies around the world. Clients are incorporating professional en-

gagement plans and the LCPP model into their production activities, ensuring efficiency, managing social risk management, and, as a result, proving to be socially responsible businesses.[85]

SUPPORTING SOCIAL DEVELOPMENT PROJECTS

Facing market entry and growth challenges in some regions, women are making inroads and expanding market share for their companies by cultivating strong relationships with local communities through social-development projects, which can have positive social impacts and contribute to their long-term business success.

For example, in Argentina, the introduction of industrial steel in construction has met resistance in parts of the country due to historical and cultural preferences for bricks and other materials. **Flora Otero**, an engineer and Sustainability Manager at Acero Argentina, the country's steel industry association, sees a great opportunity for steel amid rapid urbanization and has established the industry as a key stakeholder in energy-efficient, socially conscious urban development. With support from Acero's leadership, she brought together steel companies to join players from the construction industry and others to participate in Barrio 31, a World Bank-funded affordable housing project situated in the heart of Argentina's capital, Buenos Aires. The project set ambitious targets for energy efficiency in both construction and operation, including the installation of solar panels on all buildings. The strategies would reduce carbon emissions by an estimated 50 percent and also result in a roughly 90 percent reduction in water usage during the construction phase. Launched in 2016, the partners have constructed 1,200 affordable housing units, benefiting migrants and low-income families. By participating in the project, the steel industry has not only contributed to community development, but has also managed to demonstrate the benefits of steel products and their potential to be part of a low-carbon future.[86]

Building Local Capacity and Empowering Women

Several legacy industries addressed in this study play a central role providing access to energy, water, and sanitation around the world. However, in less-developed markets, many of these industries are struggling to provide basic services to meet the needs of rapidly growing and urbanizing populations. FPA's interviews revealed that women in these markets are utilizing their skills and career experience to improve access to clean water and waste management by building the capacity of local communities. Recognizing that female economic inclusion is a proven pathway to poverty alleviation and social development,[88] these women are also focused on empowering women to provide these critical services and scaling the impacts.

For example, clean water scarcity has been an acute social problem in India, where an estimated 99 million people lack access to safe water.[89] Having worked in the water, sanitation, and hygiene (WASH) sector for much of her career, **Lincy Paravanethu** was concerned by the lack of attention paid to how women, who are largely responsible for collecting clean water in lower-income countries, interact with wells and other water facilities in their day-to-day lives. To tackle the issue, Lincy founded the Vivir Consultancy in 2019, which supports NGOs and companies with training communities and municipality officials in using and maintaining sanitation and water infrastructure, with a particular focus on women. Though it's still in its early stages, Paravanethu is hopeful that the consultancy's work will accelerate through those who are trained, and significantly increase hygienic sanitation and clean water access for local residents.[90]

Waste management represents another industry struggling to meet the public demand in less-developed markets, with manifold impacts on community development, health, and safety, among other areas. In Nepal, for example, waste management is not a national government priority, and budget allocations are insufficient to prevent improper disposal of waste, including in open dumpsites and rivers, and other

> **"Sometimes what we forget in engineering is the humans who are the operators, the beneficiaries, the caretakers... Engineering is mostly about the machines and all the technical aspects. We as a sector, which is heavily male and engineering-dominated, tend to forget the human elements in every machine. Somebody has to turn the damn thing on."**
>
> *— Lincy Paravanethu, Co-Founder and Partner of Vivir Consultancy*

Several legacy industries addressed in this study play a central role providing access to energy, water, and sanitation around the world. **However, in less-developed markets, many of these industries are struggling to provide basic services to meet the needs of rapidly growing and urbanizing populations.**

"[In Nepal] women are doing the primary [waste] segregation at home and sell newspapers, plastic bottles, and beer bottles to waste collectors. They already have the concept and know the benefits of waste management. They have the potential to go out to work for the community and municipality, make earnings, and become entrepreneurs."

— Aisha Khatoon, CEO of Lead Nepal

health risks.[91] **Aisha Khatoon**, who has spent her career working with marginalized groups, is tackling this issue by empowering women. Traditionally responsible for domestic work in Nepal, women are the first point of contact of household waste. Building their capacity to sort and manage waste, while protecting their health, can not only improve health and environmental outcomes by reducing landfill and illegal dumping, but also provide women with an independent income by reselling materials. Khatoon trains women in basic waste management, helping them to start formal and informal recycling businesses. The initiative seeks improved outcomes for women with greater health and sustainability impacts for the wider community.[92]

SECTION D. CREATING INCLUSIVE CORPORATE AND INDUSTRY CULTURES

In the face of shifting global market conditions, competition from newer industries, and a period of technological transformation, the ability to attract new talent and leverage the creativity and expertise of employees will be key to legacy industries' growth. Perceptions of these sectors as being white, male, and slow to change can make them relatively unattractive to various segments of the labor force, including women, racial minorities, LGBTQ+ people, and young people. In response, women, together with their male allies, in these industries are creating more diverse and inclusive workplaces by leveraging leadership positions to create top-down change and pushing corporate leaders to institutionalize gender equality and inclusivity through practical policies and initiatives.

Lack of Diversity Risks Workplace Discrimination and Ability to Attract Talent

The under-representation of women in legacy industries is symptomatic of a wider lack of diversity and inclusion that affects industry and workplace culture. In the United States, according to the Bureau of Labor Statistics (BLS), the industries in this study are disproportionately dominated by white workers, ranging from 80 percent white workers in manufacturing industries to 94 percent white workers in forestry. By comparison, 78 percent of employed people in the United States are white.[93] In the United Kingdom, these industries are even more dominated by white workers, with 92.6 percent white workers in manufacturing, 94.7 percent white workers in construction, and 95.9 percent white workers in utilities services, compared to the overall UK workforce, which is 85.6 percent white.[94] The homogeneity of the labor force in legacy industries, in particular, can be intimidating to women and other under-represented groups, such as LGBTQ+ people and people with disabilities, and puts them at risk

of discrimination and harassment.

Creating and cultivating an inclusive workplace can help reduce the risk of a hostile work environment. In a wide-ranging study on workplace harassment, the Equal Employment Opportunity Commission (EEOC), the U.S. government agency that arbitrates workplace discrimination complaints, found that all forms of harassment, including sexual harassment, are more likely to occur in homogenous workplaces, where employees who do not conform to workplace norms are more vulnerable to discrimination and abuse from colleagues and superiors.[95] In legacy industries, women and racial minorities can therefore be vulnerable to harassment amid a majority white male workforce. Diversifying the workforce of these male-dominated legacy industries and fostering values of inclusion can help to improve the working environment for all employees and increase the productivity of all employees.

A lack of diversity can also limit these companies' ability to attract talent, including young people and others, who value diversity in the workplace and factor it into their job search criteria. An inclusive corporate culture can help companies engage younger workers, including millennials, who are the fastest-growing sector of the workforce globally. A Deloitte survey found that 83 percent of millennials describe themselves as "more actively engaged" in their work when they felt their organization fostered an inclusive culture.[96] As the competition for skilled labor intensifies, particularly among aging societies, attracting young and increasingly selective workers will be an important factor to business growth and competitiveness.

Women in Legacy Industries Are Making Diversity and Inclusion the Norm

FPA interviewed women who have led cultural change within their organizations and industries. Among them, female CEOs and industry leaders are wielding their influence to increase diversity within their companies and the wider industry, by setting a top-down expectation of inclusion and incorporating inclusive practices into their day-to-day business operations. Lower down the pipeline, women in middle management are leveraging external support and development opportunities to make the business case for diversity to their leaders and organize grassroots efforts to amplify under-represented voices.

WOMEN LEADERS ARE CREATING AN INCLUSIVE CULTURE FROM THE TOP DOWN

Within companies, female interviewees in the C-suite and on boards are instituting an inclusive corporate culture from the top down by making diversity a business priority and hiring and promoting people with a shared commitment to inclusivity.[97] A 2019 report by S&P Global found that companies with female CEOs have twice the number of female board mem-

"[Inclusivity is] what I want my legacy to be. It's that we're not just a successful company, but one that is all about ensuring that every employee feels that they have a voice and a seat at the table regardless of their background, their gender, their race, their sexual orientation, or their level in the organization."

— Kim Ann Mink, former CEO of Innophos

"We are trying to develop leaders [from] the members that we currently have, who have a desire to be in leadership and [to] support them in their journey."

— Justina Sanchez, Product Safety Engineer at TÜV SÜD America

"When we had the Women in Titanium organization, more and more women felt, 'Oh, there's a place for me. There are people that look like me. There [are] other women there, I'll feel a little bit more comfortable.' ... People want to go into an organization where they're going to feel welcomed."

— Dawne Hickton, Executive Vice President of Jacobs Solutions and Founder of Women in Titanium

bers as those with male CEOs—23 percent women, compared to just 11 percent, respectively.[98] Employees at organizations with gender-balanced boards are 4 percent more likely to describe their company as "gender inclusive" than those with male-dominated boards, according to the ILO.[99]

Kim Ann Mink was a female CEO who took this approach. During her tenure at Innophos, she was one of only a few female CEOs of a publicly listed US chemical company. She made diversity a priority when she joined the company in 2015 and integrated it into how the company defines its success. Key to her success was ensuring that the senior leadership was fully committed to inclusivity, a method she refers to as setting the "tone at the top." Under her leadership, the company successfully shifted the balance of the C-suite and board from being male-dominated to today having 43 percent and 50 percent female representation, respectively, in just four years.[100]

In addition to diversifying their own companies, women with a track record of business success are leveraging their influence and position as industry leaders to change attitudes and amplify underrepresented voices in the legacy industries. One such leader is **Dawne Hickton**, Executive Vice President of Jacobs Solutions and the founder of Women in Titanium. After becoming the first female chair of the International Titanium Association (ITA) in 2014, Dawne noticed how few women were actively involved in the organization—she estimates that of 1,000 conference attendees that year, approximately forty were women. In response, she and the other women created Women in Titanium, which has since successfully increased female participation, supported their professional development, and amplified women's voices throughout the industry.[101]

Women Employees Successfully Advocating for Greater Diversity and Inclusion

In addition to efforts by industry leaders, interviewees in lower- and mid-level employment shared their experiences pushing their leadership to prioritize inclusion—making the business case for diversity at the grassroots level. One example is **Justina Sanchez**, a Product Safety Engineer at TÜV SÜD America, a multinational engineering company, who recently founded a company-wide women's network in the Americas. Having been inspired by the opportunities she accessed internationally, including mentoring by an industry CEO, she wanted her female colleagues at TÜV SÜD America to benefit from similar experiences. To secure buy-in from company leadership, Sanchez made a bold move to pitch her idea to her CEO and demonstrated the business case for diversity. She was able to secure $20,000 in funding to make the women-focused initiative a reality.[102] The new program pairs women in the early stages of their careers with senior leaders as mentors and offers leadership training and professional-development opportunities. □

Part III. How to Further Unleash Women's Potential as Changemakers

Despite women's great potential as changemakers, they continue to face a variety of challenges as they strive to enact positive changes in male-dominated legacy industries (*Figure 8*), such as removing barriers to entering companies and moving up the career ladder, challenging inadequate family leave policies, closing the gender pay gap, or simply creating their own businesses.

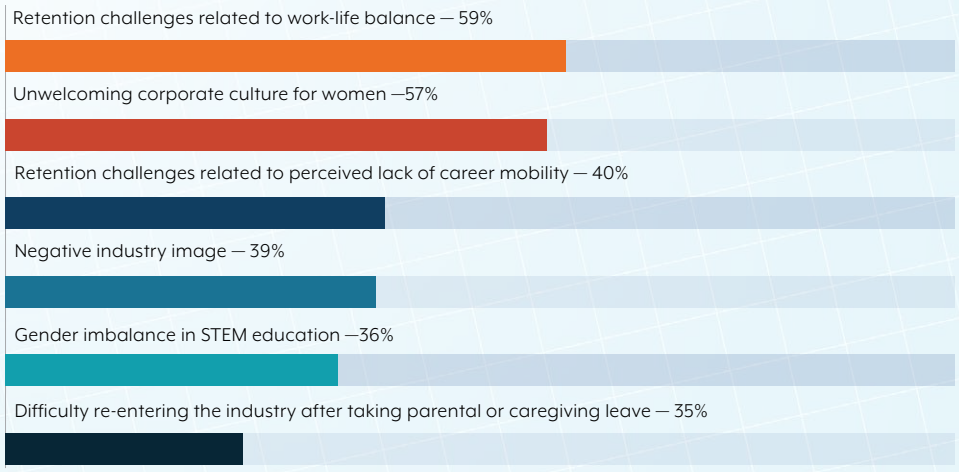
Among the ways to empower and support women, interviewees stressed how important it is for key stakeholders—primarily employers, industry and women's organizations, and investors—to make greater efforts to remove such obstacles by facilitating institutional and cultural changes. This can be done by building a strong pipeline of incoming female talent, creating inclusive workplaces to attract and retain female talent, creating support networks among women inside and outside corporations, and supporting female entrepreneurs.

SECTION A. BUILDING THE PIPELINE OF FEMALE TALENT

Unleashing women's potential as changemakers in male-dominated legacy industries requires promoting their entry into these industries in larger proportions. However, these sectors tend to lack a strong pipeline of incoming female talent. In response, various stakeholders are acting to overcome challenges, including:

FIGURE 8. Major Factors Inhibiting Greater Gender Diversity in Male-Dominated Legacy Industries

Responses to survey question: "What factors inhibit greater gender diversity in your industry? (Choose no more than three)"



Source: FPA survey among women in the male-dominated legacy industries that are included in this study. Total responses=129.

▷ A prevailing gender disparity within science, technology, engineering, and mathematics (STEM) professions as a result of the existing gender gap in education, and barriers that female STEM graduates face entering the workforce; and

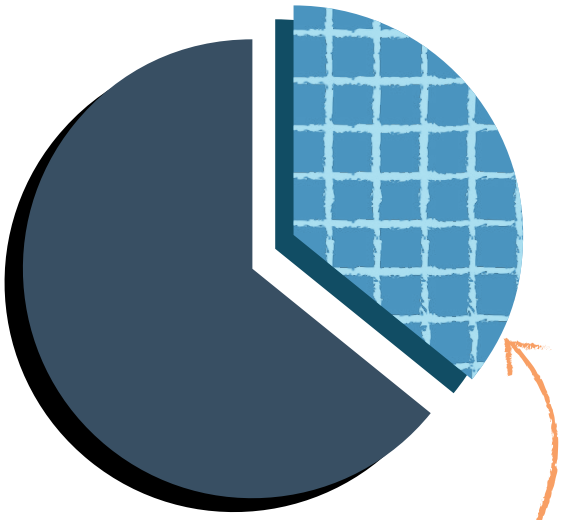
▷ Companies struggling to attract female talent due to negative industry reputations and/or the stigma of a male-dominated work environment.

Addressing the Gender Disparity in STEM Professions

The legacy industries in this study are experiencing periods of intense transformation and adaptation as they respond to consumer and investor pressure to both modernize and curtail the harmful impacts their products and/or operations have on people's health and the environment. Both require large numbers of STEM-qualified professionals to fill engineering, research and development, and "middle-skilled" technical roles.[103] According to FPA's research, a significant gender disparity persists among STEM professionals for two key reasons:

▷ **Globally, more men than women pursue STEM education:** More than one-third of respondents to FPA's survey cited the gender imbalance in STEM education as a major factor inhibiting gender diversity in their respective industries. In fact, in 2018, women accounted for just 35 percent of STEM graduates globally from post-secondary educational institutions, according to the International Labour Organization (ILO).[104] This gap is largely attributable to widespread social norms and harmful stereotypes that designate boys and men—and not women and girls—as naturally gifted at STEM.[105] Meanwhile, research by UNESCO shows that as a result of this narrative, girls start to opt out of STEM educational opportunities at a young age, leading first to their under-representation in universities and vocational training institutions and then, eventually, the workforce. UNESCO found that in 2016, the majority of girls who pursued STEM-related studies concentrated on courses focused on health and welfare, while only 8 percent chose engineering, manufacturing, or construction courses.[106]

▷ **The gender imbalance in education increases as students graduate from post-secondary institutions and seek to enter the workplace:** Research by Catalyst, a nonprofit that is working to accelerate women's progress in work, found that, despite accounting for 35 percent of STEM graduates worldwide, women represent just 29 percent of scientific R&D professionals globally.[107] A study by the Canadian Census Bureau found that men were twice as likely as women to find work that was relevant to their STEM degrees.[108] This drop-off is due in part to gender bias among hiring managers—interviewees noted that hiring managers rarely have an incentive to seek out female candidates, and several recounted their experiences of having their qualifications doubted by men in their field. In the EU, women with STEM doctorates are significantly under-represented in the business enterprise sector (BES), where researchers are paid significantly more, than the higher education sector (HES). Women represent just 20.2 percent of researchers in the BES, compared to 42.1 percent of researchers in the HES, an imbalance which contributes to a significant gender pay gap wherein women in 2014 earned 17 percent less than their male counterparts.[109]



36%

of respondents to FPA's survey cited the gender imbalance in STEM education as a major factor inhibiting gender diversity in their respective industries.

Closing these gaps requires interventions at each stage of women's lives and careers. A number of organizations and institutions are demonstrating effective strategies that are increasing the representation of women in male-dominated industries.

Building young girls' interest in STEM is the first step toward establishing a steady pipeline of female talent into male-dominated industries; by showing the various paths one can take with a STEM education, it is more likely that girls will remain engaged. Starting early is key: A recent UNESCO study found that gender stereotyping of children begins when they are as young as six, and that young people have already formed ideas

PHOTO BY MARK AVINO/SMITHSONIAN INSTITUTION

Campers at She Can Camp, a STEM-centric program for girls from the Smithsonian Air and Space Museum, launch a weather balloon with museum director Ellen Stofan.

about their ambitions and future career plans by the time they are thirteen.[110] These findings are echoed by FPA's interviewees, who, based on their past experiences as students and their current positions working with girls, noted that effective interventions begin early—before girls enter secondary education—and continue throughout their school and university careers. One example of an early-intervention program is the She Can Camp, run by the Smithsonian Air and Space Museum in Washington, D.C. The summer camp is open to girls aged 11 through 13 who attend schools in low-income areas, and aims to instill a love of, and curiosity about, space and science. In its first two years, the camp has served 120 girls from the Washington, D.C., area,[111] and in 2020 it will pilot a new camp targeting low- income female students in Arkansas.[112]

Bridging the gap between female talent and job opportunities can involve facilitating female STEM students' job searches before and after graduation and expanding their professional networks. The Brooke Owens Fellowship, a volunteer-run non-profit, places female STEM students in internships at aerospace companies, providing the opportunity to gain experience while learning more about possible professional opportunities in the industry (*Box 1*). Columbia University's Women in Energy program holds regular events and discussions for women in all academic disciplines interested in a career in the energy sector, including site visits to prominent firms, roundtable discussions about policy issues, and meetings with human resources professionals to help students better understand individual companies' hiring practices and priorities.[113]

Professional training and certification can improve women's chances of entering the workforce by providing them with the necessary skills training and accreditation to put them on an equal footing with male applicants and ensure they are fully qualified for available positions. Pre-apprenticeship programs have become a common way to provide women with the training they need to be hired and to succeed as skilled trade apprentices. Two examples of such programs are Nontraditional Employment for Women (NEW) and Oregon Tradeswomen, both of which offer tools training, either for free or with the assistance of scholarships, as well as additional support for participants, including access to social workers (*Box 2*). Both organizations maintain direct hiring agreements with local apprenticeship programs, and their impact is clear: NEW, for example, has placed roughly 1,300 graduates in apprenticeships since 2005.[114]

Inclusive hiring processes require intervention on the part of companies seeking new talent to diversify both the candidate pool and the decision-making panels that deal with hiring. One effective way to help ensure a diverse array of candidates is to

BOX 1. **BROOKE OWENS FELLOWSHIP FOR WOMEN IN AEROSPACE**

A pioneering initiative working to close the gap between female STEM graduation and employment is the Brooke Owens Fellowship, a non-profit established in 2017 by three industry leaders in aerospace. The fellowship is open to women, non-binary and transgender[1] undergraduate students, and consists of three main elements:

- **A paid summer internship at a top aerospace firm:** Up to forty students per year are chosen from the pool of applicants and placed at one of more than thirty host organizations.

- **Mentorship from senior industry figures:** Every fellow is matched with two mentors—one within their placement organization, and another from the wider industry. Alumnae interviewed for this study credited their mentors with helping them better understand the industry and the types of occupation they wanted to pursue.[2]

- **Access to alumnae support community:** Fellows join an ever-growing alumnae network of aerospace industry workers and are granted access to an annual summit featuring lectures focused on subjects ranging from career planning to the future of the aerospace industry.

The fellowship's impact has been swift: The high volume of applicants challenges an industry narrative that women are either not applying to, or qualified for, jobs in aerospace, while the number of participating companies grows each year. Lori Garver, one of the fellowship's founders, sees it not only as a way to facilitate talented women's entry into the aerospace industry, but also as a vital challenge to the industry's status quo. Many alumnae now work for companies where they interned, though the fellowship has also had a broader impact; other women have reported that they feel more accepted within the industry, telling Lori that they "feel more welcome and [are] more likely to stay in this field because of the clear intention to recruit and retain and value more women, because of the fellowship."[3]

Sources:
[1] Brooke Owens Fellowship. (2019). Frequently Asked Questions. Retrieved from http://www.brookeowensfellowship.org/faq.
[2] Roselin Campos and Sumayya Abukhalil, fellowship alumna, personal communication, October 2019.
[3] Lori Garver, personal communication, September 2019.

actively seek out and support applicants from under-represented groups. One policy example involves writing inclusive job descriptions that avoid overtly masculine language and instead focus on the skills and qualities needed to excel in the role. For example, a 2017 study by LinkedIn found that 44 percent of women were discouraged by the use of the word "aggressive" in job descriptions.[115] Several companies are taking explicit actions to make job posting more inclusive. British Water, the UK's trade association for water suppliers, has recently started to list job openings that don't include any qualification or experience requirements, with the aim of encouraging more women and people from under-represented groups, such as those without degrees, to apply.[116] At Japan Tobacco International (JTI), computer programs are used to analyze the language in job descriptions and to flag the use of masculine words. On the hiring side, companies like Northrop Grumman and JTI are seeking to mitigate the effects of unconscious bias in hiring and promotions by ensuring a gender balance in interviewer panels. [117]

ATTRACTING FEMALE TALENT INTO LEGACY INDUSTRIES

A global skilled labor shortage is creating competition for talent in all industries. A survey of employers in high- and middle-income countries by Manpower, a consulting firm focused on employment, found that 45 percent are struggling to fill their openings due to a lack of both applicants and skills.[118] Mid-skilled professions—including the skilled trades, manufacturing, technicians, and drivers—and highly-skilled professions such as engineering are currently the most in demand, both generally and within legacy industries.[119] In addition, rapidly changing economies in low-income and developing countries and the emergence of new industries have led the World Bank to estimate that one-third of the working-age population in such countries lack the basic skills and qualifications, thus limiting economic investment and growth.[120]

Amid intense competition for talent, FPA's interviews revealed two main factors contributing to legacy industries' difficulty attracting female talent: Many women are unfamiliar with these industries and the careers they offer, and those who

are aware of them are deterred by their reputation for being male-dominated and contributing to negative environmental, social, and health impacts.

▷ **Women tend to be unfamiliar with jobs in these industries** due to lack of exposure to, and knowledge of, the occupations, as well as legal and cultural barriers to female participation. Interviewees, particularly those from the mining, metal, and paper industries, commented that they might not have entered their respective industries had they not had family members or friends already employed in them. In addition, women have historically faced legal and cultural barriers to participating in certain industries, including mining and water treatment. Under the ILO's Underground Work (Women) Convention of 1935, women were banned from working in underground mines in 98 ratifying countries.[121] Today, while thirty countries have overturned the convention, including Canada, Australia, and the European Union member states, it still remains in place in 68 countries, the majority of which are low-income; and, progress to overturn it has been slow.[122] Culturally, women in India have faced barriers to participation in the water industry, where travel into the field to build and maintain water infrastructure is common, due to conservatism and safety concerns. Some family members – particularly male spouses of women in the water industry - often oppose their unaccompanied travel. Additionally, male colleagues may restrict their participation due to safety concerns and traditional gender norms, leading many women to instead take office or administrative jobs—or simply avoid the industry altogether.

▷ **A negative image of legacy industries deters female and young talent.** Approximately 40 percent of respondents to FPA's survey said that a negative industry image is a main factor inhibiting gender diversity in their respective industries. According to interviewees, legacy industries have the stigma of being masculine and male-dominated, which can be off-putting to women due to concerns regarding sexual harassment and gender-based discrimination from male colleagues, supervisors, and clients. The lack of a clear career trajectory due to the scarcity of prominent female role models was also highlighted by interviewees. In addition, millennials—the largest generation worldwide,[123] who are forecast to represent 35 percent of the global workforce by 2020[124] —are drawn to work that is mission-driven and rapidly evolving. In fact, Deloitte's 2018 global survey of millennials found that 83 percent of respondents believed that business success should be measured in terms of positive social and environmental impact, and diversity and inclusion, not simply based on financial performance—but only 44 percent felt that business leaders are making a positive impact on the world.[125]

Increasing women's familiarity with and interest in legacy industries can help to attract more women and young people. Companies can work to improve their images by acknowledging the importance of promoting gender diversity within companies and taking deliberate action toward that end. In addition, industry associations and women's networks can create opportunities for women to learn more about the skills required to work in these industries and demonstrate the wide range of career paths available. For example, the International Titanium Association's Women in Titanium network has organized trips to companies such as SpaceX in Hawthorne, California, to highlight the companies and jobs for those who wish to make use of their interest and knowledge of metals.[126] These tours are not only open to network members—girls from local high schools and colleges who are interested in the metals industry may also attend. The International Association of Plastics Distribution's (IAPD) Women in Plastics network promotes its sector by regularly hosting workshops and lectures on college campuses across the U.S. to demonstrate the work that companies are doing on sustainability and new product innovation.[127]

BOX 2. **PRE-APPRENTICESHIP PROGRAMS TRAIN WOMEN FOR THE SKILLED TRADES**

Pre-apprenticeship programs provide a proven model for facilitating women's entry into the construction industry. Two prominent examples include Nontraditional Employment for Women (NEW) and Oregon Tradeswomen (OTI), both U.S.-based, non-profit programs that operate in New York and Oregon, respectively. These programs effectively prepare women to enter full-time apprenticeships and share three main components:

- **Essential hard and soft skills training:** NEW and OTI train women in skill sets they may not have had access to in their youth or past jobs, including financial literacy and the use of industry tools. Additionally, these programs simulate the typical structures and working environments of apprenticeships and job sites, which can be unfamiliar and off-putting to women considering entering the construction industry.

- **Access to social services and counselors:** The two organizations recognize that many participants face serious obstacles when it comes to employment—be it lack of access to childcare or even domestic violence. As such, both partner with social workers to help support women in addressing these challenges.

- **Established partnerships with local unions:** Both NEW and OTI work closely with local trade unions that administer most apprenticeship programs and have established priority hiring relationships for program graduates. These arrangements are mutually beneficial: Unions seeking to increase female representation hire apprentices with basic training they can trust, while graduates begin earning a reliable wage quickly, reducing drop-off rates.[1]

Both NEW and OTI have seen success over the years: OTI has graduated around 100 women per year since 2008, most of whom moved on to apprenticeships,[2] while more than 1,300 NEW graduates have entered the construction industry since 2005.[3] By providing women with the necessary tools to overcome challenges and pursue fulfilling work while earning a competitive wage, these organizations also demonstrate that skilled trades can potentially provide women with a sustainable livelihood and their communities a means for poverty alleviation.[4]

Sources:
[1] Rod Belisle, local apprenticeship program coordinator, personal communication, October 2019.
[2] Kelly Kupcak, Executive Director, OTI personal communication, October 2019.
[3] Nontraditional Employment for Women. (2019). About NEW. Retrieved from https://www.new-nyc.org/pages/about.html
[4] Kelly Kupcak, Executive Director, OTI, personal communication, October 2019. Amanda Kogut-Rosenau, VP Programs, NEW, personal communication, September 2019.

SECTION B. **CREATING INCLUSIVE WORKPLACES**

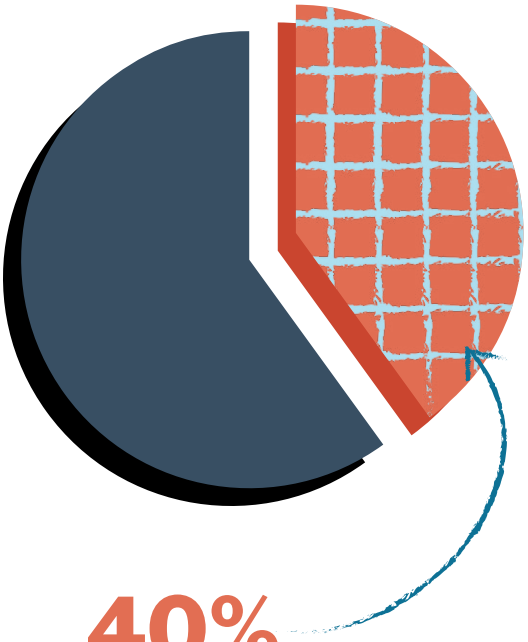
Equally important as creating a strong pipeline of female talent is building inclusive workplaces to attract and retain female talent. FPA has identified three key barriers to success that women in male-dominated industries face: gender-based discrimination, insufficient support for work-life balance and dedicated facilities in the workplace, and a lack of female role models and access to advancement opportunities. Leading companies seeking to reap the benefits of diversity—and standing out as examples for others—have taken action to foster a more inclusive professional culture while implementing policies aimed at ensuring greater gender equality.

Ending Gender-Based Discrimination

While gender-based discrimination is not unique to male-dominated industries, women are more likely to experience it in these sectors, according to Catalyst.[128] FPA's research supports this finding, with female interviewees reporting significant gender-based discrimination that manifested in three main ways: gender-based pay gaps, exclusion from decision-making processes, and sexual harassment and mistreatment.

ELIMINATING GENDER-BASED PAY GAPS

Progress on closing the gender pay gap has stalled: According to the World Economic Forum Global Gender Gap 2020 report, no country has yet achieved gender equality in wages. In fact, in countries that are members of the Organisation for Economic Cooperation and Development (OECD), the median wage gap has decreased by 1 percent in ten years; in the rest of the world, the gap is getting wider.[129] Seventy percent of respondents to FPA's survey reported that they were aware of a gender-based pay gap in their industry, nearly half of whom reported experiencing this personally.



40%

of respondents to FPA's survey said that a negative industry image is a main factor inhibiting gender diversity in their respective industries.

Structurally, the gender pay gap can be attributed in part to a lack of salary transparency, which prevents women from accessing the information necessary to successfully negotiate starting salaries or raises, and to flaws in the structuring of established pay grades, which, despite establishing clear pay grades, tend to allow managers to set salaries within those grades at their own discretion. The gender pay gap can also be attributed to discrimination. Interviewees believed that their hiring managers, most often men, devalued their qualifications and prior experience—either consciously or unconsciously—because of their gender. They also reported the existence of a dual standard during salary negotiations, whereby men who negotiate for a higher salary are seen as tough, but women who do so are seen as pushy or aggressive, which made interviewees less willing to negotiate assertively.

Reporting upon and closing gender pay gaps can help address this issue. Interviewees uniformly advocated for greater reporting of pay scales and salaries for all positions, praising the UK's Equality Act 2010 Regulations of 2017 on mandatory pay-disparity reporting for any company over 250 employees, although several noted that irregularities between male and female salaries can be explained away by the reporting companies or by opponents of equal pay. Government- mandated reporting and company transparency are key to closing the gender pay gap. Publicly available data can provide new insights, especially with regard to male-dominated legacy industries, which are understudied from a gender perspective. For example, a study by Carnstone Partners LLP, using new data after the UK gender pay gap reporting regulation came into force, revealed that a tobacco company's UK subsidiaries had an average gender pay gap of 34 percent in salaries and 67 percent in bonuses.[130] One notable example of how a company can radically commit to closing the pay gap in just a few years also comes from the tobacco industry, which demonstrates that progress can and should be made across all male-dominated sectors. In 2019, Philip Morris International (PMI) became the first international company to be certified by the Equal-Pay Foundation as having a fair wage policy between women and men in all of its subsidiaries globally (*Box 3*).

COMBATTING SEXUAL HARASSMENT

Sexual harassment is more prevalent in male-dominated workplaces. According to a 2017 survey by Pew Research Center, women working in an environment where they are outnumbered by men are 50 percent more likely to report a problem of sexual harassment than those working in an environment where they outnumber men.[131] Based on FPA's interviews, while sexual harassment exists across the selected industries and occupations, and in all workplace environments, it was most frequently reported by women in physically demanding workplaces, including metal casting plants and construction sites, and during field trips to maintain water or energy facilities. The sexual harassment and mistreatment primarily reported were in the forms of repeated crude and inappropriate comments, undermining or dismissing women's work and contributions, and ignoring women's reports of discriminatory behavior.

Establishing clear policies and reporting mechanisms in response to sexual harassment sends the message that companies take this issue seriously and value the safety and well-being of employees. However, more than one-third of countries globally do not have legislation prohibiting workplace sexual harassment,[132] and more than half of companies in high-income countries surveyed by Equileap, a non-profit organization focused on gender equality in the corporate sector, did not have policies to address sexual harassment.[133] While further research is necessary to ascertain how anti-harassment policies materially impact companies, existing research clearly demonstrates the impact that sexual harassment has on individuals and organizations.[134] Victims of harassment are at risk of negative physical and mental health, unemployment or forced job change, and retaliation from individuals or organizations. Companies of all sizes can incur significant financial losses due to litigation costs, increased employee turnover, and lost productivity, which can cost up to $22,500

THREE KEY FACTORS SHARED BY INCLUSIVE COMPANIES*

▷ **They have a top-down commitment to building a diverse workforce and creating an inclusive culture,** including zero tolerance for bullying or sexual harassment, and a clear set of anti-harassment policies.

▷ **They take a holistic and systematic approach to women's representation,** consisting of measures that ensure equal access to hiring and promotion opportunity at different levels and engaging employees – both men and women– through the implementation process.

▷ **They set transparent targets and roadmaps for increased female employment and leadership,** which are key to shifting corporate culture away from words and toward action, and enable the ongoing measurement of the effectiveness of new policies.

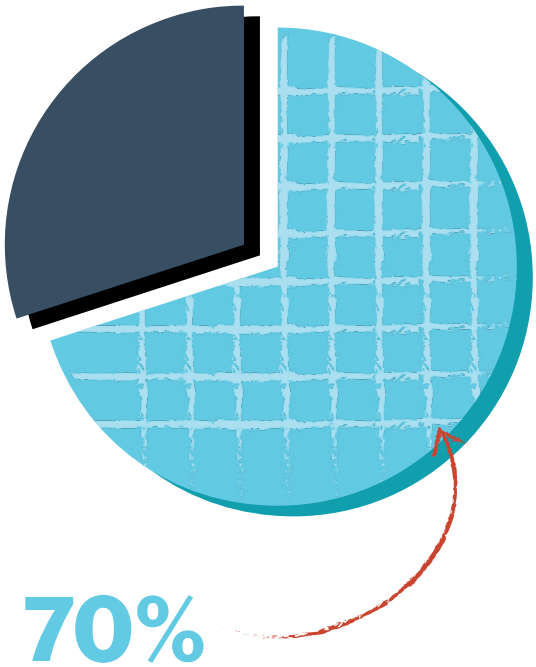
** Based on FPA interviews*

per person within a team affected by harassment, based on research conducted using data from North America.[134]

INCLUSIVE DECISION-MAKING PROCESSES

Female interviewees across industries noted the existence of a prevailing "boys' club" culture. This has caused women to be excluded from social settings and formal meetings with senior leaders and executives where key business decisions are made and work is assigned. Male interviewees echoed that women's absence from these settings prevents them from advocating for themselves. Additionally, interviewees observed that women tend to be less likely than men to be appointed to lead or participate in high-profile product development, business expansion, or interdisciplinary projects, that can make them more visible to senior leaders and decision-makers.

This phenomenon is in part attributed to gender-based stereotyping and unconscious bias among male managers. Interviewees noted a tendency among male managers and executives to make assumptions on behalf of women without actually asking them, leading to their being passed over for overseas travel or strategically important projects. A woman working for a major offshore oil and gas drilling firm reported that, while offshore and overseas projects were viewed by the company as a prerequisite for promotions, managers often assume that women, especially those with young children, would be unwilling to take those projects, without asking them.



70%

of respondents to FPA's survey said that they were aware of a gender-based pay gap in their industry, half of whom had experienced this personally.

Asking women to participate in decision-making and project allocation is a simple, yet effective, way for managers to include more women in high-profile and transformative work. While there is not a standalone policy or program that effectively eliminates gender-stereotyping, companies can take measures to make male leaders and managers more conscious of their business practices. Male and female interviewees recommended that companies require leaders and employees to go through unconscious bias training to instill a company-wide commitment to inclusive behavior. Male interviewees also noted that men should act as advocates for their female colleagues and direct reports in meetings.

Supporting and Including Women in the Workplace

Women working in legacy industries, particularly in jobs requiring frequent travel or irregular shifts, can often struggle to bal-

BOX 3. PHILIP MORRIS INTERNATIONAL ACHIEVES EQUAL-SALARY CERTIFICATION

Among companies committed to gender diversity, Philip Morris International (PMI) stands out as the first global company to be certified by Equal-Salary—a Swiss non-profit focused on closing the gender pay gap—as paying an equal wage for equal work to all of its employees, in over ninety countries as of 2019, regardless of gender.[1] PMI opted for a bold strategy starting in 2015, which resulted in the company's global certification in just four years. Other organizations certified by Equal-Salary include the World Economic Forum, the Global Fund, and Gavi.

Three key factors contributed to this success:

- **The buy-in of corporate leadership:** PMI's senior leadership has established gender diversity as a key business priority, viewing pay equality as an integral part of its corporate agenda.[2]

- **The engagement of external parties:** PMI worked with Equal-Salary and PricewaterhouseCoopers (PwC) to analyze its practices and achieve the certification, which lent credibility to the process and contributed to impartiality.

- **A holistic approach combining quantitative and qualitative analysis:** Equal-Salary first conducted a statistical analysis of all salaries being paid to employees in order to assess degree of imbalance and target gaps. Then, PwC conducted a qualitative review to assess the company's HR practices, leadership commitment to equal pay, and employees' perception of that commitment.[3] This holistic review enabled PMI to reform all practices through which a pay disparity can arise.

The program's initial success established a strong foundation for the company's continued work toward gender equality. As PMI's VP of Diversity and Inclusion, Melissa Whiting, commented, "Leaders are really proud that we did this. Employees are really proud that we did this. Now they say, 'Okay, what do we do next? How do we now improve women in senior leadership?' And that's super powerful."[4]

Sources:
[1] PMI Press Release. (2019, March 4). Philip Morris International Leads by Example on Equal Pay: Becomes First Multinational to Obtain Global EQUAL-SALARY Certification. Retrieved from https://www.pmi.com/media-center/press-releases/press-release-details/?newsId=15536
[2] Melissa Whiting, personal communication, October 2019.
[2] Equal Salary. (2019). What is Equal-Salary Certification. Retrieved from https://www.equalsalary.org/equal-salary-certification/.
[3] Melissa Whiting, personal communication, October 2019.

ance work and family responsibilities—and employers by and large are not providing sufficient support. Additionally, women can feel excluded from their workplaces due to a lack of female or gender-neutral facilities available to them. Providing supportive policies and adequate facilities for all genders could greatly improve working conditions and attract more female talent.

SUPPORT FOR WORK-LIFE BALANCE

Today, in most societies, women assume the majority of family responsibilities compared to men, even in families where both spouses are employed. Across the OECD, women in two-income households spend more than twice as long on household chores and childcare than men do.[134] Navigating the tension between work and family responsibilities can therefore be challenging for women, such as those working in metal foundries and paper mills. The non-stop operation of machinery in these plants necessitates that employees work long shifts, often throughout the night or on weekends. This creates a challenge for women, who are generally responsible for managing household responsibilities, childcare and elder care, i.e. working a "second shift" on top of their paid job. The OECD calculated that if this unpaid domestic work is taken into account, women work an average of two hours per day longer than men.[136]

Across industries, female interviewees felt that their companies did not offer sufficiently flexible work policies or parental leave to enable them to balance their work and family lives. Such pressure to balance these competing responsibilities can exacerbate the gender imbalance in occupations where women are already under-represented, such as engineers. A 2017 survey of nearly 1,500 U.S.-based female former engineers revealed several critical reasons for leaving the profession: The overwhelming majority of respondents cited insurmountable problems around lack of flexibility, long hours, and insufficient pay to cover childcare costs.[137]

Implementing policies that support work-life balance was ranked by nearly half of FPA's survey respondents as one of the three most effective interventions to increase women's participation in their respective industries. For example, parental leave enables men to share childcare responsibilities with women immediately after the birth or adoption of a new child. One

practice that has been gaining traction in the UK is job-sharing, which allows two people working part-time to share what is typically a full-time job. According to The Job Share Project, a UK-based coalition of consultants and companies researching this issue, 46 percent of companies offer job-sharing as a form of flexible working, seeing it as a measure to retain female talent and enable better work/life balance.[138] British Gas, the largest energy utility in the U.K., has been recognized for its flexible work policies, including job-sharing, alternative hours, and caregiving leave.

PROVIDING DEDICATED FACILITIES FOR WOMEN

In addition to the lack of flexibility, one issue commonly raised by interviewees working in hands-on technical or engineering roles, such as those in metal foundries or on oil rigs and construction sites, is the lack of dedicated facilities for women, including toilets and changing rooms, and a lack of readily available protective clothing sized for women. Several women working in the metal industry as plant managers or metallurgists noted that while their workplaces may have a women's toilet, it is often not located in the building in which they worked, and they rarely have access to shower facilities. In the mining industry, lack of personal protective equipment (PPE) designed for women makes it dangerous for them to work underground, where loose clothing can get caught and cause injuries. A similar issue is faced by women in the construction industry.

Providing facilities and safety equipment for women sends a clear message of inclusion, demonstrates that women and men are equally valued employees, and enables the safe participation of women in hands-on technical roles. For example, in response to requests for PPE in sizes and styles that fit women, Skanska, a multinational construction and development firm based in Sweden, worked with existing female employees to ensure that the styles and sizes on offer were fit for their purpose, and made them available to order through the company catalogue (*Box 4*). Additionally, the ILO is calling on companies and governments to strengthen maternity protection, identifying it as a key development policy that is linked to increased female employment and decreased child poverty.[139] Clear policies for protecting pregnant women's health in the workplace, as well as paid maternity leave and medical benefits, are all recommended interventions that can be undertaken by individual employers and supported by national legislation and social policies.[140]

Clear policies for protecting pregnant women's health in the workplace, as well as paid maternity leave and medical benefits, are all recommended interventions that can be undertaken by individual employers and supported by national legislation and social policies.

Removing Barriers to Women's Professional Advancement

A substantial gender disparity exists in the senior leadership within the legacy industries selected for this study. Approximately three-quarters of FPA survey respondents agreed that women in their industry are most under-represented in executive or C-suite leadership, while almost 40 percent observed the same trend within their respective companies or organizations. Nearly half of interviewees, including those who had spent multiple decades working in their respective industries, expressed that they had never directly reported to a woman.

Interviewees attributed the lack of female leadership to both gender discrimination and the lack of institutional support for women, specifically noting the impact of the "visibility gap" and poor retention of women. This creates a "leaky pipeline" to leadership in which the representation of women decreases at each successive career stage. Because women are less likely than men to be appointed to lead development or interdisciplinary projects, they are less visible to company leadership, thus creating a visibility gap that places them at a disadvantage when competing for promotions. In addition, lack of adequate parental leave policies and other forms of support causes many women to leave their companies to give birth or take care of young children at the exact age or career stage at which they would begin preparing for promotion into the senior ranks.

Interviewees also noted the impact of limited upward or cross-divisional mobility, or "glass walls" with respect to women's professional advancement. Women's resulting concentration in certain occupations (such as administrative roles) and absence from others (such as strategic or financial roles) limits their access to the necessary official or unofficial experience to

BOX 4. SKANSKA PROVIDES PROTECTIVE EQUIPMENT DESIGNED FOR WOMEN

As part of an effort to create more inclusive, safer work environments, in 2019, the U.S. regional division of Skanska, a multinational construction company, introduced personal protective equipment (PPE) designed specifically for women. Traditionally, many companies and manufacturers have offered PPE in sizes and styles fitted for men's bodies, which create safety risks for women on construction sites, whose ill-fitting vests and gloves can get caught on machinery.

In addition to being among the first companies to take this step, Skanska's effort is notable for its engagement of female employees throughout the design process. The company invited female employees to take part in fit tests and share what they both needed and wanted from effective PPE. Women's feedback was incorporated into the designs through an iterative redesign process, leading to the creation of a product that reflects the needs of female construction workers.

The new vests and gloves are now available to female employees across the U.S., with plans to expand the range of available equipment in 2020, and feedback from women in the company has been glowing. Skanska hopes this will have a broader, industry-wide impact. As Jarrett Milligan, VP of Environment Health & Safety, commented, "That's something that we pride ourselves on here. While construction is an ever-evolving industry, it can be a slow and steady process to adopt new methods. To see this getting traction pretty quick and to see some of our competitors even praising us [is gratifying]."

PHOTO FROM SKANSKA

Women wear the new personal protective equipment (PPE) from Skanska.

Source: Jarrett Milligan, personal communication, October 2019.

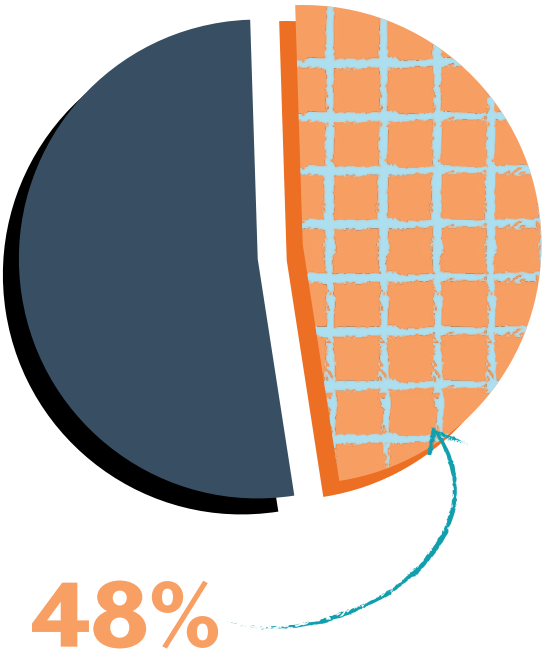
compete for leadership positions in their companies.[141] According to FPA's survey, engineering, field and plant operations, and corporate strategy are the three occupational areas where women are most under-represented in their respective industries (*Figure 8*), and also tend to be important recruitment pools for senior leadership. For example, interviewees from the oil and gas, mining, and paper industries noted that experience in plant operations or field work—such as operating machinery in a paper mill or on an oil rig—is traditionally considered as an unofficial prerequisite for advancement in their industries. Under-representation of women in these roles can therefore have a compounding effect on their representation higher up the career ladder.

Furthermore, at the very top, women are often required to demonstrate a higher level of expertise and professional experience than male peers in order to be invited to serve on boards. In 2016, in a survey of the Forbes Global 2000, Accenture found that female board members are nearly twice as likely as their male counterparts to have professional technology experience. On the boards of utilities companies, 10 percent of women had technology expertise, compared to just 8 percent of men, while in the natural resources industry, this gap widened to 10 percent of women and just 3 percent of men.[142] Similar trends occur within director-level positions. In fact, in all but two industry sectors (capital markets and diversified financials, and insurance), the percentage of women directors with technology experience exceeded that of men.[143]

Diversifying shortlists for promotions and succession planning can encourage leaders and decision-makers to consider candidates from under-represented groups. Including more women can facilitate their increased representation further up the organizational hierarchy and bring to light unexpected successors to senior executive positions. A male CEO interviewee noted that one key aspect of diversifying succession plans is to ensure gender-equitable access to experiences that candidates would need to be considered for top jobs—for example, providing the opportunity to a potential CFO candidate to operate profit-and-loss projects.

Mentorship and sponsorship programs for women were identified by nearly 70 percent of FPA survey respondents as the most effective intervention to increase women's participation in their respective industries. Impactful practices noted by interviewees were those that matched women with an executive outside their direct line of reporting and emphasized that mentors should act as advocates for their mentees. Those interviewed noted that mentorship can have the added effect of exposing male executives to the value of gender diversity, as well as reducing the impact of implicit bias.

One effective program highlighted in FPA's interviews is the global mentorship program at TÜV SÜD, a global company with expertise in product certifications and approval tests. The program matches female employees with senior managers in different divisions so that they can access support from someone not associated with their ongoing performance evaluation or day-to-day work. **Justina Sanchez,** an engineer, said she particularly values her mentor, the CEO of a different regional division, who can provide her with insights regarding wider company objectives: "He's full of great insight and knowledge. From my view, I have a limited perspective as an engineer where he's at this global level, he sees the big picture, and he's able to give me such great key information and say, 'Here is how it can be done most effectively.' He inspires me to develop something and do something with it.[144] Similar schemes have been instituted at Northrop Grumman, where mentoring starts at the VP level and flows downward to lower levels throughout the company.



48%

of FPA's interviewees, including those who had spent multiple decades working in their respective industries, had never directly reported to a woman.

SECTION C. **CONNECTING WOMEN PROFESSIONALS**

Female professionals in male-dominated industries are at higher risk of isolation from other women, including peers and role models, and exclusion from professional networks. In response, women's networks—either formal or informal—have emerged within and external to corporations to offer professional and social benefits that enhance women's well-being and career advancement. They play an important role in increasing retention and fostering gender equality within organizations and across their respective industries—ultimately enabling the legacy industries to better tap into female talent.

Interviewees highlighted three primary types of women's networks that they considered instrumental to their professional advancement and well-being:

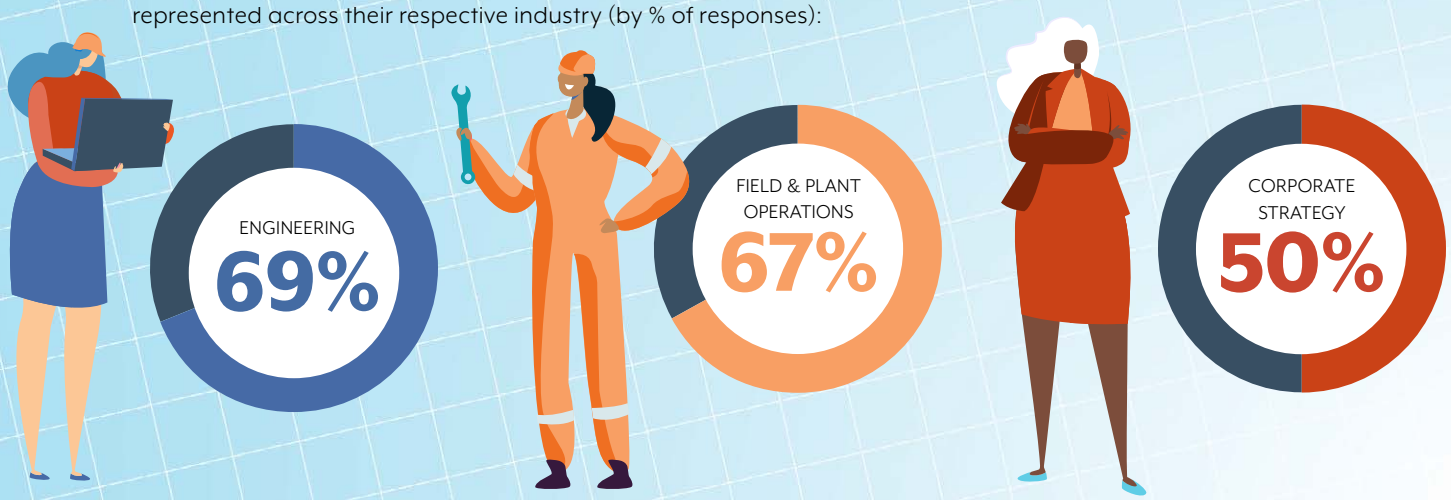
- **Employee resource groups (ERGs) for women** are company-supported, internal organizations (also known as "affinity groups," "employee networks," and "diversity councils"), particularly common in large companies.[145]

- **Committees or councils specifically for women housed within industry professional associations** capitalize on the industry associations' influence and member networks to reach and support women professionals across the industry.

- **Grassroots organizations**, founded and driven by individuals in the associated industry, operate on regional, national, or international levels and typically focus on creating social networks for their members through on-site events or online communities.

FIGURE 9. **Where Women Are the Most Under-represented in Male-Dominated Legacy Industries**

The top three occupations reported by survey respondents as to where women are the most under-represented across their respective industry (by % of responses):



Source: FPA survey among women in the male-dominated legacy industries that are included in this study. Total responses = 127

FPA's interviews revealed that these organizations create supportive networks for women across legacy industries, provide them with access to professional and educational resources, and help to increase the profile and recognition of women in their industries.

Expanding Networks of Support

Female interviewees, who often find themselves "the only woman in the room" at their companies or on their teams, highlighted how women's networks create a safe space for them to share experiences, seek advice, and receive guidance and support. Interviewees commented that seeing other women persevere gave them encouragement and perspective on what they could achieve themselves. Indeed, numerous studies show the positive impacts that women's networks offer in terms of social support, friendship, and providing a sense of reciprocity among female participants.[146, 147]

In addition, ERGs within companies can play a special role in voicing female employees' needs and creating a more inclusive working environment. One interviewee in the oil and gas industry, for example, recounted that her in-company women's network supported her advocacy for more accessible parking spaces for expectant mothers and the creation of nursing facilities. After seeing the need among her colleagues, she voiced her ideas to the women's network leaders, who then advocated on her behalf to HR and relevant management. Her company subsequently provided the additional parking and facilities.

Accessing Education and Professional Resources

More than two-thirds of interviewees reported that their companies do not offer professional-development opportunities. In response, a number of women's organizations in the male-dominated industries covered in this study are filling that gap most commonly through mentorship programs, workshops, and networking events, benefits that were highly valued by interviewees in working toward their career-advancement goals. These organizations facilitate mentor-mentee relationships between women at different career levels, as well as between women professionals and students, that empower and advance women's careers in their industry.[148] In addition, interviewees noted that workshops and networking events organized by women's organizations enable them to make productive professional contacts with women at different companies, especially senior leaders.

Interviewees also identified two emerging practices among women's organizations to provide professional-development support: First, some organizations, including those in the chemical, aerospace, and defense industries, are increasingly engaging men during their networking events. Sixty percent of respondents to FPA's survey reported that they consider men to be the most important allies for female professionals. Inviting and including men in the organizations' events not only creates opportunities for women to engage with male allies in their networks, but also helps to create buy-in among participating men about promoting gender diversity across industries.

The International Association of Plastics Distribution's (IAPD) Women in Plastics Committee (WiP) represents one organization that is leading in such a practice. Each quarter, WiP hosts educational workshops around the U.S., dedicated to issues related to women's careers, from sustainability to evolving leadership practices within the industry. Over the last two years, WiP has emphasized the importance and significantly increased the number of male attendance, believing that change is not possible without men's engagement on many issues.[149] **Sita Sonty,** a board member of Women in Aerospace, also highlighted the importance of hosting more "non-gendered" events on subjects interesting to both female and male professionals and inviting male speakers and participants. She contended that, "The more we create non-gendered events, the more level the playing field will be."[150]

Collaborating with educational or certification organizations to support women's professional development represents another emerging innovation, as demonstrated by Women of the Vine & Spirits (WOTVS). In 2018, WOTVS formed a strategic alliance with the Wine & Spirit Education Trust, a global organization offering courses and internationally recognized certifications in the development of wine, spirits, and sake to increase visibility and provide career-advancement opportunities for women in the alcoholic beverage industry. **Deborah Brenner,** WOTVS Founder and CEO, told FPA that this alliance has led to increased certification, which provides personal and professional benefits, among its members: "It's twofold. It's telling people, 'I am qualified for this,' and it's also giving women confidence. Women tend to really thrive and build their self-esteem by having that certification and that education. It's important for them."[151]

Increasing Visibility

Given the overall lack of visibility of women across male-dominated industries, some women's networks are strategically raising the profiles of women in their industry by recognizing their accomplishments, in part by creating initiatives, publications, and annual lists. One effort is the elimination of all-male conference panels and agendas. For example, International Women in Mining (IWiM) runs the IWiMSpeakUp project, in which IWiM members register their profiles and submit their resumes to the IWiM database. The organization then promotes qualified members to organizers of major mining conferences as panelists and speakers. By doing so, it aims to increase the visibility of women across the industry.[152]

Another strategy is creating awards to highlight women's achievements, presence, and impact within their broader industry or industry associations. For example, as part of a broader initiative to increase the manufacturing industry's attractiveness to women and empower women leaders, the Manufacturing Institute launched the annual STEP Ahead Awards in 2013. The awards recognize women in the industry who demonstrate excellence and leadership in their careers. After the awards, honorees participate in a two-day professional-development program that tasks them to mentor and support the next generation of female talent. According to the institute, in the first five years, STEP Ahead Award winners impacted more than 300,000 individuals in efforts to develop women in their careers and engage the next generation of women.[153]

SECTION D. SUPPORTING FEMALE ENTREPRENEURSHIP

Alongside women who advance business transformation within established corporations, an increasing number of women in legacy industries are forging out on their own to create their own businesses and manifest their innovation or business ideas. A notable and steady increase in female entrepreneurship over the past decade was reported by interviewees from the energy, mining, chemical, and alcohol industries. However, the total number of women-led start-ups remains relatively small, due in part to the lack of access to funding and limited business-development capacity. Public- and private-sector players are increasing efforts to remove these barriers and support female entrepreneurs.

Women's Motivation to Start Their Own Businesses

FPA interviewed sixteen female entrepreneurs for this study, 80 percent of whom had previously worked in established companies. These women were motivated to start their own companies to pursue their innovative ideas, escape the limitations of their male-dominated workplace, and/or have more time for family and personal interests. They cited myriad factors for venturing out on their own, including:

▷ **Female entrepreneurs didn't see a clear pathway to materialize their innovation or business ideas within larger, established companies.** This was particularly the case for those in tech-heavy industries like aerospace, defense and chemicals. Large companies tend to perpetuate the business models that initially made them successful, and deviating from those models to innovate is difficult.[154] This inertia, along with risk-averse management, bureaucratic barriers, and budget constraints, can deter innovative employees from pursuing new ideas within large companies.[155]

▷ **Limiting and discouraging corporate cultures at their previous employers pushed female entrepreneurs to start their own businesses.** Interviewees noted that the lack of opportunities for women left them discouraged.

One-quarter of the female entrepreneurs interviewed for this study commented that they had previously worked in a corporate environment and took the lack of women in executive or managerial positions as a sign that they wouldn't be able to reach a leadership position themselves. In addition, approximately 40 percent of these female entrepreneurs said they had grown tired of trying to make their voices heard by male colleagues and managers and pushing back against unwelcoming or toxic work environments. These women found that starting their own businesses allowed them to focus their attention on their work and create team environments that welcome and support innovation.

▷ **Starting their own businesses provided the flexibility needed to balance work and personal responsibility.** Lack of workplace flexibility was a common problem highlighted by interviewees, which can be particularly challenging for industries with significant field- and site-based work. Commuting to these sites often requires significant travel time that falls outside of regular work hours. This is especially true for the mining industry, where mine sites are often so remote that workers are required to stay for weeks or months at a time. Additionally, entrepreneurship can provide a faster pathway to re-enter the industry for women who take time off from their careers to have children or focus on their families. Women who want to pursue innovative approaches may be held back when re-entering the industry through their former employers.

Despite a notable increase in female entrepreneurship in some legacy industries, including energy, chemical, and alcohol, the number of women-led startups remains relatively small overall, according to FPA interviewees. Their experiences reflect a significant gender gap in entrepreneurship globally. In the European Union, the proportion of women in self-employment is under 10 percent, compared with 17.5 percent for men.[156] In emerging markets, women-owned businesses (WOBs) comprise just 28 percent of business establishments, according to a 2017 report by IFC on micro, small, and medium enterprises.[157] Interviewees pointed to two major challenges faced by female entrepreneurs: lack of funding access and business capacity.

Expanding Access to Funding

A significant gender gap exists in the financing of entrepreneurial activity, which prevents innovation and transformative technologies from coming to market or growing to scale. Numerous studies indicate that female entrepreneurs tend to face more limited access to financing, in forms of both debt financing and private equity funding.[158]According to Crunchbase, female-founded startups accounted for only 10–13 percent of global venture capital (VC) each year over the period Q1 2014 through Q3 2019.[159] Echoing these studies, FPA interviews also found that raising capital is a significant barrier for female entrepreneurs in the legacy industries.

In particular, female entrepreneurs trying to sell products to the public in a competitive market cited funding as a major hurdle. For example, startup businesses in the alcohol industry require significant capital to get off the ground, given the initial costs of equipment, ingredients, and property. Interviewees told FPA that when starting out, first-time brewers, distillers, and winemakers rely on bank loans and crowdsourced investments from their personal networks. These smaller, under-funded businesses often struggle with growth because increasing output capacity requires significantly more capital. They are unable to expand and may stall out, as accessing the next round of capital remains a challenge.[160] For instance, **Megan Bell**, Owner and winemaker of Margins Wines, told FPA that the challenge of accessing funding was preventing her business from growing to scale. With her wine currently selling out within seven days of hitting the market, she now has a list of ten states that would like to carry it, and a distribution network setup in which she could grow to three times her current size and still sell out consistently. However, she has not been able to raise the capital necessary for that expansion.[161]

According to an experienced investor interviewed for this study, one major contributing factor to female entrepreneurs' struggle to secure financing is the inclination among investors to seek investment opportunities that match previous successful projects, which are anchored to male founders and teams. In addition, a number of VC firms mainly rely on warm introductions through internal referrals or trusted connections, thus creating a challenge for women, whose networks are less likely to overlap with those of men working in VCs.[162] According to the IFC, women only hold 10 percent of all senior positions in private equity and venture capital firms around the globe. This gender disparity among allocators reinforces the impact that male biases have on women's access to funding.[163]

Despite these challenges, both public- and private-sector players are playing an important role in supporting female entrepreneurs who are working to develop their innovative ideas outside established corporate structures.

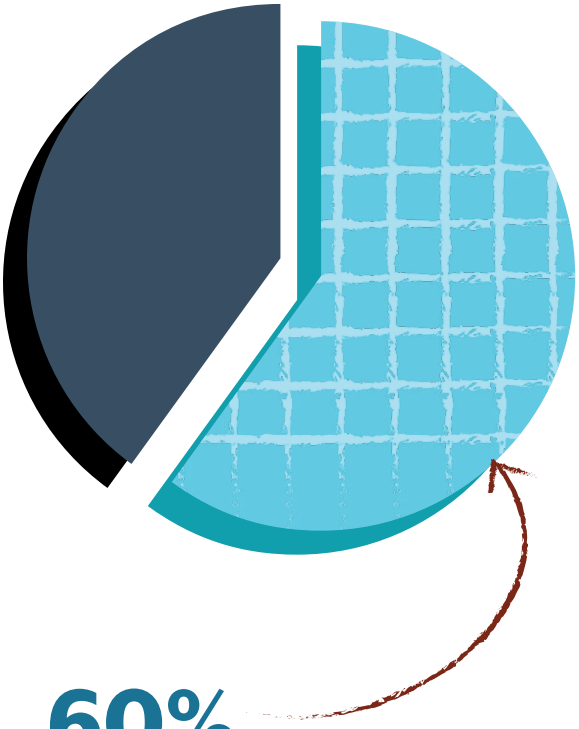
Public initiatives for female entrepreneurs began as a response to the growing number of women entering the labor force in the 1970s. Since then, female entrepreneurship policies and programs, such as grants and other forms of microfinancing, have become common in both developed and developing countries and from local, federal, and international stakeholders.[164] One government initiative that was lauded by two UK-based entrepreneurs whom FPA interviewed is Innovate UK's Wom-

en in Innovation program. Innovate UK, a public body funded by a grant-in-aid from the British government, funds business and research collaborations to accelerate science and technology innovations that will contribute to economic growth. The U.K. government estimates that boosting female entrepreneurship could add £180 billion to the British economy; however, in 2016, research showed that only 14 percent of Innovate UK applicants were women. In response, they launched the Women in Innovation program, which consists of a funding competition and events to encourage female-led innovation. The first competition in 2016 awarded fifteen female-led businesses £50,000 each in funding and provided them with business support, and a further sixteen awardees received tailored packages of business support. A second competition, launched in 2018, awarded funds to nine winners. According to Innovate UK, the program has increased the proportion of females registering for its support by 70 percent.[165]

Private-sector support for female entrepreneurs has increased in the last few years, particularly with regard to closing the gender gap in private equity and venture capital investing. This is driven both by concern over the influence that male-dominated VC firms' homogeneity has on the allocation of investments and growing awareness that, despite the disparity in funding, women- founded and co-founded startups outperform male-founded startups.[166] One increasingly popular strategy to support female entrepreneurs is gender lens investing (GLI), which refers to a wide range of practices and targeted outcomes that incorporate gender-based factors into investment decisions.[167] First emerging in the early 1990s, this trend encourages investors to finance businesses—including both large corporations and small entrepreneurs—that were founded by women, have women in leadership and board positions, support women-inclusive corporate practices, and/or provide products or services that positively impact women and improve their status and living conditions.[168, 169, 170] GLI has gained momentum in recent years: between 2017 and 2018, the total assets in public and private gender lens products doubled to $4.65 billion.[171]

An increasing number of organizations are providing critical research to map the GLI landscape and advance the field. For example, the Wharton Social Impact Initiative has collaborated with pioneers of GLI, such as U.S. Trust, the Criterion Institute, and Catalyst at Large, to identify trends and knowledge gaps and provide guidance on how to analyze investment criteria and evaluate outcomes with a gender lens. Similarly, Equileap, a leading organization that provides data and insights on gender equality in the corporate sector, researches and ranks over 3,500 public companies globally using a unique Gender Equality Scorecard™.

The trend is international in scope. The 2X Challenge[172] calls for the G7 countries and other development finance institutions (DFIs) to "join together to collectively mobilize $3 billion in commitments that provide women in developing country markets with improved access to leadership opportunities, quality employment, finance, enterprise support, and products and services that enhance economic participation and access." DFIs can use the 2X Challenge to encourage investees to collect data on women employees and consumers, measure the development impact of investing with and in women, and make a business case for investing with and in women.[173]



60%

of respondents to FPA's survey considered men to be the most important allies for female professionals.

Building Business Capacity

Another major challenge faced by female entrepreneurs is a lack of business capacity, including business skills and strong business networks, which can inhibit them from marketing themselves and their products to business leaders and breaking into the supply chain.

▷ **Underdeveloped Business Skills:** Female entrepreneurs cited a lack of skills needed to grow their businesses, such as in finance, marketing, business development, and management. This is especially true for those with highly technical careers who did not have formal business training or relevant business experience. According to the

OECD, women are less likely than men to feel they have the skills, knowledge, and experience to start a business. Women with prior experience in corporate life are also less likely to have been in senior management positions, which is then a barrier to acquiring management experience and skills that they can transfer to entrepreneurship.[174]

▷ **Limited Access to Business Networks:** Additionally, female entrepreneurs struggled to access necessary business networks to support their enterprises. Networks provide female entrepreneurs with critical social capital and, alongside funding, are the most important resource for their success, because they provide peer support, mentors, business partners, customers, and financing.[175, 176] However, studies show that female entrepreneurs' networks are smaller, less diverse, and lower in quality than their male counterparts.[177] Two interviewees who were familiar with consultancies and startups in the mining industry shared similar observations. They noted that many women in the mining industry spend their careers in siloed technical positions outside of leadership, and thus have not been exposed to or built relationships with the male-dominated C-suites. Their peer networks are also smaller, given the small number of female entrepreneurs in legacy industries.

To help female entrepreneurs grow their business capacity, a variety of initiatives and programs have been launched by both public and private players to provide business training and tailored business advice and support.[178, 179] In particular, female entrepreneurs who interviewed for this study highlighted how they benefited from business incubators and accelerator programs dedicated to women. Research has shown that programs dedicated specifically to female entrepreneurs and WOBs have a greater impact than general programs, because more women participate, and the support and networking are more tailored to their needs.[180]

The number of business incubators and accelerator programs specifically for women is growing, but the majority are currently in the United States, Canada, and Australia.[181] These programs typically support female entrepreneurs and WOBs by hosting workshops, training, and networking events, and by providing coaching and business counselling on issues ranging from finance and marketing to leadership and work-life balance. In male-dominated industries, some individual women are taking the initiative to support female entrepreneurs through business incubators and accelerator programs.

One notable example is the Artemis Project, the brainchild of Women on the Move (WOM) Inc., Canada's leading business accelerator for female founders in STEM-related industries.[182] In 2018, WOM's Founder, **Heather Gamble**, launched this tailored capacity-building program, which accelerates business outcomes for female entrepreneurs in the mining and metals industry through its entrepreneur collective and business-development assistance. With a growing network of more than thirty-five female entrepreneurs in the industry, the program provides a peer network for other female entrepreneurs to tap into. Heather says she wants to "help them develop outcomes, not just put a glossy brochure together," which she does through one-on-one business-development coaching and networking. In addition, the program pulls relevant women-owned businesses together, co-creates unique solutions, and then takes them as a delegation to meet with executives in mining companies and build business relationships. Three female entrepreneurs who interviewed for this study are participating in the Artemis Project, and each spoke highly of how it helps them build the business capacity they need.[183] □

Part IV. **Call for Action**

Through data analysis and extensive one-on-one interviews, this study demonstrates how greater gender diversity can facilitate and accelerate transformation in male-dominated legacy industries. However, multiple barriers continue to limit these industries from reaping gender-related dividends. In order to achieve greater gender parity and capture these benefits, it will be essential to eliminate the harmful gender stereotypes and biases in which industry and company cultures are deeply rooted; build a strong pipeline of, and retain, female STEM talent; and enhance women's economic inclusion.

Meaningful and sustainable institutional change will require a concerted effort from all stakeholders, from the public sector and industry associations to individual companies and investors around the world. Effective action will stem from cross-sectoral action and collaboration, which can break through silos and create strong coalitions to take purposeful, substantive steps toward equality. Concrete, meaningful steps can be taken now by a range of stakeholders, including:

PUBLIC SECTOR

National governments and multinational organizations can play central roles in crafting, passing, and enforcing laws and regulations around gender equality and workplace inclusion, with recommended actions including but not limited to:

▷ **Fulfilling commitments to the UN Sustainable Development Goals, the Beijing Declaration and Platform for Action, and international treaties such as CEDAW,** which provide blueprints for increasing women's rights and economic participation globally. National governments can make use of their frameworks for target-setting and progress measurement. For example, Canada, one of the first to sign and ratify the Convention on the Elimination of All Forms of Discrimination Against Women (CEDAW), has used the convention as a framework and guide to implement anti-discrimination laws nationally, including the Employment Equity Act, which requires private companies employing over 100 people to identify and eliminate barriers to women's employment.[184]

▷ **Enhancing national legislation on women's rights and social welfare systems.** Laws against workplace sexual harassment are absent in more than one-third of countries worldwide,[185] and only thirty-eight countries have ratified the ILO's Maternity Protection Convention (revised), 1952 (No. 103), which guarantees paid maternity leave and women's right to work in physically safe conditions during pregnancy.[186] Without laws on the books, there cannot be true accountability. Further, it is critical that governments incorporate gender considerations into the design and implementation of labor laws and social welfare mechanisms. Strengthening mandated support for women can help balance professional and family responsibilities and enhance economic inclusion.

▷ **Mandating information disclosure and greater transparency, and holding companies accountable for their performance,** particularly with regard to eliminating pay gaps and sexual harassment. One useful template for pay gap disclosure is the Equality Act 2010 (Gender Pay Gap Information) Regulations 2017, passed by the British government in 2017, which requires private and voluntary-sector organizations with more than 250 employees to report gender-based pay disparities based on specified metrics.[187, 188] However, wider coverage is recommended, with no threshold set on the size of companies. In addition, mandating companies to disclose the number and arbitration/judgment results of discrimination complaints, including those related to gender, can put pressure on companies to handle complaints in an appropriate and fair manner and take further action to improve their working environments.

▷ **Establishing collaborative partnerships with private-sector companies and increasing female labor force participation.** For instance, the World Economic Forum and Inter-American Development Bank have facilitated the creation of several Closing the Gender Gap Accelerators in countries in Latin America, the Middle East, and Europe. The Accelerators bring together relevant government ministers and representatives from each country's biggest employers to design and implement relevant initiatives to increase female labor force participation, close gender-based pay gaps, encourage female leadership and management, and increase access to skills training and education.[189]

COMPANIES AND EMPLOYERS

Companies, including multinationals and all their subsidiaries, can demonstrate their commitment to gender equality by purposefully creating a safe, equitable, and inclusive work environment for all employees. They can take action by making gender equality an explicit business priority, allocating financial and non-financial resources toward creating change, and putting in place active interventions such as:

▷ **Setting transparent targets and building roadmaps for increased female employment, management, and leadership,** and regularly reporting on the progress made toward these goals. For example, companies such as Greif Paper and Northrop Grumman publish sex-disaggregated employment data, as well as data on progress, in their annual sustainability or corporate social responsibility reports.

▷ **Enforcing a zero-tolerance policy for sexual harassment,** including the establishment of an independent process to assess and respond to complaints.

▷ **Reporting on gender-based pay gaps** and working actively to close them. Well-resourced companies can bring in external consultants and organizations to identify gaps and effective solutions, a strategy that can increase employees' trust in the impartiality and expertise of the process.

▷ **Leading a cultural shift in their wider industry,** by demonstrating effective interventions, sharing best practices with other companies, and supporting and funding grassroots women's organizations and the initiatives of industry associations.

▷ **Mobilizing existing company infrastructure to push for change.** For example, advocacy for national policies and laws on gender diversity via government relations departments could be an effective way to align private- and public-sector efforts and avoid the duplication of work.

INDUSTRY ASSOCIATIONS

Industry associations are uniquely placed to lead the movement for diversity and inclusion, due to their wide-reaching influence within male-dominated industries and access to key decision makers and stakeholders, including policymakers, companies, and industry leaders. As such, they can make gender diversity an industry-wide priority, facilitate collaboration between different actors, and reduce silos by:

▷ **Celebrating the achievements and contributions of women.** Associations can raise women's profiles across the industry by honoring women with industry awards, including amplifying their voices in trade publications, and inviting them to speak on their areas of expertise at conferences and trade shows. Industry associations and trade event organizers can follow the examples of institutes and companies, such as the National Institutes of Health (NIH)[190] and techUK,[191] in ensuring that all panels feature at least one woman.

▷ **Facilitating best practice sharing for building inclusive work cultures** and designing diversity policies across the industry via workshops and webinars for industry leadership, HR professionals, and smaller companies, which may lack the personnel or resources to create new initiatives for gender diversity. Associations can also develop toolkits, including regulation and policy guidebooks, templates for company policies, and training materials, and make them accessible to other companies.

▷ **Collaborating with existing women's organizations or creating affiliated bodies** to advocate for and amplify the voices of women in the industry. Associations can partner with grassroots women's organizations to leverage their effective programs and networks to engage more women in the industry. They can also support female professionals by establishing affiliated bodies. Two successful examples include Women in Titanium, an affiliate women's organization of the International Titanium Association, and Women in Plastics, a committee of the International Association of Plastic Distributors (IAPD), both of which bring together women across the industry and provide networking opportunities and professional support.

INVESTORS

In addition to influencing industries and companies to alter their practices with regard to environmental, social, and governance outcomes, investors can advocate for an increased focus on gender equality and advance changes in businesses by:

- **Applying a gender lens to investment decision making,** by taking into consideration whether businesses have a strong track record of improving gender diversity in employment, in executive management, and on boards and building corporate culture and policies that support gender equality. For example, Pax World Funds, a leading investment group, launched the Pax Ellevate Global Women's Leadership Fund (PXWEX) in 2014. It was the first mutual fund to invest specifically in companies that actively advance gender diversity on boards and in executive management. Of the companies in the PXWEX Fund, 91 percent have three or more women on boards, and overall women hold 35 percent of the board seats, compared to the global average of 24 percent.[192]

- **Pressing businesses to improve gender diversity and equality,** by filing shareholder resolutions asking companies to increase diversity and female representation on their boards, conduct pay audits to evaluate gender-based pay gaps, and report relevant performance and progress regularly.

- **Increasing the use of open processes for venture fund applications,** rather than heavily relying on referrals, and making the application accessible and open to all people, including female entrepreneurs who do not have robust business networks. One example of an entity that has adopted this practice is the Clean Energy Trust, which bases funding decisions on the quality and potential of business ideas rather than who the founder is or what their background is.

OTHER STAKEHOLDERS

Many non-governmental organizations (NGOs) are dedicated to increasing gender diversity and creating inclusive workplaces. **Women's advocacy groups** can help facilitate the transformation of male-dominated legacy industries by sharing their knowledge and resources with industry-specific groups and providing support such as unconscious bias training for company leadership and educational workshops for HR professionals who are seeking to hire more diverse candidates. Additionally, **other types of advocacy groups** can accelerate transformational change by engaging legacy industries as partners rather than adversaries.

Industry associations can assist gender diversity by following the examples of institutes and companies, such as NIH and techUK, in **ensuring that all panels feature at least one woman.**

Because these legacy industries have historically flown under the radar and are woefully understudied from a gender perspective, **researchers, consultants, and the media** all have roles to play in holding companies accountable to their commitment to change by measuring and acknowledging progress (or lack thereof). Researchers and consultants can contribute deeper analysis on the issues impeding gender equality and how best to overcome them. For example, FPA recommends increased focus on the cost of sexual harassment to companies, in terms of lost productivity, employee turnover, and litigation fees, as most of the commonly cited statistics on this issue are out of date.[193] **Journalists and news outlets** can report on the progress being made by companies and legacy industries on gender diversity and highlight the transformational impacts that women continue to make across these industries. □

Appendix I. **Endnotes**

[1] For the purposes of this report, "legacy industries" refers to fourteen well-established industries across a range of sectors, including energy, materials, industrials, consumer products, utilities, and waste services.

[2] United Nations, Department of Economic and Social Affairs, Population Division. (2019). World Population Prospects 2019, custom data acquired via website. Retrieved from https://population.un.org/wpp/.

[3] UNESCO UIS. (2019). *Data for the Sustainable Development Goals.* Retrieved from http://uis.unesco.org/.

[4] ILO, ILOStat. (2019). *Employment Statistics.* Retrieved from https://ilostat.ilo.org/topics/employment/.

[5] Plataforma SINC (2014, March 19). Gender Diversity Promotes Radical Innovation, Study Finds. Science Daily. Retrieved from https://www.sciencedaily.com/releases/2014/03/140319085430.htm

[6] Miller, T., Del Carmen Triana, M., (2009). Demographic Diversity in the Boardroom: Mediators of the Board Diversity-Firm Performance Relationship. *Journal of Management Studies*, Vol. 46(5), 755–86. https:/ /doi/10.1111/j.1467-6486.2009.00839.x

[7] Williams Woolley, A., Chabris, C.F., Pentland, A., Hashmi, N., Malone, T.M. (2010). Evidence for a Collective Intelligence Factor in the Performance of Human Groups. *Science*, Vol. 330, 686–88. Retrieved from http://www.chabris.com/Woolley2010a.pdf

[8] Diaz-Garcia, C., Gonzalez-Moreno, A., Saez-Martinez, F.J. (2011). Gender Diversity within R&D Teams: its impact on radicalness of innovation. *Innovation: Organization & Management*, Vol. 15(2), 149–60. https:/ /doi/abs/10.5172/impp.2013.15.2.149

[9] UN Women. (1995). Beijing Declaration and Platform for Action. Retrieved from https://beijing20.unwomen.org/~/media/headquarters/attachments/sections/csw/pfa_e_final_web.pdf

[10] WEF. (2020). *Global Gender Gap Report 2020*. Retrieved from http://www3.weforum.org/docs/WEF_GGGR_2020.pdf

[11] UN SDG. Sustainable Development Goals Knowledge Platform. Retrieved from https://sustainabledevelopment.un.org/

[12] A positive correlation is considered statistically significant with a p-value < 0.05. Also note that correlation is not causation. For example, the statement of "The top-quartile companies with the highest percentage of women in senior management are on average 47 percent more profitable than those in the bottom quarter" is not intended to prove that the relationship is causal or that having a higher percentage of women in leadership automatically translates into higher profitability. Rather, it indicates that companies with a higher percentage of women in leadership are, on average, more profitable.

[13] Bureau for Employers' Activities. (2019, May 22). *The business case for change: Country snapshots*. International Labor Organization. Retrieved from https://www.ilo.org/global/publications/WCMS_702188/lang--en/index.htm

[14] Ben-Amar, W., Chang, M.M., McIlkenny, P. (2018, March 7). Board Gender Diversity and Corporate Response to Sustainability Initiatives: Evidence from the Carbon Disclosure Project. Journal of Business Ethics, Vol. 142(2), 369–83. http://dx.doi.org/10.1007/s10551-015-2759-1

[15] International Monetary Fund (2019, October). *World Economic Outlook: Global Manufacturing Downturn, Rising Trade Barriers.* Washington, D.C.: International Monetary Fund. Retrieved from https://www.imf.org/en/Publications/WEO/Issues/2019/10/01/world-economic-outlook-october-2019

[16] Matsuda, N. (2019, September 23). China steel sector flashes signs of another glut. *Nikkei Asian Review.* Retrieved from https://asia.nikkei.com/Business/Business-trends/China-steel-sector-flashes-signs-of-another-glut

[17] Kemp, J. (2019, October 29). U.S. gas market struggles with persistent oversupply: Kemp. Reuters. Retrieved from https://www.reuters.com/article/us-usa-gas-kemp/u-s-gas-market-struggles-with-persistent-oversupply-kemp-idUSKBN1X81NW

[18] Deloitte. (2017). *The next of aerospace of defense: How to outperform in an environment of innovative disruption*. Retrieved from https://www2.deloitte.com/content/dam/Deloitte/us/Documents/manufacturing/us-manu-next-era-of-aerospace-and-defense.pdf

[19] Nielsen. (2015, January). *We Are What We Eat: Healthy Eating Trends around the World*. Retrieved from https://www.nielsen.com/wp-content/uploads/sites/3/2019/04/Nielsen20Global20Health20and20Wellness20Report20-20January202015-1.pdf

[20] Mullen, C. (2018, December 28). Millennials drive big growth in sustainable products. *Bizwomen*. Retrieved from https://www.bizjournals.com/bizwomen/news/latest-news/2018/12/millennials-drive-big-growth-in-sustainable.html?page=all

[21] Bureau for Employers' Activities. (2019, May 22). *The business case for change: Country snapshots*. International Labour Organization. Retrieved from https://www.ilo.org/global/publications/WCMS_702188/lang--en/index.htm

[22] Cara Olmsted, personal communication, September 2019.

[23] Laurie Wiegand-Jackson, personal communication, September 2019.

[24] Hewlett, S.A., Marshall, M., Sherbin, L., & Gosalves, T. (2013). *Innovation, diversity, and market growth*. Center for Talent and Innovation. Retrieved from https://www.talentinnovation.org/_private/assets/IDMG-ExecSummFINAL-CTI.pdf

[25] Herring, C. (2009). Does diversity pay?: Race, gender, and the business case for diversity. *American Sociological Review*, 74(2). 208–44. Retrieved from https://www.asanet.org/sites/default/files/savvy/images/journals/docs/pdf/asr/Apr09ASRFeature.pdf

[26] Blum, K. (2018, November 23) Prioritizing gender diversity in sales expands the talent pool and brings broader business benefits. *Smarter with Gartner*. Retrieved from https://www.gartner.com/

smarterwithgartner/why-sales-must-hire-more-women/?utm_source=social&utm_campaign=sm-swg&utm_medium=social

[27] CEB Global. (2017). *Gaining the Talent Advantage: Gender Diversity in Sales*. Gartner. Retrieved from https://www.cebglobal.com/content/dam/cebglobal/us/EN/best-practices-decision-support/sales-service/pdfs/gaining-the-talent-advantage-gender-diversity-in-sales.pdf

[28] Christophe Bauer, personal communication, November 2019.

[29] Hewlett, S.A., Marshall, M., Sherbin, L., & Gosalves, T. (2013). *Innovation, diversity, and market growth*. Center for Talent and Innovation. Retrieved from https://www.talentinnovation.org/_private/assets/IDMG-ExecSummFINAL-CTI.pdf

[30] Hourihan, M. (2016, January 27). Driving legacy sector innovation: A Q&A (with William B. Bonvillian and Charles Weiss). *AAAS News*. Retrieved from https://www.aaas.org/news/driving-legacy-sector-innovation-qa

[31] Carissa Schutzman, personal communication, October 2019.

[32] Miller, T., & Del Carmen Triana, M. (2009). Demographic diversity in the boardroom: Mediators of the board diversity-firm performance relationship. *Journal of Management Studies*, 46(5), 755–86. https://onlinelibrary.wiley.com/doi/10.1111/j.1467-6486.2009.00839.x

[33] Bureau for Employers' Activities. (2019, May 22). *The business case for change: Country snapshots*. International Labour Organization. Retrieved from https://www.ilo.org/global/publications/WCMS_702188/lang--en/index.htm

[34] Groupthink (n.d.) In Psychology Today's Basics. Retrieved from https://www.psychologytoday.com/us/basics/groupthink

[35] Sita Sonty, personal communication, September 2019.

[36] Nicolette Skjoldhammer, personal communication, November 2019

[37] Flora Okereke, personal communication, October 2019

[38] Development Dimensions International, Inc., the Conference Board, Inc., & EYGM Limited. (2018). *Global leadership forecast 2018: 25 research insights to fuel your people strategy*. Available at: www. ddiworld.com/resources/library/trend-research/global-leadership-forecast-2018

[39] Zoe Coull, personal communication, November 2019.

[40] Vanessa Clark, personal communication, October 2019.

[41] Measured by Bloomberg ESG Disclosure scores and based on the amount of environmental, social, and corporate governance related information a company reports publicly. Data were retrieved from Bloomberg in May 2019.

[42]Caroline Alting, personal communication, November 2019.

[43] Bureau for Employers' Activities. (2019, May 22). The business case for change: Country snapshots. International Labor Organization. Retrieved from https://www.ilo.org/global/publications/WCMS_702188/lang--en/index.htm

[44] U.S. Energy Information Administration. (2016). International Energy Outlook 2016. Retrieved from https://www.eia.gov/outlooks/ieo/pdf/0484(2016).pdf.

[45] OECD. (2019). OECD.Stat. Data retrieved December 2019 from https://stats.oecd.org/.

[46] European Environment Agency. (2018). 2018 Industrial Pollution Country Profiles, EU-28. Retrieved from https://www.eea.europa.eu/themes/industry/industrial-pollution/industrial-pollution-country-profiles-2018/2018-industrial-pollution-country-profiles.

[47] The Lancet Commissions (2017, October 19). The Lancet Commission on Pollution and Health. *The Lancet*, Vol. 391, (10119), 462–512. http://dx.doi.org/10.1016/S0140-6736(17)32345-0.

[48] Eccles, R.G., Klimenko, S. (2019, May). The Investor Revolution. Harvard Business Review. Retrieved from https://hbr.org/2019/05/the-investor-revolution.

[49] McElhaney, K.A., Mobasseri, S. (2012, October). *Women Create A Sustainable Future*. California: UC Berkeley Haas School of Business. Retrieved from https://www.ibe.org.uk/userfiles/women_create_sustainable_valueoct2012.pdf

[50] Ben-Amar, W., Chang, M.M., McIlkenny, P. (2018, March 7). Board Gender Diversity and Corporate Response to Sustainability Initiatives: Evidence from the Carbon Disclosure Project. *Journal of Business Ethics*, Vol. 142(2), 369–83. http://dx.doi.org/10.1007/s10551-015-2759-1

[51] Provided by Sustainalytics and measuring a company's percentile rank (on the scale of 0 to 100) based on its ESG performance score relative to its industry peers for 2018 or 2017 (where data unavailable for 2018). Data were retrieved from Bloomberg in May of 2019.

[52] Ballew, M., Marlon, J., Leiserowitz, A., Maibach, E. (2018, November 20). *Gender Differences in Public Understanding of Climate Change*. Yale Program on Climate Change Communication. Retrieved from https://climatecommunication.yale.edu/publications/gender-differences-in-public-understanding-of-climate-change/.

[53] IPCC. (2014). *Climate Change 2014: Mitigation of Climate Change. Contribution of Working Group III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change*. Cambridge: Cambridge University Press.

[54] ISO. (2015). ISO 14001 Key Benefits. Retrieved from https://www.iso.org/files/live/sites/isoorg/files/store/en/PUB100372.pdf.

[55] Carolina Bengochea, personal communication, November 2019.

[56] Soma Chakraborty, personal communication, November 2019.

[57] UN Environment. (2017). *Global Status Report 2017*. Retrieved from https://www.worldgbc.org/sites/default/files/UNEP%20188_GABC_en%20%28web%29.pdf.

[58] Victoria Burrows, personal communication, October 2019.

[59] AF&PA. (2018). 2018 *AF&PA Sustainability Report*. Retrieved from https://www.afandpa.org/docs/default-source/default-document-library/2018|sustainabilityreport_pages.pdf.

[60] Donna Harman, personal communication, October 2019.

[61] Heidi Brock, personal communication, October 2019.

[62] Xinhua. (2018, July 24). Zimbabwe's 2018 tobacco production hits all-time high. *XinhuaNet News*. Retrieved from http://www.xinhuanet.com/english/2018-07/24/c_137345408.htm.

[63] Dahlia Garwe, personal communication, September 2019.

[64] UN Environment. (2018). Single-Use Plastics: *A Roadmap for Sustainability*. Retrieved from https://wedocs.unep.org/

bitstream/handle/20.500.11822/25496/singleUsePlastic_sustainability.pdf?isAllowed=y&sequence=1

[65] Pamela Marrone, personal communication, October 2019.

[66] Fanya Ismail, personal communication, November 2019.

[67] Data covers construction, mining, utilities, water, and manufacturing in general.

[68] Eurostat. (2018, June). *Accident at work statistics*. Eurostat Statistics Explained. Retrieved from https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Accidents_at_work_statistics#Analysis_by_activity

[69] IPIECA, International Finance Corporation, & United Nations Development Programme. (2017, July). *Mapping the oil and gas industry to the SDGs: An Atlas*. Retrieved from https://www.undp.org/content/undp/en/home/librarypage/poverty-reduction/mapping-the-oil-and-gas-industry-to-the-sdgs--an-atlas.html

[70] Business for Social Responsibility. (2017). 10 Human Rights Priorities for the Extractives Sector. Retrieved from https://www.bsr.org/en/our-insights/primers/10-human-rights-priorities-for-the-extractives-sector

[71] Business for Social Responsibility. (2017). 10 Human Rights Priorities for the Power and Utilities Sector. Retrieved from https://www.bsr.org/en/our-insights/primers/10-human-rights-priorities-power-and-utilities-sector

[72] Data were retrieved from Bloomberg in May of 2019.

[73] DeMaria, J. (2017, April 12). Organizational safety culture. Retrieved from https://ishm.org/organizational-safety-culture/

[74] Kim, Y., Park, J., & Park, M. (2016). Creating a Culture of Prevention in Occupational Safety and Health Practice. *Saf Health Work*, 7(2), 89–96. https://doi.org/10.1016/j.shaw.2016.02.002

[75] United States Department of Labor (n.d.). Pulp, Paper, and Paperboard Mills. Retrieved from https://www.osha.gov/SLTC/pulppaper/

[76] U.S. Bureau of Labor Statistics (2018) Survey of Occupational Injuries and Illnesses. Available from https://www.bls.gov/iif/soii-data.htm

[77] Pulp & Paper Canada. (2003). The Team behind the Grande Prairie Mill. Retrieved from https://www.pulpandpapercanada.com/the-team-behind-the-grande-prairie-mill-1000129219/

[78] Cathy Slater, personal communication, October 2019.

[79] Business for Social Responsibility, United Nations Global Compact. (2015). *Supply Chain Sustainability: A Practical Guide for Continuous Improvement, Second Edition*. Retrieved from: https://www.unglobalcompact.org/library/205

[80] International Labour Organization. (2016). *Workplace Compliance in Global Supply Chains*. Retrieved from https://www.ilo.org/wcmsp5/groups/public/---ed_dialogue/---sector/documents/publication/wcms_540914.pdf

[81] Maria Reymao, personal communication, October 2019.

[82] Business for Social Responsibility. (2017). *10 Human Rights Priorities for the Extractives Sector*. Retrieved from https://www.bsr.org/en/our-insights/primers/10-human-rights-priorities-for-the-extractives-sector

[83] IPIECA, International Finance Corporation, & United Nations Development Programme. (2017, July). M*apping the oil and gas industry to the SDGs: An Atlas*. Retrieved from https://www.undp.org/content/undp/en/home/librarypage/poverty-reduction/mapping-the-oil-and-gas-industry-to-the-sdgs--an-atlas.html

[84] Rozo Rincon, M. (2015) *Procurement innovation challenge*. Washington, D.C.: World Bank Group. Retrieved from http://documents.worldbank.org/curated/en/923151468184462699/Procurement-innovation-challenge

[85] Monica Ospina, personal communication, November 2019.

[86] Flora Otero, personal communication, November 2019.

[87] Business for Social Responsibility. (2017). *10 Human Rights Priorities for the Power and Utilities Sector*. Retrieved from https://www.bsr.org/en/our-insights/primers/10-human-rights-priorities-power-and-utilities-sector

[88] Water.org. (n.d.) India's Sanitation & Water Crisis. Retrieved from https://water.org/our-impact/india/.

[89] Lincy Paravanethu, personal communication, September 2019.

[90] Lypiridis, C., & Shrestha, S. (2018, January 30). Incentives for cleaner cities in Nepal. *World Bank Blog*. Retrieved from https://blogs.worldbank.org/endpovertyinsouthasia/incentives-cleaner-cities-nepal.

[91] Aisha Khatoon, personal communication, October 2019.

[92] Bureau of Labor Statistics. (2018). Labor Force Statistics from the Current Population Survey 2018. Retrieved from https://www.bls.gov/cps/tables.htm.

[93] Nomis. (2019, October 15). Annual Population Survey data for Ethnicity by industry. Retrieved from https://www.nomisweb.co.uk/datasets/aps180

[94] EEOC. (2016). Select Task Force on the Study of Harassment in the Workplace. Retrieved from https://www1.eeoc.gov/eeoc/task_force/harassment/report.cfm?renderforprint=1.

[95] Deloitte. (2015). *The Radical Transformation of Diversity & Inclusion: The Millennial Influence*. Retrieved from https://www2.deloitte.com/content/dam/Deloitte/us/Documents/about-deloitte/us-inclus-millennial-influence-120215.pdf.

[96] Moore, K. (2018, August 17). What Women CEOs Are Doing to Increase Gender Diversity in Leadership. Fast Company. Retrieved from https://www.fastcompany.com/90219491/what-ceos-are-doing-to-increase-gender-diversity-in-leadership.

[97] S&P Global. (2019). *When Women Lead, Firms Win*. Retrieved from https://www.spglobal.com/en/research-insights/featured/when-women-lead-firms-win.

[98] ILO. (2019). The Business Case for Change. Retrieved from https://www.ilo.org/wcmsp5/groups/public/---dgreports/---dcomm/---publ/documents/publication/wcms_700953.pdf.

[99] Kim Ann Mink, personal communication, November 2019.

[100] Dawne Hickton, personal communication, November 2019.

[101] Justina Sanchez, personal communication, September 2019.

[102] "Middle-skilled roles" refers to skilled jobs that require more than a high-school diploma not a bachelor's degree.

[103] ILO, ILOStat. (2019). Employment Statistics. Retrieved from https://ilostat.ilo.org/topics/employment/.

[104] UNESCO. (2017). Cracking the Code: girls' and women's education in science, technology, engineering and mathematics (STEM). Retrieved from https://unesdoc.unesco.org/ark:/48223/pf0000253479.

[105] Ibid.

[106] Catalyst. (2019, June 14). Women in STEM: Quick Take. Retrieved

from https://www.catalyst.org/research/women-in-science-technology-engineering-and-mathematics-stem/

[107] Statistics Canada. (2017, November 29). Census in Brief: Are young bachelor's degree holders finding jobs that match their studies? Retrieved from https://www12.statcan.gc.ca/census-recensement/2016/as-sa/98-200-x/2016025/98-200-x2016025-eng.cfm

[108] European Commission. (2019). *She Figures 2018.* Retrieved from https://op.europa.eu/en/publication-detail/-/publication/9540ffa1-4478-11e9-a8ed-01aa75ed71a1/language-en

[109] UNESCO. (2017). Cracking the code: girls' and women's education in science, technology, engineering and mathematics (STEM). Retrieved from https://unesdoc.unesco.org/ark:/48223/pf0000253479.

[110] Smithsonian National Air and Space Museum, (2018, August 17). She Can STEM Camp Takes Off. Retrieved from https://airandspace.si.edu/stories/editorial/she-can-stem-camp-takes

[111] Schmidt, H. (November 2019). National Air and Space Museum Expands 'She Can' STEM Summer Camp to Bentonville. *5 News.* Retrieved from https://5newsonline.com/2019/11/14/national-air-and-space-museum-expands-she-can-stem-summer-camp-to-bentonville/

[112] Jully Marino Carela, director of Women in Energy Program, Columbia University, personal communication, September 2019.

[113] Nontraditional Employment for Women. (2019). About NEW. Retrieved from https://www.new-nyc.org/pages/about.html

[114] LinkedIn. (2019). Language Matters: How words impact men and women in the workplace. Retrieved from https://business.linkedin.com/content/dam/me/business/en-us/talent-solutions-lodestone/body/pdf/Linkedin-Language-Matters-Report-FINAL2.pdf

[115] Lila Thompson, CEO of British Water, personal communication, November 2019.

[116] Christiane Bisanzio, VP diversity & inclusion, JTI, personal communication, September 2019. Kurby Hodges, diversity & inclusion manager, Northrop Grumman, personal communication, November 2019.

[117] Manpower Group. (2018). Solving the Talent Shortage: Build, Buy, Borrow and Bridge. Retrieved from https://go.manpowergroup.com/hubfs/TalentShortage%202018%20(Global)%20Assets/PDFs/MG_TalentShortage2018_lo%206_25_18_FINAL.pdf?hsLang=en.

[118] Ibid.

[119] World Bank. (2017, October 10). Skills Development. Retrieved from https://www.worldbank.org/en/topic/skillsdevelopm

[120] ILO (2017). CO45 – Underground Work (Women) Convention, 1935 (No. 45). Retrieved from https://www.ilo.org/dyn/normlex/en/f?p=NORMLEXPUB:12100:0::NO::P12100_ILO_CODE:C045.

[121] ILO (2019). Ratifications of CO45 - Underground Work (Women) Convention, 1935 (No. 45). Retrieved from https://www.ilo.org/dyn/normlex/en/f?p=1000:11300:0::NO:11300:P11300_INSTRUMENT_ID:312190.

[122] Tilford, C. (2018, June 6). The Millennial Moment – In Charts. *Financial Times*, Retrieved from https://www.ft.com/content/f81ac17a-68ae-11e8-b6eb-4acfcfb08c11.

[123] Manpower Group. (2016). Millennial Careers: 2020 Vision. Retrieved from https://www.manpowergroup.com/wps/wcm/connect/660ebf65-144c-489e-975c-9f838294c237/MillennialsPaper1_2020Vision_lo.pdf?MOD=AJPERES.

[124] Deloitte. (2018). 2018 *Deloitte Millennial Survey.* Retrieved from https://www2.deloitte.com/content/dam/Deloitte/global/Documents/About-Deloitte/gx-2018-millennial-survey-report.pdf.

Magnis sit, qui ut volo qui nimoluptat ad molupta taecus asped expliquo mo volorest, aute ni num earibus

[125] Dawne Hickton, personal communication, November 2019. Michelle Pharand, ITA Women in Titanium committee member, personal communication, November 2019.

[126] Lisa Kreinces, IAPD Women in Plastics committee member, personal communication, September 2019. Jinny Kcehowski, IAPD Women in Plastics committee chair, communication, September 2019.

[127] Catalyst. 18, August 23). Quick Take: Women in Male-Dominated Industries and Occupations. Retrieved from https://www.catalyst.org/research/women-in-male-dominated-industries-and-occupations/.

[128] World Economic Forum. (2019). *Global Gender Gap Report 2020*. Retrieved from http://www3.weforum.org/docs/WEF_GGGR_2020.pdf.

[129] Carnstone Partners LLP. (2018). *The Gender Pay Gap: An Initial Review of the FTSE 100 and 250.* Retrieved from https://carnstone.com/insight?insight=79.

[130] Parker, K. (2018, March 7). Women in majority-male workplaces report higher rates of gender discrimination. Pew Research Center. Retrieved from https://www.pewresearch.org/fact-tank/2018/03/07/women-in-majority-male-workplaces-report-higher-rates-of-gender-discrimination/.

[131] World Policy Analysis Center. (2017). Preventing Gender-Based Workplace Discrimination and Sexual Harassment: New Data on 193 Countries. Retrieved from https://www.worldpolicycenter.org/sites/default/files/WORLD%20Discrimination%20at%20Work%20Report.pdf.

[132] Equileap. (2019). 2019 Gender Equality Global Ranking. Retrieved from https://equileap.org/2019-global-report/.

[133] ICRW. (2018). The Costs of Sex-Based Harassment to Businesses: An In-Depth Look at the Workplace. Washington, D.C. Retrieved from https://www.icrw.org/wp-content/uploads/2018/08/ICRW_SBHDonorBrief_v4_WebReady.pdf

[134] Shaw, E., Hegewisch, A., Hess, C. (2018, October 15). Sexual Harassment and Assault at Work: Understanding the Costs. Institute for Women's Policy Research. Retrieved from https://iwpr.org/publications/sexual-harassment-work-cost/.

[135] OECD. (2014, June 03). *Balancing Paid Work, Unpaid Work, and Leisure*. Retrieved from http://www.oecd.org/gender/data/balancingpaidworkunpaidworkandleisure.htm.

[136] Ibid.

[137] Fouad, N.A., Chang, W.H., Wan, M., & Singh, R. (2017). Women's Reasons for Leaving the Engineering Field. Frontiers in Psychology, 8, 875. doi:10.3389/fpsyg.2017.00875.

[138] The Job Share Project. (2011). Job Sharing at Senior Level: Making It Work. Retrieved from https://www.thejobshareproject.com/3434hjkv97fgb378fbv/jobsharefullreport.pdf.

[139] ILO. (2012, November 23). Maternity protection: Not just a personal

issue. Retrieved from https://www.ilo.org/global/about-the-ilo/newsroom/features/WCMS_193975/lang--en/index.htm

[140] ILO. Maternity Protection Resource Package. Retrieved from http://mprp.itcilo.org/pages/en/index.html

[141] ILO. (2015). *Women in Business and Management: Gaining Momentum, Global Report*. Retrieved from https://www.ilo.org/wcmsp5/groups/public/---dgreports/---dcomm/---publ/documents/publication/wcms_316450.pdf.

[142] Accenture. (2016). *Tech Experience: Women's stepping stone to the corporate boardroom?* Retrieved from https://www.accenture.com/us-en/company-boardroom-tech-experience-2016

[143] Ibid.

[144] Justina Sanchez, personal communication, September 2019.

[145] Huang, G. (2017, November 13). 90 percent of Fortune 500 companies already have a solution to gender equality but aren't utilizing it. Forbes. Retrieved from https://www.forbes.com/sites/georgenehuang/2017/11/13/90-of-fortune-500-companies-already-have-a-solution-to-gender-equality-but-arent-utilizing-it/#61b9b4f1c34c

[146] Gewin, V. (2018, December 20). Women can benefit from female-led networks. *Nature*. Retrieved from https://www.nature.com/articles/d41586-018-07878-w

[147] Greguletz, E., Diehl, M.-R., & Kreutzer, K. (2018). Why women build less effective networks than men: The role of structural exclusion and personal hesitation. *Human Relations*, 72(7), 1234–61. doi: 10.1177/0018726718804303

[148] For example, International Women in Mining's International Women in Resources Mentoring Programme (IWRMP), Women in STEM Mentorship Program, Pink Petro's Lean in Energy: Global Mentoring, Women in Energy Mentorship Program.

[149] Jinny Kcehowski, chair of Women in Plastics Committee, personal communication, September 2019.

[150] Sita Sonty, personal communication, September 2019.

[151] Deborah Brenner, personal communication, September 2019.

[152] International Women in Mining (n.d.) IWiMSpeakUp. Retrieved from https://internationalwim.org/projects/speakers/

[153] The Manufacturing Institute. (2018, April 11). 130 Women receive Manufacturing Institute's STEP Ahead Award. http://www.themanufacturinginstitute.org/News-Articles/2018/04/11-STEP-Ahead-Awards.aspx

[154] Viki, T. (2018). Why Large Companies Continue to Struggle with Innovation. *Forbes*. Retrieved from https://www.forbes.com/sites/tendayiviki/2018/11/04/why-large-companies-continue-to-struggle-with-innovation/#394ff92c67b4

[155] Wessel, M. (2012). Why Big Companies Can't Innovate. *Harvard Business Review.* Retrieved from https://hbr.org/2012/09/why-big-companies-cant-innovate

[156] Lassébie, J., Sakha, S., Kozluk, T., Menon, C., Breschi, S., & Johnstone, N. (2019). Levelling the playing field: Dissecting the gender gap in the funding of start-ups. *OECD Science, Technology and Industry Policy Papers*, 73. https://doi.org/10.1787/7ddddd07-en

[157] Bruhn, M., Hommes, M., Khanna, M., Singh, S., Sorokina, A., & Wimpey, J.S. (2017). *MSME finance gap: Assessment of the shortfalls and opportunities in financing micro, small and medium enterprises in emerging markets*. Washington, D.C.: World Bank Group.

[158] Lassébie, J., Sakha, S., Kozluk, T., Menon, C., Breschi, S., & Johnstone, N. (2019). Levelling the playing field: Dissecting the gender gap in the funding of start-ups. *OECD Science, Technology and Industry Policy Papers*, 73. https://doi.org/10.1787/7ddddd07-en

[159] Mascarenhas, N. & Teare, G. (2019). *Q3 2019 Diversity Report: Over $20B Invested In Female-Founded, Co-Founded Startups This Year Alone*. Crunchbase News. Retrieved from https://news.crunchbase.com/news/q3-2019-diversity-report-over-20b-invested-in-female-founded-co-founded-startups-this-year-alone/

[160] Rowe, P. (2016, May 4). Venture offers craft breweries an alternative to 'selling out to Big Beer.' *Los Angeles Times*. Retrieved from https://www.latimes.com/business/la-fi-0504-truecraft-20160504-story.html

[161] Megan Bell, owner and winemaker at Margins Wines, personal communication, October, 2019.

[162] Miranda-Wolff, A. (2018, March 15). Illinois serves as an example of how women can thrive as venture capitalists in the Midwest. *Venture Beat*. Retrieved from https://venturebeat.com/2018/03/15/illinois-serves-as-an-example-of-how-women-can-thrive-as-venture-capitalists/

[163] International Finance Corporation, Oliver Wyman, & RockCreek. (2019). *Moving Toward Gender Balance in Private Equity and Venture Capital*. Washington, D.C.: International Finance Corporation. Retrieved from https://www.ifc.org/wps/wcm/connect/topics_ext_content/ifc_external_corporate_site/gender+at+ifc/resources/gender-balance-in-emerging-markets

[164] Lassébie, J., Sakha, S., Kozluk, T., Menon, C., Breschi, S., & Johnstone, N. (2019). Levelling the playing field: Dissecting the gender gap in the funding of start-ups. OECD Science, Technology and Industry Policy Papers, 73. https://doi.org/10.1787/7ddddd07-en

[165] Innovate UK (2019, March 8). Women in Innovation: 9 female-led businesses backed. Retrieved from https://www.gov.uk/government/news/women-in-innovation-9-female-led-businesses-backed.

[166] BCG Research showed that investments in companies founded or cofounded by women averaged $935,000, which is less than half the average $2.1 million invested in companies founded by male entrepreneurs. Despite this disparity, startups founded and cofounded by women actually performed better over time, generating 10 percent more in cumulative revenue over a five-year period: $730,000, compared with $662,000. Abouzahr, K., Brooks Taplett, F., Krentz, M., & Harthorne, J. (2018). *Why Women-owned startups are a better bet.* Boston Consulting Group. Retrieved from https://www.bcg.com/en-us/publications/2018/why-women-owned-startups-are-better-bet.aspx

[167] Biegel, S., Hunt, S.M., & Kuhlman, S. (2019) *Project Sage 2.0: Tracking Venture Capital with a Gender Lens.* University of Pennsylvania's Wharton Social Impact Initiative. Retrieved from https://socialimpact.wharton.upenn.edu/research-reports/reports-2/project-sage-2/

[168] Criterion Institute. (n.d.). *Framing gender lens Investing*. Retrieved from https://criterioninstitute.org/resources/document-framing-gender-lens-investing

[169] Cambridge Associates. (2018, September). *Gender Lens Investing: Impact Opportunities Through Gender Equity*. Retrieved from https://www.cambridgeassociates.com/research/gender-lens-investing-impact-opportunities-through-gender-equity/

[170] Morgan Stanley (2017, January 17) An Investor's Guide to Gender Diversity. Retrieved from https://www.morganstanley.com/ideas/gender-diversity-investor-guide

[171] Price, D. (2018, October 30). Total assets in public and private gender-lens products double to $4.65 billion. *Impact Alpha*. Retrieved from https://impactalpha.com/total-assets-in-public-and-private-gender-lens-products-double-to-4-65-billion/

[172] 2X Challenge Financing for Women (2018). Retrieved from https://www.2xchallenge.org/

[173] 2X Challenge Financing for Women (2018, October 19). 2X Challenge: Background Document to Criteria and Governance Framework. Retrieved from https://static1.squarespace.com/static/5b180402c3c16a6fe0001e45/t/5bf3d4f30e2e72ecbbc48080/1542706423894/2X+Challenge+Background+Materials+to+Criteria+%2820+November+2018%29.pdf

[174] Boden, R.J., Jr., & Nucci, A.R. (2000) On the survival prospects of men's and women's new business ventures. *Journal of Business Venturing*, Vol. 15(4), 347—62. https://doi.org/10.1016/S0883-9026(98)00004-4

[175] Halabisky, D. (2017). Policy Brief on Women's Entrepreneurship. *OECD SME and Entrepreneurship Papers*, No. 8. https://doi.org/10.1787/dd2d79e7-en

[176] Ernst Young. (2013). It's who you know: Women entrepreneurs and the impact of networks. Retrieved from https://www.ey.com/Publication/vwLUAssets/EY_Its_who_you_know_Women_entrepreneurs_and_the_impact_of_networks/$FILE/EY-Its-who-you-know-Women-entrepreneurs.pdf

[177] Halabisky, D. (2017). Policy Brief on Women's Entrepreneurship. *OECD SME and Entrepreneurship Papers*, No. 8. https://doi.org/10.1787/dd2d79e7-en

[178] Business Develop Services can be defined as "services that improve the performance of the enterprise, its access to markets, and its ability to compete. The definition of 'business development service' … includes an array of business services [such as training, consultancy, marketing, information, technology development and transfer, business linkage promotion, etc.], both strategic [medium to long term issues that improve performance] and operational [day-to-day issues]. BDS are designed to serve individual businesses, as opposed to the larger business community." Pinto, R. (2004). Business Development Services: How to Guide. Bratislava Regional Centre: United Nations Development Programme. Retrieved from http://www.pintoconsulting.de/Images/pdf/10_business_dev_services_2004.pdf

[179] Halabisky, D. (2017). Policy Brief on Women's Entrepreneurship. *OECD SME and Entrepreneurship Papers*, No. 8. https://doi.org/10.1787/dd2d79e7-en

[180] OECD. (2018, March). Women-dedicated business incubators and accelerators can stimulate growth intentions and support high potential female entrepreneurs. Retrieved from https://www.oecd.org/gender/data/women-dedicated-business-incubators-and-accelerators-can-stimulate-growth-intentions-and-support-high-potential-female-entrepreneurs.htm

[181] Halabisky, D. (2017). *Policy Brief on Women's Entrepreneurship*. OECD SME and Entrepreneurship Papers, No. 8. https://doi.org/10.1787/dd2d79e7-en

[182] Women on the Move (n.d.) About us. Retrieved from https://womenonthemove.club/about/

[183] Heather Gamble, personal communication, October, 2019.

[184] Riggin, J. The Potential Impact of CEDAW Ratification on U.S. Employment Discrimination Law: Lessons From Canada. *Columbia Human Rights Law Review,* vol. 42 (2), (2011), 541–611. Retrieved from http://www.corteidh.or.cr/tablas/r26395.pdf

[185] World Policy Analysis Center. (2017). *Preventing Gender-Based Workplace Discrimination and Sexual Harassment: New Data on 193 Countries*. Retrieved from https://www.worldpolicycenter.org/sites/default/files/WORLD%20Discrimination%20at%20Work%20Report.pdf.

[186] ILO. Ratifications of C183 - Maternity Protection Convention, 2000 (No. 183). Retrieved from https://www.ilo.org/dyn/normlex/en/f?p=1000:11300:0::NO:11300:P11300_INSTRUMENT_ID:312328

[187] Metrics include the mean and median pay gap in both hourly pay and bonus and proportion of men and women in each pay quartile.

[188] Legislation.gov.uk. (2017). The Equality Act 2010 (Gender Pay Gap Information) Regulations 2017. Retrieved from https://www.legislation.gov.uk/ukdsi/2017/9780111152010.

[189] Wood, J. (2019, December 20). What is a gender parity accelerator, and how does it work? *World Economic Forum*. Retrieved from https://www.weforum.org/agenda/2019/12/closing-gender-gap-accelerator/

[190] Collins, F.S. (2019, June 12). Time to End the Manel Tradition. National Institutes of Health. Retrieved from https://www.nih.gov/about-nih/who-we-are/nih-director/statements/time-end-manel-tradition.

[191] David, J. (2017, August 2). techUK Makes Commitment to Abolish "Manels." techUK. Retrieved from https://www.techuk.org/insights/news/item/11151-techuk-makes-commitment-to-abolish-manels.

[192] Keefe, J. (2018, January 22). #MeToo, "Time's Up" and Gender Lens Investing. PaxWorld. Retrieved from https://paxworld.com/metoo-times-up-and-gender-lens-investing/

[193] The World Economic Forum, among others, have called for new research on the financial cost of sexual harassment to companies due to the fact that the most comprehensive study was completed in 1988. World Economic Forum. (2017). *Why We Need to Calculate the Economic Costs of Sexual Harassment.* Retrieved from https://www.weforum.org/agenda/2017/10/why-we-need-to-calculate-the-economic-costs-of-sexual-harassment/).

Appendix II: Methodology Note

The Women as Levers of Change report was built on a six-month, in-depth study conducted by FP Analytics (FPA) in 2019 and focused on fourteen industries.[1] The industries were selected based on three common criteria: 1) they have among the lowest percentages of women in their workforce; 2) they all have significant environmental, social, and health impacts; and 3) they are also under growing pressure for product and business model innovation as well as legal compliance.[2] The study included original quantitative and qualitative research. The methodology is explained as below.

I. QUANTITATIVE RESEARCH

The quantitative analysis incorporated data from over 2,300[3] publicly listed companies in the selected industries, which are located around the world,[4] spanning the period from 2013 through 2018. The data were retrieved from Bloomberg in May of 2019 and focused on two sets of metrics:

- Gender-diversity metrics, including the percentages of women employed by companies, on boards, and in executive management; and

- Corporate-performance metrics, including earnings before interest and taxes (EBIT) margin, environmental, social, and governance (ESG) performance rating,[5] ESG disclosure scores,[6] and other environmental metrics, such as energy intensity,[7] greenhouse gas (GHG) emissions intensity,[8] and water intensity.[9]

Building on the company-level data, FPA assessed the state of gender inequality of specific industries and its change over time and examined the relationship between individual gender-diversity metrics and corporate-performance metrics through regression analysis. Where a statistically significant, positive correlation exists,[10] FPA further examined its magnitude by:

- Comparing the averages of a corporate-performance metric based on the quartile groups of companies per a gender-diversity metric of interest, with the focus on the top and bottom quartiles;[11] or

- Comparing the percentages of companies (used as an indicator for likelihood) experiencing performance improvement based on whether there is a positive or negative/no change in a gender-diversity metric of interest.

Adding to a growing body of research on the business case for gender diversity, FPA data analysis revealed a positive correlation between women's representation in executive management and corporate profitability, and between women's representation on boards and corporate performance in managing and disclosing ESG-related matters. However, four caveats are worth noting:

- Correlation does not equal causation. For example, the statement of "The top-quartile companies with the highest percentage of women in executive management are, on average, 47 percentage more profitable than those in the bottom quarter" is not intended to prove that the relationship is causal or that having a higher percentage of women in leadership automatically translates into higher profitability. Rather, it is simply indicating that companies with a higher percentage of women in leadership are, on average, more profitable.

- The data findings do not reveal what drives the identified correlations. While correlation can be clearly identified, causation cannot be conclusively proven without conducting controlled experiments, which are beyond the scope of this study. In complement, FPA found and reported certain factors—such as gender-based attributes—perceived by interviewees to potentially contribute to the correlations; however, the degree to which such factors contribute to or constitute causal links remains to be proven conclusively.

- While the positive correlations between gender diversity and corporate performance are real and statistically significant, the regression analysis showed that women's representation alone generally explains a relatively small proportion of corporate performance, which should not be surprising, particularly for a complex subject like business profitability.

- The regression analysis also revealed that the magnitude of the correlation between gender diversity on boards and corporate ESG-related metrics is affected by company size[12] and

the state of gender equality in the country[13] where a company is headquartered. By controlling these two factors respectively, FPA compared the average of a corporate ESG metric of the top-quartile and bottom-quartile companies based on women's representation on boards and found a generally consistent positive correlation between the gender diversity and ESG metrics. However, there was one outlier: for companies headquartered in countries where the state of gender equality is below the global median,[14] the percentage of women on boards is either negatively correlated[15] with the transparency in companies' disclosure of ESG information or shows a positive, but statistically insignificant, correlation with companies' ESG performance. The implications of this outlier warrant additional research, which is beyond the scope of this study.

II. QUALITATIVE RESEARCH

The qualitative research primarily consisted of in-depth, one-on-one interviews, followed by a survey sent to all interviewees and contacts, with the goals of:

- Gaining insights from women in the selected industries regarding how they perceive their role driving innovation and industrial transformation, where they see opportunities and challenges, and the means by which their respective companies and industries can further unleash women's potential as change-makers; and

- Identifying and studying successful cases and nascent initiatives in specific industries and companies to showcase how women are transforming businesses or advancing gender equality and pinpointing best practices to promote gender diversity and empower women.

Interviews were primarily focused on women in the selected industries. Interviewees were identified based on: the recommendations of national and international industry associations and women's organizations, which connected FPA to their female members, as well as to staff and board members; literature review and data analysis, which surfaced female industry leaders, innovators, and entrepreneurs; and word-of-mouth recommendations from interviewees themselves, who were an invaluable resource in connecting FPA to female colleagues, mentors, and role models.

In total, FPA spoke to 159 women working in a diverse range of organizations and occupational types and geographical regions. Based on the common contention by female interviewees that male allies have been vital to their career success, FPA interviewed a small sample of twelve men who had been either recommended by female interviewees as mentors and sponsors or identified as men leading innovative practices with the aim of increasing gender diversity in their industry.

The information gathered in the interviews informed the narrative of the overall report and was complemented by FPA's quantitative research as well as the existing literature on this subject. Findings from the interviews were highlighted as examples of women's positive impact on male-dominated legacy industries and of organizational best practices and guided the development of recommendations for the range of stakeholder groups. □

[1] The fourteen industries include: oil and gas; coal; aerospace and defense; construction and engineering; paper and forest products; chemicals; alcohol; tobacco; electric and gas utilities; water utilities; environmental services; metals and mining; construction materials; and containers and packaging.

[2] The selected legacy industries were benchmarked against other industries across the consumer discretionary, industrials (excluding aerospace and defense, construction and engineering, and environmental services), health care, finance, information technology, communication services, and real estate sectors.

[3] The sample size varies by analyzed issues due to limited data availability of certain metrics, such as women's percentage in management and environmental, social, and governance (ESG) ratings.

[4] Companies were categorized based on the Global Industry Classification Standard.

[5] Provided by Sustainalytics (a data provider and research firm focused on ESG) and measuring a company's percentile rank (on the scale of 0 to 100) based on its ESG performance score relative to its industry peers.

[6] Measured by Bloomberg ESG Disclosure Score, which rates companies on a scale of 0.1 to 100 based on the amount of ESG data a company reports publicly that is relevant to its industry.

[7] Measured as the ratio of megawatt hours of energy a company consumed to its sales revenue in a given period.

[8] Measured as the ratio of metric tonnes of GHG a company emitted to its sales revenue in a given period.

[9] Measured as the ratio of cubic meters of water a company consumed to its sales revenue in a given period.

[10] A correlation is considered as statistically significant with a p-value < 0.05 unless otherwise noted.

[11] The quartiles were divided based on gender-diversity metrics within a sample. Because the sample size varies by metric, the number of observations of each quartile also varies by metric. FPA calculated and compared the means of a corporate-performance metric of companies in the top 25 percent versus those in the bottom 25 percent. A two-sample, one-tail t-test using unequal variance was further applied to assess the statistical significance in the difference between the means, and only those that were statistically significant were reported.

[12] Measured by total asset values in U.S. dollars.

[13] Based on a country's gender-equality score rated by the World Economic Forum's *2018 Global Gender Gap Report*.

[14] Countries that were ranked in the third quartile and fourth (bottom) quartile in the World Economic Forum's 2018 Global Gender Gap Report.

[15] P-value < 0.1.

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https://foreignpolicy.com/fp-analytics/