

Gender Diversity and Climate Innovation

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BloombergNEF

SPF SASAKAWA
PEACE
FOUNDATION

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Section 1. Executive summary

30%

Share of women required on the board of directors to reach a critical mass

16%

Share of companies with more than 30% female directors on the board

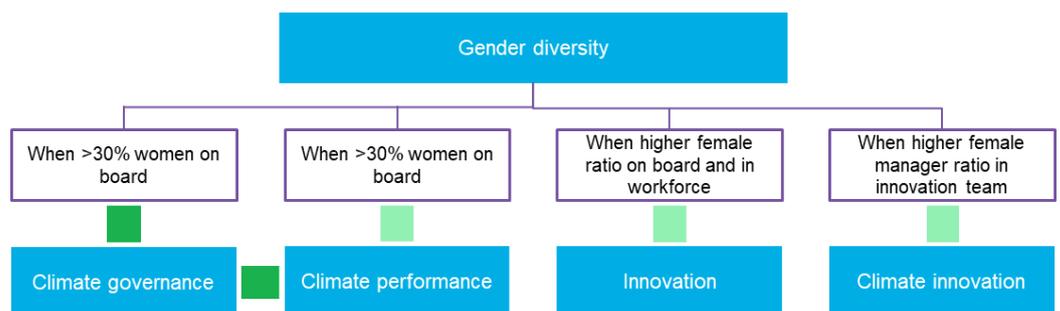
31%

Average share of women on the board at companies that became TCFD supporters in 2017

Gender diversity is now recognized as an important element in corporate strategy. While the share of female leaders in the global corporate boardroom is increasing, the relationship between gender diversity, climate performance and innovation has not been widely discussed. This analysis, of more than 11,700 companies, points to a correlation between the presence of a critical mass of women on the board, and climate governance and innovation.

- **Women on the board:** The proportion of companies with more than 30% women on the board of directors has risen eightfold in just over a decade, from 2% in 2009 to 16% today.
- **Early adopters** of the recommendations of the Task Force on Climate-related Financial Disclosures (TCFD) show higher gender diversity, and greater transparency on climate-related data, than peers. International initiatives are expected to play a prominent role in climate governance and strategies in the near term and in cutting emissions in the long term.
- **Legislation and reporting** requirements accelerate disclosure on gender diversity and climate change. European countries have made significant progress in introducing legislated targets on female representation on corporate boards and voluntary initiatives since 2011, while Asian nations are lagging on diversity disclosure and performance.
- Leading integrated **oil companies** that have strategies for decarbonization and digitalization tend also to have higher female board representation. Gender diversity in that sector, however, does not directly contribute to lowering emissions and expanding digitalization.
- **Public corporate commitments** to shared gender diversity benchmarks allow companies to benchmark to global peers. Companies may consider setting **longer-term diversity goals** in the same fashion that they set goals for financial performance and climate.
- Increased and **standardized disclosure** of gender diversity will enable companies and financial markets to better assess the linkages between diversity and business performance. Data and benchmarks will also allow markets to back-test the relationships between the two.
- (On December 11, BNEF made a number of corrections to this report, to clarify that the research found correlation – but not causation – between diversity and climate performance.)

Figure 1: Correlation between gender diversity and climate innovation



Source: BloombergNEF. Note: Dark green = positive correlation, light green = somewhat positive.

Section 2. Background – why gender and climate

Corporations and investors from across the world are stepping up their efforts to tackle climate change and lead the way to a greener future. We see more and more signals of their transition intentions, from investors signing up for Task Force on Climate-related Financial Disclosures (TCFD) recommendations, to corporations committing to the Science Based Targets Initiative.

Businesses, large and small, are innovating in clean energy, carbon capture technologies and circular economy adoption. Meanwhile, most businesses have failed to deploy the full potential of human capital by failing to embrace gender diversity. Women are listed in less than 11% of patent applications related to the energy sector, while 25% is the average ratio of female employees in the workforce of energy companies.

A gender-diverse workforce can be expected to bring more experiences, knowledge, and skills to the table. As diverse teams consider issues from multiple perspectives, they may emerge with solutions that more stakeholders in society find acceptable. Gender diversity in the workforce may have a link to companies’ innovative efforts toward the clean energy transition and the implementation of strategies for timely climate action. In this report, we study the state of gender diversity among listed companies across the world, and its correlation to climate action and innovation.

The first three sections of this report are the results of quantitative analysis on 1) gender and climate governance, 2) gender and climate performance and 3) gender and innovation. The last section is a case study on four leading companies on 4) gender diversity and climate innovation.

Figure 2 shows the view of the private foundation collaborated on this report that there is a causal link between diversity and climate performance. This report itself, however, concentrates on correlation, not causation.

Figure 2: Sasakawa Peace Foundation’s view of the gender-climate link



Source: *The Sasakawa Peace Foundation*

Section 3. Gender and climate

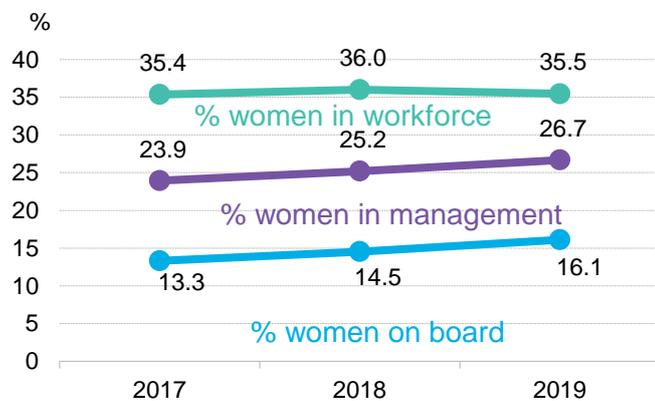
Climate change and gender diversity are counted as key responsibilities that the board of directors can take on and monitor within any organization. However, the extent to which firms take on such responsibility depends on their governance practices, among other considerations.

This section analyzes the relationship between gender and climate governance and performance by looking at disclosed data by companies.

3.1. Gender diversity – status of the market

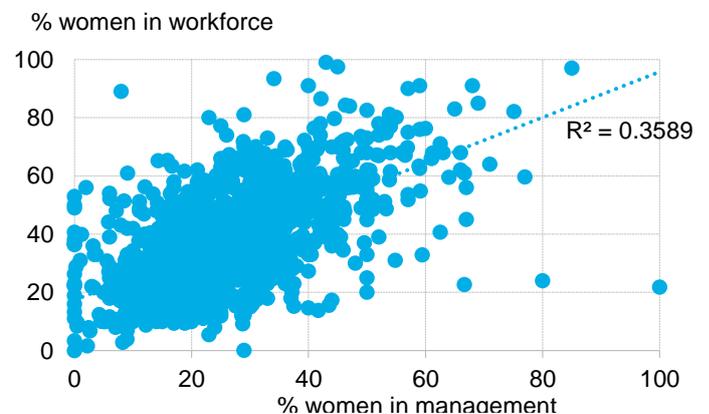
Gender diversity at 11,700 companies covered in this research (see A.1 for data coverage) has improved in the past three years. In particular, the female ratio on boards of directors increased by 2.8 percentage points to 16.1% in 2017-2019 (Figure 3). However, higher female representation on the board is not correlated with other diversity metrics such as the share of female managers and employees. Instead, gender diversity at management level strongly correlates with female employee rates (Figure 4). It is possible that gender-diverse companies with more female leaders in management positions creates diverse teams and brings in diverse opinion in discussions, which may end up helping to retain more female employees.

Figure 3: Average ratio of gender diversity at companies



Source: Bloomberg Terminal

Figure 4: Correlation between % women in management and % women in workforce



Source: Bloomberg Terminal. Note: sample size = 1134 companies with disclosure on % women on board, % women in management, % women in workforce.

Gender diversity policy

It is important to note that country's gender-related policies may heavily influence the gender diversity performance of companies. European countries have made significant progress in introducing legislated targets as well as voluntary initiatives and quotas on female representation on the corporate board since 2011. Among European Union member countries, 11 have introduced different types of laws, namely Belgium, France, Italy, the Netherlands, Spain, Portugal, Denmark, Finland, Greece, Austria and Slovenia. Companies headquartered in these

countries or with business operations there have tended to maintain relatively high levels on gender diversity on the board.

Table 1: Top 5 countries for women on board, in management, in workforce (2019)

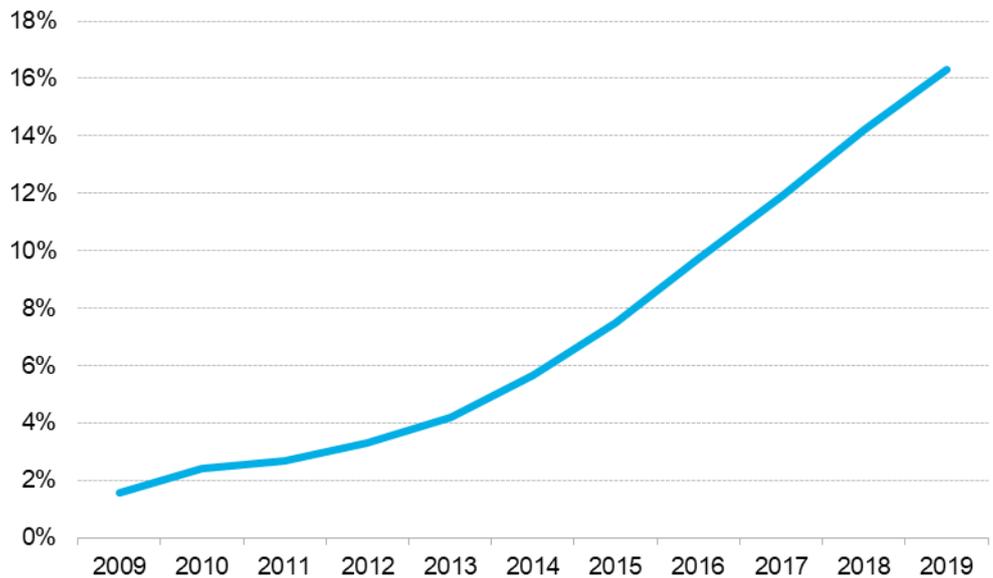
Ranking	% women on board (data in 2010)	% women in management (data in 2010)	% women in workforce (data in 2010)
1	France, 44.1% (12.7%)	Philippines, 50.0% (10%)	Israel, 53.7% (15.2%)
2	Norway, 38.3% (35.9%)	Israel, 46.0% (15.2%)	Philippines, 49.5% (10.0%)
3	Sweden, 35.5% (23.3%)	Nigeria, 32.0% (9.6%)	Poland, 43.9% (11.3%)
4	Italy, 35.0% (4.1%)	Malaysia, 31.9% (6.1%)	Thailand, 43.8% (9.9%)
5	Belgium, 34.2% (10.1%)	New Zealand, 31.6% (11.5%)	South Africa, 43.6% (14.7%)

Source: Bloomberg Terminal. Note: countries that had less than 10 companies in the coverage were excluded in this table. Green represents increase of more than 30 percentage points.

Voluntary initiatives such as the 30% Club seem to be having an influence in leading companies to make gender diversity a high priority for business strategy. The 30% Club was launched in 2010, aiming to increase gender diversity at board and senior management levels in 13 locations globally, including the U.K., the U.S., Australia, Hong Kong, Japan and the Middle East and North Africa. While the level of activity differs by location, the club has said that it believes 30% represents a critical mass for enabling minority groups to impact boardroom dynamics.

The combination of legislation, voluntary policy, quotas and initiatives like the 30% Club has pushed up the share of companies with more than 30% female members on the board. This proportion reached 16% in 2019, from less than 2% in 2009.

Figure 5: Share of companies with higher than 30% women on board



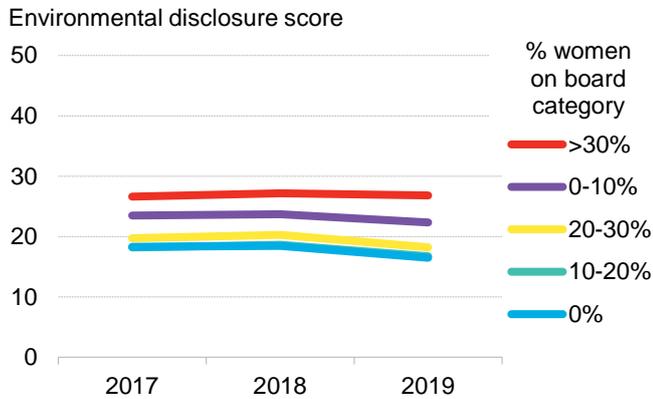
Source: Bloomberg Terminal. Note: Sample size is 11,760 companies.

3.2. Gender and climate governance

As the number of companies with more than 30% females on the board is increasing, we examined whether such gender-diverse companies are also better at climate governance. In this study, environmental disclosure scores were used as an indicator to measure the commitment that a company has on disclosing environmental data, including emissions. The more data a company discloses, the higher the environmental disclosure score, and the better the climate governance.

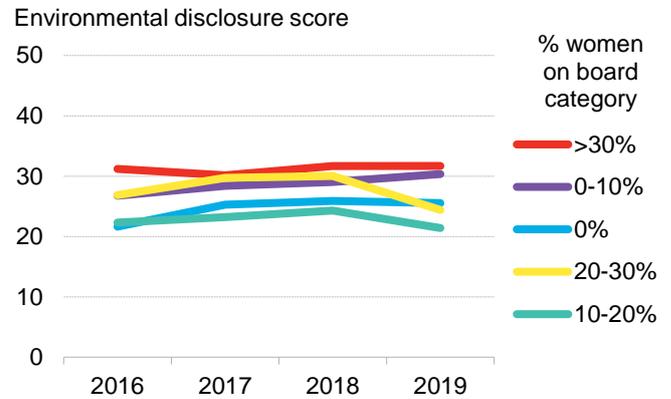
The results suggest that companies with higher than 30% women on board had better climate governance globally in the past four years (Figure 6). This trend has been observed in electric utilities, oil and gas and mining sectors (Figure 7, Figure 8, Figure 9). Other than in the 30%-or-higher category, the correlation differs by sector. Mining is the only sector that showed positive correlation across all the categories, meaning the higher percentage of female representation on a board, the better the environmental disclosure. But, the other two sectors and global average saw the category of 0-10% women on board as the second-highest for environmental disclosure score (Figure 6, Figure 7, Figure 8). This is because the level of disclosure is affected by environmental reporting requirements in local markets and gender diversity policy discussed earlier.

Figure 6: Global average: environmental disclosure score by % women on board category



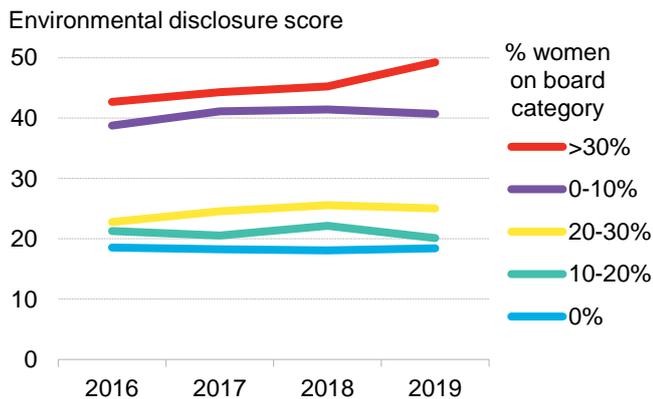
Source: Bloomberg Terminal Note: 10-20% is very close to 0%

Figure 7: Electric utilities: environmental disclosure score by % women on board category



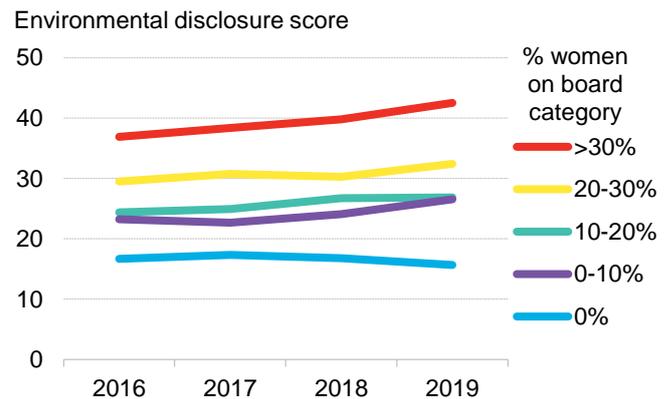
Source: Bloomberg Terminal

Figure 8: Oil and gas: environmental disclosure score by % women on board category



Source: Bloomberg Terminal

Figure 9: Mining sector: environmental disclosure score by % women on board category



Source: Bloomberg Terminal

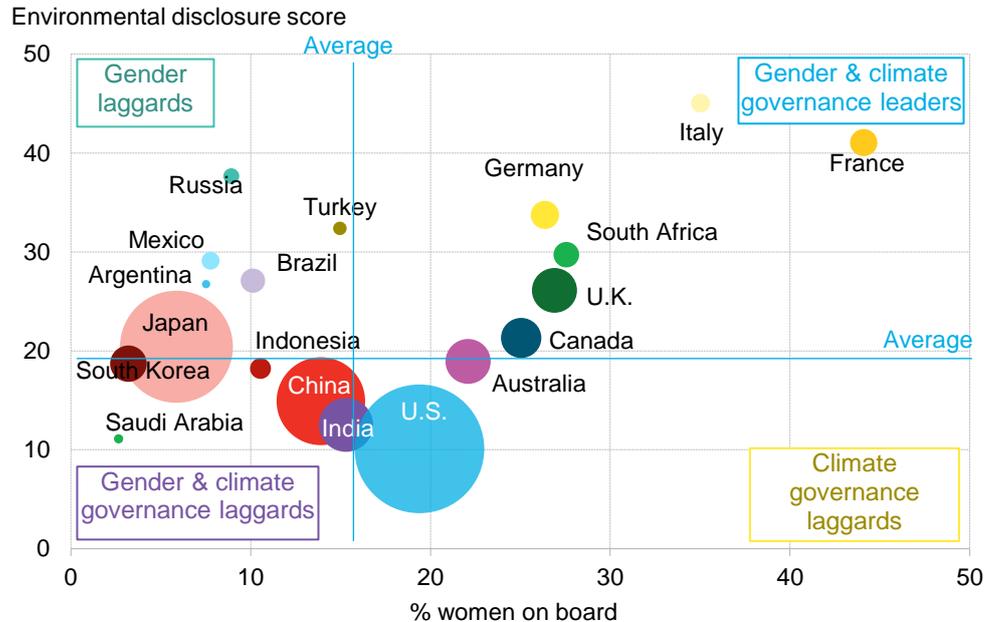
Climate governance drivers

We identified three influences on environmental reporting and data transparency, namely country policy, shareholder pressure and international initiatives.

- Some jurisdictions set stricter environmental disclosure guidelines and regulations than others. For example, France has had legislation since 2013 on additional reporting beyond finance, for all companies with over 500 employees. Globally, 24 stock exchanges require sustainability reporting for listed companies, including Hong Kong, India, France, and South Africa, while 55 stock exchanges have issued voluntary guidelines. Environment ministries in countries like Japan have set reporting guidelines on greenhouse gas emissions and energy consumption. In markets like Japan and South Korea, there is a lack of strict gender diversity policy but relatively robust environmental reporting guidelines. This affects the overall results of the relationship between gender diversity and environmental disclosure, just like in electric utilities and the oil and gas sector (Figure 10). The average percentage of women on boards for Japan is 5.9%, while the country's average environmental disclosure score is 20.4. Japan

accounts for 19% of the total universe of over 2,200 companies covered in this analysis. A similar mix of high environmental score and very low share of women on board was seen in Argentina, Chile, Mexico and Russia, among G20 countries.

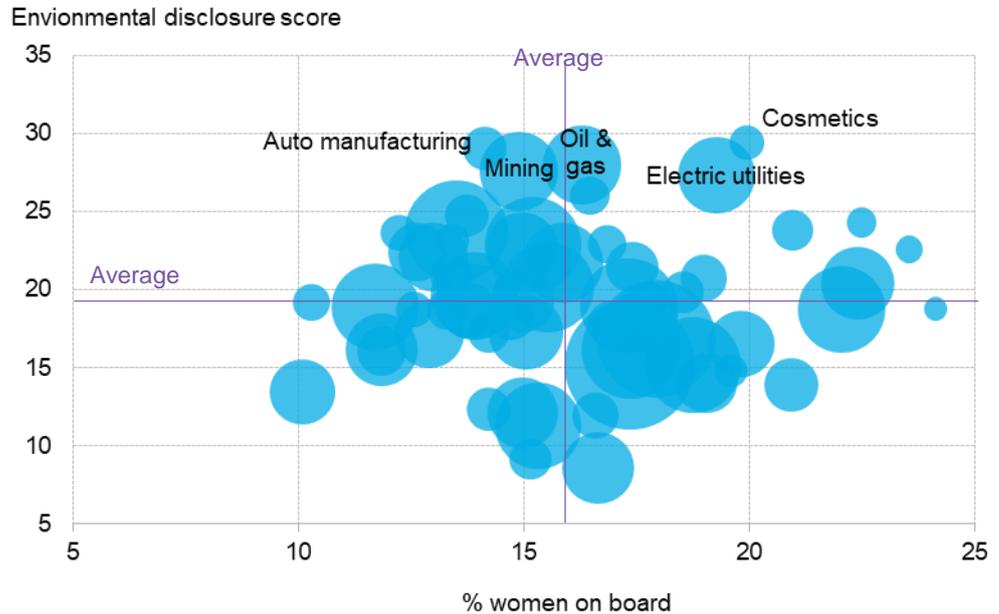
Figure 10: Average environmental disclosure and % women on board by G20 country



Source: Bloomberg Terminal. Note: bubble size = number of companies, sample size for G20 countries = 9014, Country environmental scores and % women on board are average of companies based in a given country. **Gender and climate governance leaders:** France, Italy, Germany, South Africa, U.K., Canada, Australia **Climate governance laggards:** U.S. **Gender laggards:** Russia, Turkey, Mexico, Brazil, Japan, Argentina **Gender and climate governance laggards:** China, India, South Korea, Indonesia, Saudi Arabia

- Another factor could be stakeholder pressure – from investors, NGOs, consumers and local communities – on companies in sectors with larger environmental impact. This has been fueling a trend toward transparency of climate change activities and related data for companies in oil and gas, mining and electric utilities. Consumer-facing sectors such as cosmetics and auto manufacturers also tend to have good environmental disclosure. Five sectors (oil and gas, mining, electric utility, cosmetics and auto manufacturing) have the highest environmental disclosure scores (Figure 11).

Figure 11: Top 5 sectors on environmental disclosure and diversity at board level



Source: Bloomberg Terminal, Note: bubble size = number of companies. Sample size = 10,875

- International initiatives such as TCFD, Climate Action 100+ and science-based targets (SBTs) have been associated with improved environmental disclosure for member companies and member candidate companies. The average environmental disclosure score for TCFD supporters since 2017 has been 46, while that of latest joiners was 40, up from 37 in 2017 (Figure 12). Early TCFD adopters also showed greater gender diversity on their boards. The average share of female members on the board was 31% for companies that became TCFD supporters in 2017, compared to 16% for non-adopters (Figure 13). Academic studies¹ suggest that companies that have a critical mass of three or more female directors and where women participate in board committees, have superior levels of climate-related disclosures.

Figure 12: TCFD supporters and climate governance

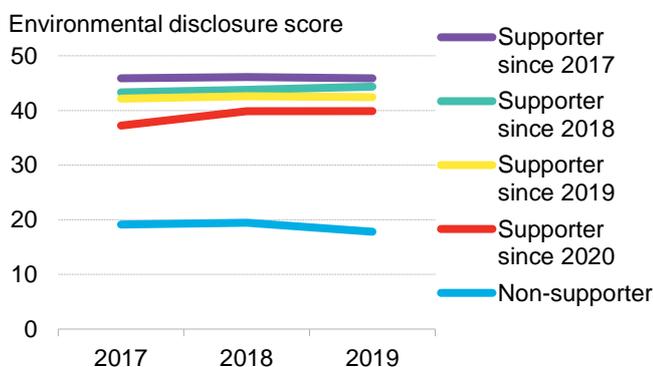
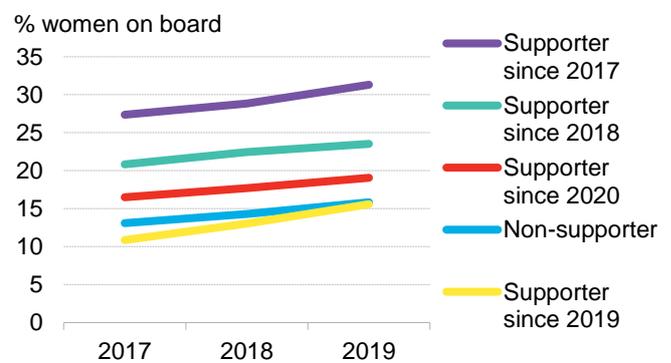


Figure 13: TCFD supporters and % women on board



¹ Gender Diversity on Boards and Firm's Environmental Policy, Board Gender Diversity and Corporate Response to Sustainability Initiatives: Evidence from the Carbon Disclosure Project, Do women on Board Influence Climate Change Disclosure to CDP? – Evidence from Large Indian Companies.

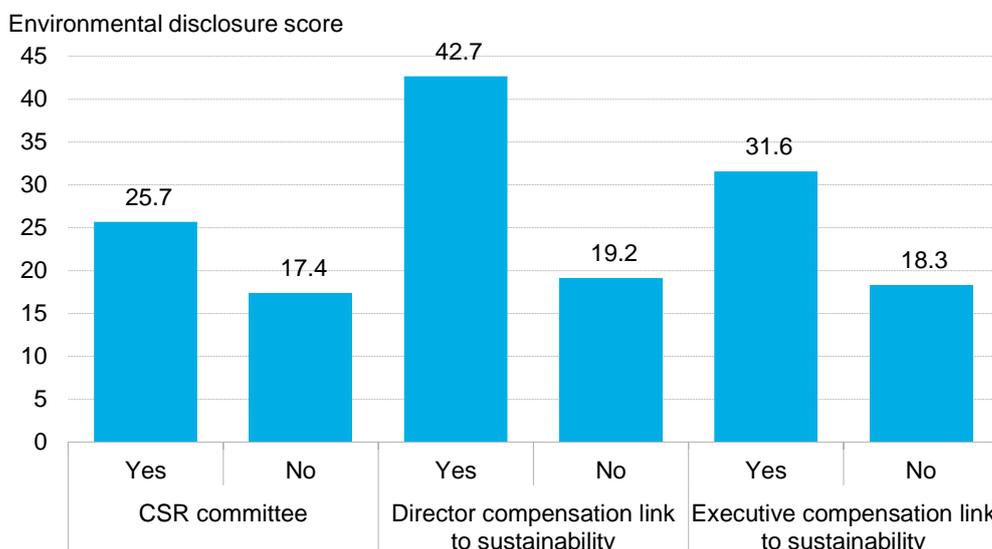
Source: TCFD, BloombergNEF, Bloomberg Terminal

Source: TCFD, BloombergNEF, Bloomberg Terminal

The level of involvement by the board of directors in climate governance is key in managing climate risk and opportunities. When the board of directors governs environmental reporting directly, such as by setting a sustainability committee that can directly report to it, environmental disclosure is higher than for companies without such an arrangement (Figure 14).

Climate governance is much more robust when the board of directors or executive compensation links to sustainability goals. Compensation is a clear driver for the board to get involved in sustainability activities and make progress toward the goals. Currently, more than 700 companies have set directors' compensation linking to sustainability goals, and some of them have higher environmental disclosure scores than companies without (Figure 14).

Figure 14: Environmental disclosure score by different sustainability governance structure



Source: Bloomberg Terminal. Note: CSR is corporate social responsibility.

3.3. Gender and climate performance

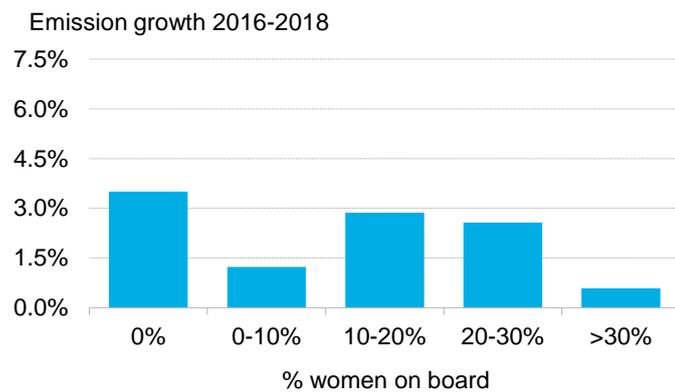
The previous section showed that gender-diverse firms tend to have better environmental reporting and climate governance than their peers. Gender-diverse firms also tend to make more investments in renewable power generation and energy efficiency improvement, according to a study by Haas School of Business, University of California, Berkeley. The study suggested that the presence of more women corporate directors encourages proactive pursuit of sustainable business practices and opportunities.

Board diversity seems to be correlated with reducing emissions, to some extent. Globally, the growth rate of emissions from companies with more than 30% female board members was only 0.6%, compared to 3.5% for the companies without any female board members (Figure 15). As discussed in the previous section, gender-diverse companies tend to have set clear climate governance strategies and disclosed environmental data. Companies with better climate governance could utilize environmental data that is measured, verified and reported in order to

identify emission reduction potential. Climate change governance may be an important stepping stone to lower emissions in the long term.

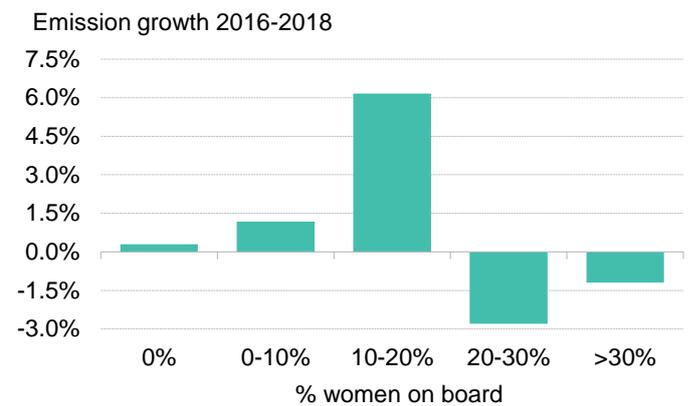
This hypothesis is supported by data from TCFD adopters. Emission reductions by TCFD supporters that have more than 20% women on their boards have been greater than companies with less than 20% women on their boards (Figure 16). And early adopters of TCFD with higher gender diversity on their board have performed better on emissions (Figure 13).

Figure 15: Global average: emission growth and board diversity



Source: Bloomberg Terminal Note: gender data is from FY2017. sample size = 2800

Figure 16: TCFD supporters: emission growth and board diversity



Source: TCFD, Bloomberg Terminal. Note: gender data is from FY2017, sample size = 403

Higher-emitting sectors such as oil and gas companies show limited correlation between emission reduction and board diversity. This is probably because lowering emissions in the oil and gas sector is harder than in others, and the sector's emission reduction data are still limited. Yet, 50 electric utilities that reduced emissions between 2016 and 2018 have relatively high women representation at board level, on average 20.7%. While emission reductions have been slower for the oil and gas sectors compared to electric utilities, major integrated oil companies like Shell and BP with a higher female share on their boards have set aggressive decarbonization targets. It is likely that emission reduction from oil and gas companies is just a matter of more time. The next section discusses the oil and gas sector and its decarbonization strategies more in detail.

Figure 17: Electric utilities: relationship between emission growth and board diversity

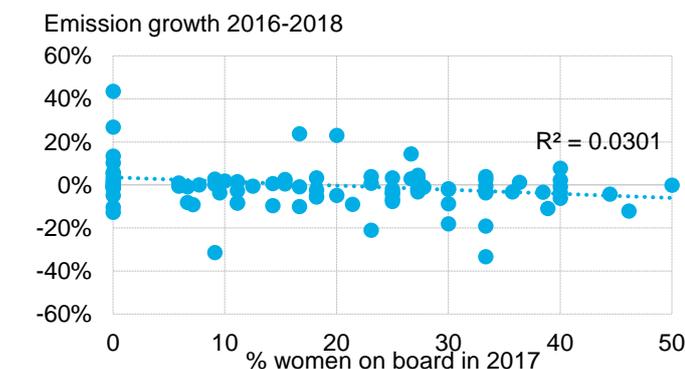
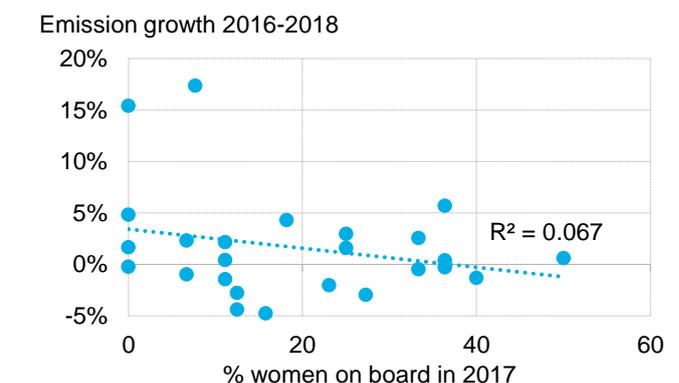


Figure 18: Integrated oil and gas: relationship between emission growth and board diversity



Source: BloombergNEF, Bloomberg Terminal, Note: sample size n=89 Source: BloombergNEF, Bloomberg Terminal, Note: n=25

Oil and gas companies' decarbonization strategies

Oil and gas companies are facing a number of regulatory and commercial challenges that are putting pressure on them to set decarbonization strategies not only for their operations, but also for the products they sell to consumers.

Investor engagement on climate change issues has increased significantly since the 2015 Paris Agreement. Shareholders in Shell, BP, Exxon Mobil, Chevron and Equinor have asked the companies concerned to release more information on their strategies to manage climate risk and set targets for emission reduction and investment in clean energy. Those companies are being pushed to disclose their strategies to deal with the transition risks and environmental impact of their operations and products. Returns on capital in the oil sector have been declining for a number of years. It is therefore prudent for companies to seek out other opportunities, many of which are in low-carbon technologies.

The table below summarizes the low-carbon targets and memberships for selected companies.

Figure 19: Decarbonization-related targets and initiatives for major oil and gas companies

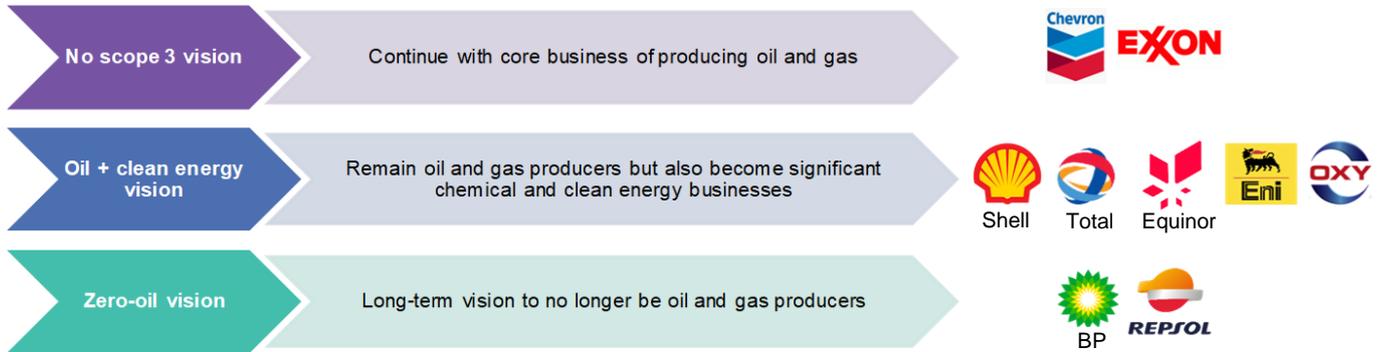
	Shell	BP	Total	Chevron	Exxon	Equinor	Eni	Repsol	OMV	Conoco	Occidental	EOG	CH2I	Suncor	Santos	Woodside	Rozaroff	Sinopec	Petrochina	CNOOC	Petrobras	PEMEX	Aramco	ADNOC	PTT	Pertamina	Petronas	Indian Oil
Operational emissions	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue
Net footprint/lifecycle	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue
Capex/capacity	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue
Portfolio mix/market share	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue
R&D/venture	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue
OGCI member	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green
Endorsed World Bank ZRF Initiative	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green
TCFD supporter	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green

Source: BloombergNEF, company reports. Note: Blue indicates low carbon targets, green shows memberships.

Goals to reduce Scope 1 and Scope 2 emissions are an important part of a company's strategy, with potential impact on project feasibility and the cost of producing oil and gas. However, Scope 3 targets point to the broader vision of management, and provide a signal to investors regarding the direction of future investment decisions.

We have identified seven European oil and gas companies that have announced Scope 3 targets: Shell, BP, Total, Equinor, Eni, Repsol and OMV. U.S. oil companies have presented no Scope 3 vision, with the exception of Occidental Petroleum, which announced a net-zero target including Scope 3 emissions.

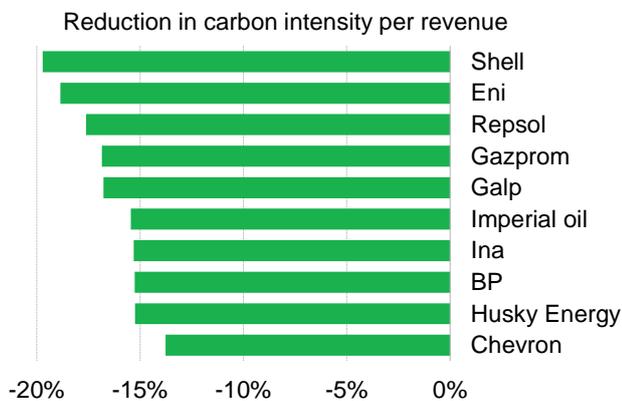
Figure 20: Strategic visions implied by the Scope 3 emissions targets announced



Source: BloombergNEF

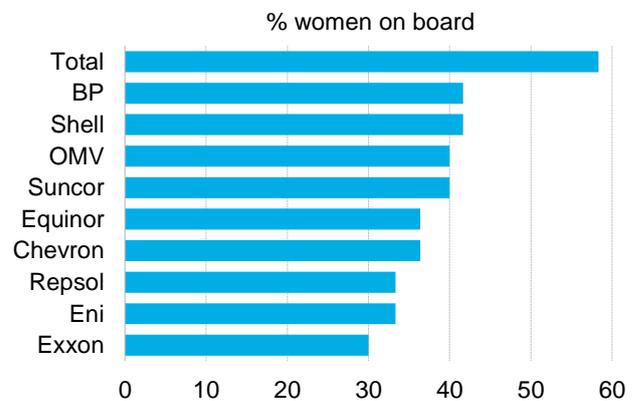
Integrated oil companies that have set clear Scope 3 emissions strategies and made significant progress in reducing Scope 1 and Scope 2 emissions appear also to have higher female representation on the board. These include Shell, Eni and Repsol (Figure 21, Figure 22). It is possible, but not proven in this report, that diversity at the workplace, including female managers (Figure 23) and employees (Figure 24), contributes to expanding decarbonization strategies to the products companies sell to consumers, if so lowering Scope 3 emissions. This topic is discussed more in the [case study section](#).

Figure 21: Top 10 integrated oil companies by reduction in carbon intensity per revenue (tCO2/\$)



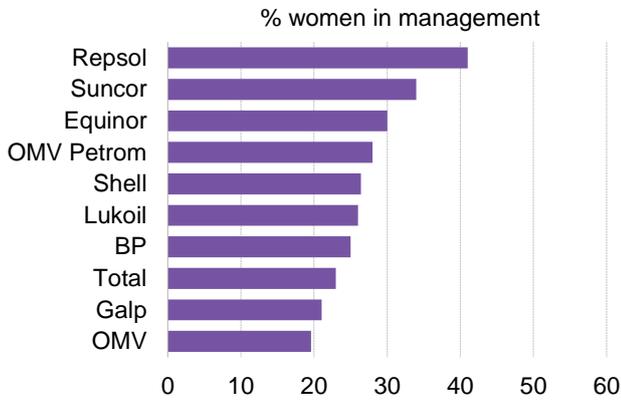
Source: Bloomberg Terminal

Figure 22: Top 10 integrated oil companies by % women on board



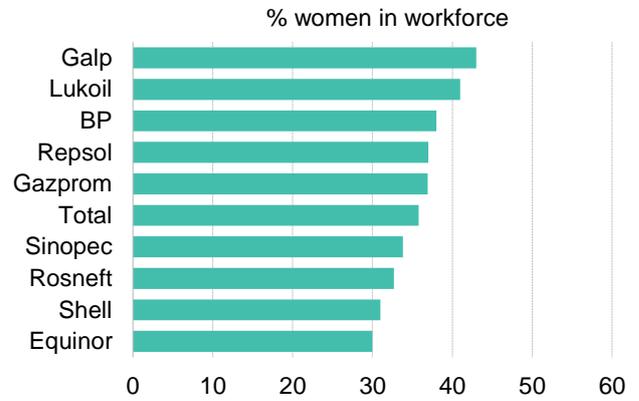
Source: Bloomberg Terminal

Figure 23: Top 10 integrated oil companies by % women in management



Source: Bloomberg Terminal. Note: OMV Petrom based in Romania.

Figure 24: Top 10 integrated oil companies by % women in workforce



Source: Bloomberg Terminal

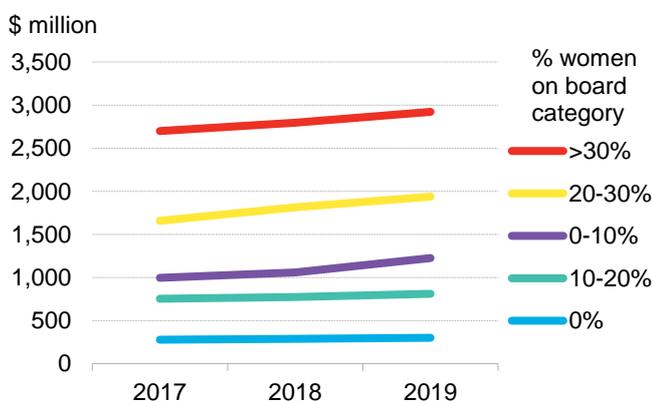
Section 4. Gender and innovation

Firms with gender-diverse boards produce more and better patents with more citations, with greater efficiency, than their competitors. At least, so say academic studies², arguing that gender-diverse boards nurture an innovative corporate culture, conducive to helping a more diverse set of innovators collaborate and thrive. As with the case of improving climate performance and disclosure, promoting innovation also requires that gender diversity goes beyond tokenism and moves towards critical mass, according to the studies³. This section examines the relationship between gender and innovation at corporations, on the basis of BNEF data and analysis.

4.1. Gender and innovation

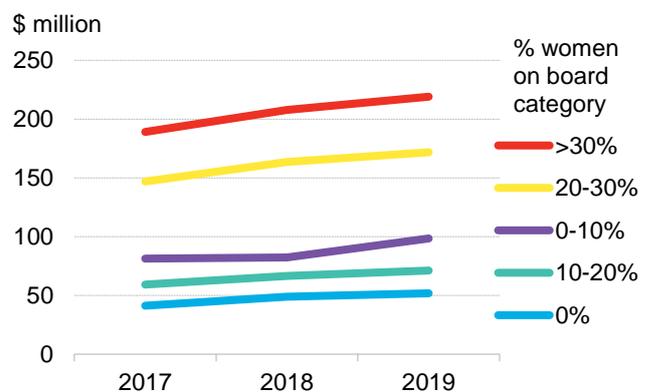
Our research findings show that companies with a higher gender diversity – or more than 30% female representation on their board – have larger intangible assets and R&D expenses than companies with fewer female members on the board (Figure 25, Figure 26). We considered intangible assets as one innovation criterion as it includes patents, copyrights, trademarks and capitalized development cost.

Figure 25: Intangible assets and % women on board



Source: Bloomberg Terminal

Figure 26: R&D expense and % women on board



Source: Bloomberg Terminal

R&D expenditure, which is also a key indicator for innovation, is strongly correlated with market value (market capitalization) (Figure 27). Companies that have invested in technological innovation tend to have high market value, because it is considered a seed for long-term business growth. It creates a positive cycle between capital and innovation as long as innovation drives business growth.

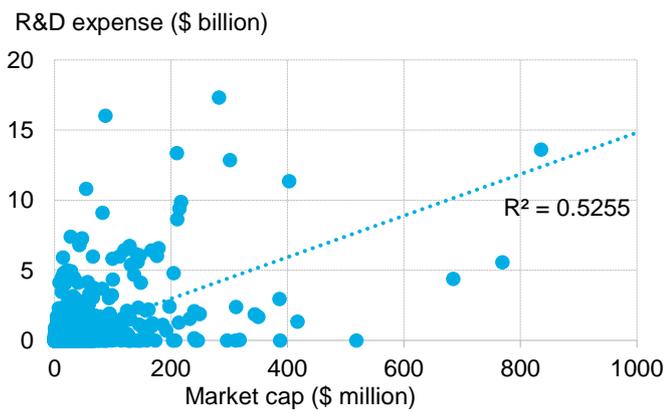
In terms of sectors, auto manufacturers on average spend by far the most on R&D, among the 72 sectors in our research coverage, followed by internet and semiconductor sectors (Figure 28). Those auto manufacturers with the highest R&D expenses also showed a positive correlation with gender diversity at the board level (Figure 29), but this was not necessarily the case in other

² Board Gender Diversity and Corporate Innovation: International Evidence,

³ The Mix That Matters.

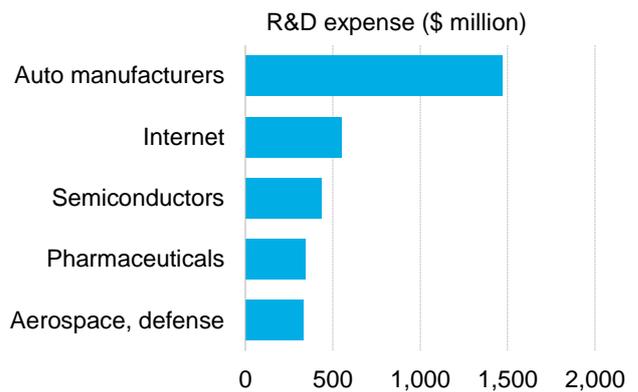
sectors such as the internet, which ranked second-highest in R&D spending (Figure 30). The category with 0-10% women on the board for the internet sector consists of only four companies – three in Asia and one in the U.S. Gender diversity, if it is a contributor, is clearly not the sole determining factor for innovation. A [later section](#) of the report discusses this topic with more focus on climate innovation in case studies.

Figure 27: Correlation between market cap and R&D expense



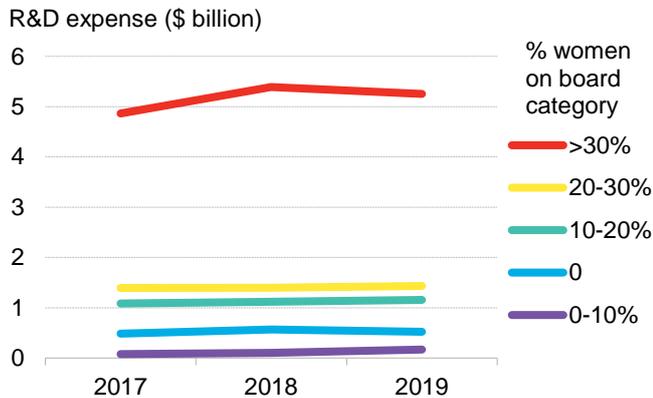
Source: Bloomberg Terminal

Figure 28: Top 5 sectors on average R&D expense



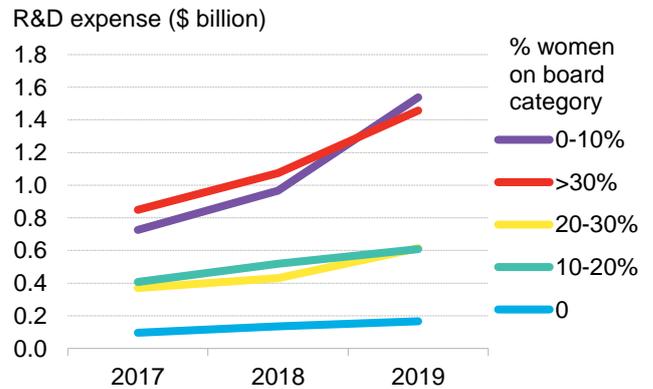
Source: Bloomberg Terminal

Figure 29: Auto manufacturers: correlation between % women on board and R&D expense



Source: Bloomberg Terminal. Note: FY2018 data is used for % women on board

Figure 30: Internet: correlation between % women on board and R&D expense



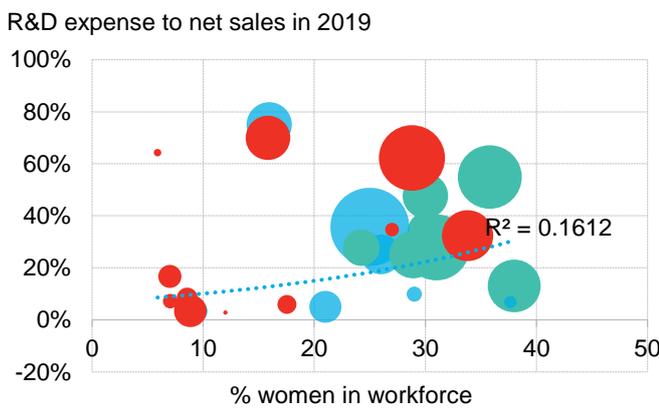
Source: Bloomberg Terminal. Note: FY2018 data is used for % women on board

4.2. Oil and gas sector

Gender diversity in the workplace is correlated with more innovative ideas for research and development in the oil and gas sector. Gender-diverse companies with a high ratio of female employees tend to have higher research and development expenses than those with lower female representation in the workforce (Figure 31).

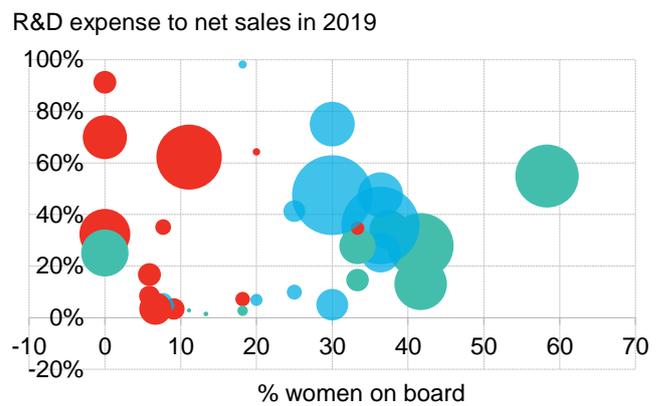
The relationship between a gender-diverse board and innovation is, however, less clear. Board gender performance is heavily influenced by policy and regulation, as discussed in the [previous section](#). Europe is most advanced in terms of gender diversity policies, and Asia lags behind (Figure 10). Companies based in Asia have low female participation on the corporate board despite the high rate of R&D spending to net sales (Figure 32). Also, the general state of gender norms such as lower female employee and manager ratios in Asia plays a big role.

Figure 31: Proportion of women in workforce, and R&D expense to net sales for oil and gas companies



Source: Bloomberg Terminal. Note: gender and innovation data was available for 36 companies only due to limited disclosure. Red represents company's HQ in APAC, green for Europe and blue for Americas. Bubble size is market cap.

Figure 32: Proportion of women on board, and R&D expense to net sales for oil and gas companies



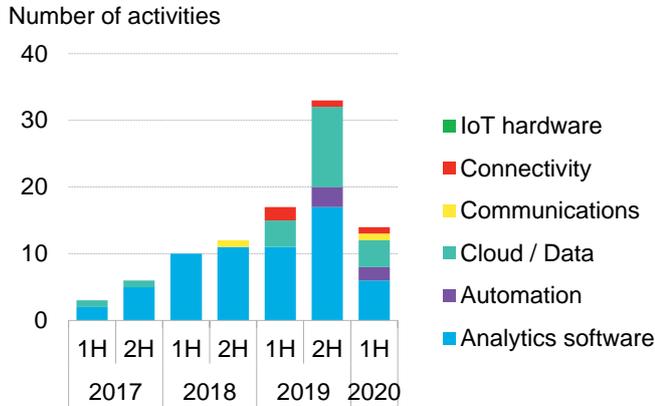
Source: Bloomberg Terminal. Note: gender and innovation data was available for 36 companies only due to limited disclosure. Red represents company's HQ in APAC, green for Europe and blue for Americas. Bubble size is market cap.

Digitalization in the oil and gas sector

Oil and gas majors are pursuing digital technologies in earnest, to increase the efficiency of their core businesses. Their key objectives, upstream and downstream, are to reduce the downtime of critical equipment, improve oil recovery rates of wells, increase energy efficiency and respond flexibly to market signals. Digitalization activities by oil and gas companies have been increasing since 2017 (Figure 33), with just over one-third of activities based in North America (Figure 34). Analytics software has so far accounted for the largest proportion of activity, including artificial intelligence, digital twins and predictive maintenance. This investment helped oil and gas companies to operate their assets remotely during the pandemic in 2020.

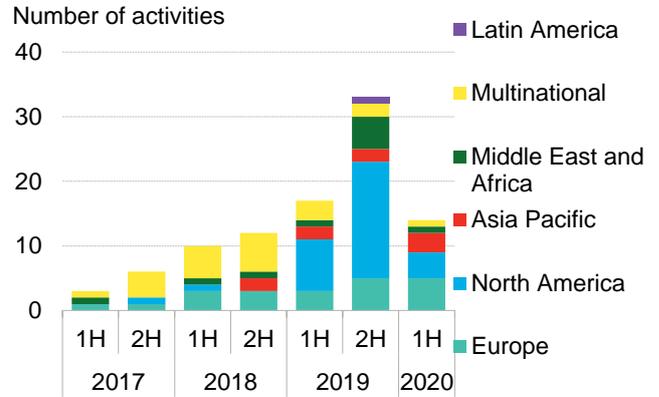
Integrated oil and gas companies have deployed digital technology pilots across their businesses and are leading in terms of adoption and investment. They were able to hire experienced data scientists and software developers to help with digital innovation. Oil companies also host incubators and accelerators for start-ups, or invest in them directly through venture capital arms. Despite the current downturn in oil prices and the pandemic, digitalization seems to have become even more important, as adopting it helps reduce costs and aids remote operations.

Figure 33: Oil and gas digitalization activity by technology



Source: BloombergNEF, CBIInsights

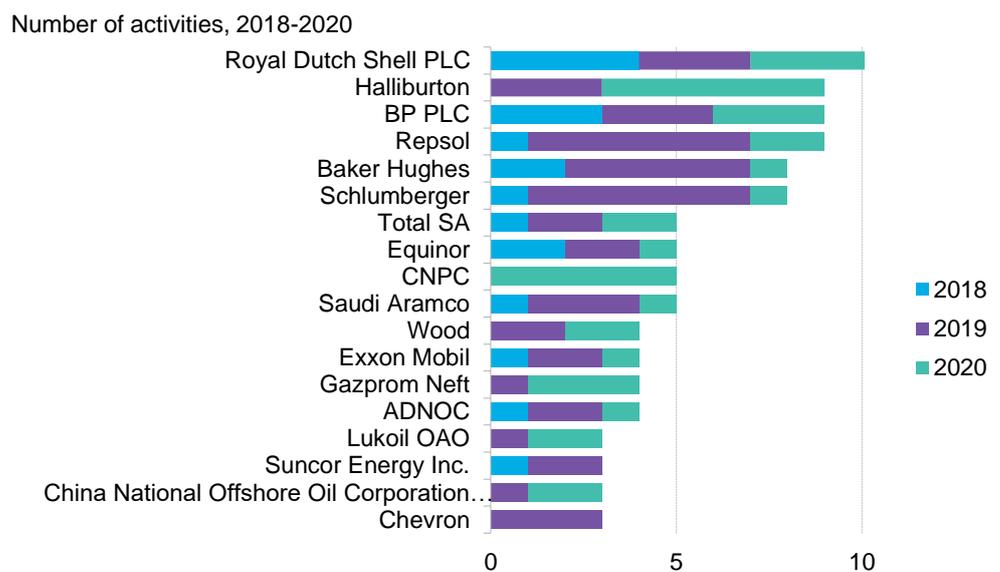
Figure 34: Oil and gas digitalization activity by region



Source: BloombergNEF, CBIInsights

European integrated oil companies like Shell, BP and Equinor have succeeded in making digitalization a company priority, and are implementing their strategies through many public digitalization partnerships and investments (Figure 35). Oil firms in the Middle East are catching up with some recent digital announcements, while U.S. oil companies are lagging. Many Asian oil firms are quite digitally active, particularly in China, but they tend to make fewer announcements publicly and choose only one major partner (such as the Sinopec and Huawei relationship). This is in contrast to European majors, which partner with varied small to large technology firms (particularly startups), in addition to forming partnerships with each other. An example is the March 2020 Shell and Equinor collaboration on digital technology, with the goal to reduce carbon emissions. Both companies have significant numbers of women in their digital leadership teams.

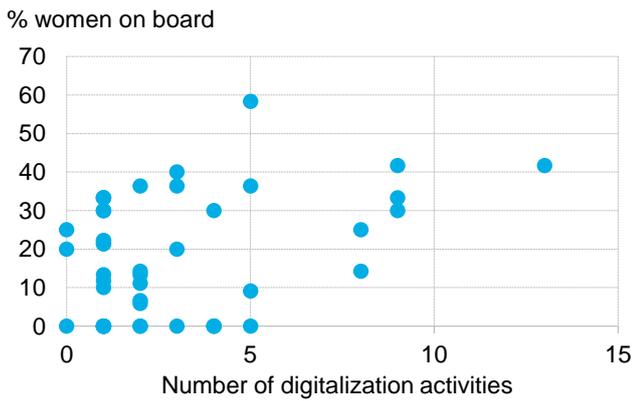
Figure 35: Oil and gas company digitalization activities



Source: BloombergNEF Digitalization Leaderboard ([web](#)), companies with more than 3 activities selected.

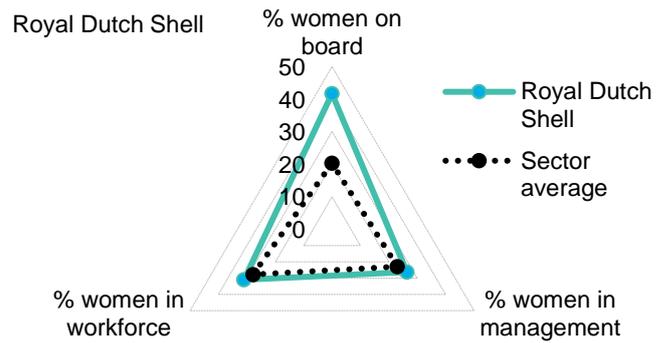
Of the leading digital oil firms, four had more than eight digitalization activities and high gender diversity at board level with more than 30% females on the board. These are Shell, Repsol and BP (integrated oil companies) and Halliburton (oil and gas service company) (Figure 36). The gender diversity performance of Shell in particular is better than its peers. Shell has more female leaders as board members, and has set gender-diversity hiring targets (Figure 37).

Figure 36: Digitalization activities and diversity at board level



Source: BloombergNEF, Bloomberg Terminal

Figure 37: Shell's gender diversity at board, management and workforce vs integrated oil sector average



Source: Bloomberg Terminal. Note: 35 companies are categorized as integrated oil and gas sector.

Section 5. Gender and climate innovation case studies

Gender diversity policies are correlated with, and may contribute to, corporate climate innovation efforts. A diverse workplace encourages new ideas from different perspectives, healthy competition and an appetite for new challenges. Building a gender-diverse workplace, for most companies, means hiring more women. This report showcases four companies that have placed women in positions of power to help strengthen corporate sustainability innovation.

- Technology innovation:** Gender diversity appears to be correlated with technology innovation and new business development. The product innovation units in Shell and Alibaba have female leaders, and they have encouraged other women innovators to excel in their work. Women innovators have a good understanding of customer needs and contribute to create product features that attend to a more diverse customer base, according to Jack Ma, Alibaba’s founder.
- Corporate culture:** Gender diversity may be associated with innovative corporate cultures. In the case of Lendlease, the idea is for women to help to shape a supportive innovation culture, encouraging everyone to contribute their ideas. The Sony example suggests that the diversity policies of a company can contribute both to gender diversity and innovation.
- Sustainability:** Companies with gender diversity goals also tend to incorporate sustainability into their innovation efforts. The top people in innovation team who lead on climate are all women, such as in Shell’s venture investment team, Alibaba’s philanthropy unit and Sony’s R&D units. Lendlease also transferred women employees from the sustainability team to the digital unit to bring in new perspectives.
- How to improve gender diversity:** To achieve gender diversity, companies can set targets and develop programs such as women’s networks and technology training. China’s Alibaba and Sony’s Japan unit set specific targets for the female employment share, including at management level. Shell has multiple programs internally to support women in leadership roles, and Lendlease set up programs to train more women in the engineering field.

Table 2: Case study summary on gender diversity and climate innovation

Company (HQ location)	Shell (Europe)	Alibaba (China)	Lendlease (Australia)	Sony (Japan)
Gender diversity	38% of the venture unit is female. There is a female chief digital officer for the downstream oil business	50% of the product innovation team is female. 42% of executives are women, of which some lead new business	27% of the digital team leadership is made up of women, with a woman head of innovative culture	The number of women managers doubled since 2015. Many are in the sustainability team
Climate innovation	Investing in clean technologies, developing digital	Developing new software products with sustainable features,	Developing digital tools to reduce emissions from operations	Building a technology-driven sustainability roadmap

	tools to reduce Scope 3 emissions	Scope reducing emissions from operations		
Gender's role for climate innovation	Gender diversity seen in clean technology venture business	Gender diversity associated with developing sustainable product features	Gender diversity aimed at bolstering a dynamic and inclusive innovation culture	Diversity policy aims to encourage female leadership and innovation

Source: BloombergNEF.

5.1. Shell: gender diversity contribution to new businesses

Royal Dutch Shell is a multinational oil and gas company with operations spanning upstream oil exploration, refinery and downstream retail. Shell stands out in the oil and gas sector in terms of its commitment to renewable energy and new technologies, as well as the role of women in driving these new businesses. Some 25-30% of Shell's managers are female, compared to a global average of 10.8% for the oil and gas sector. These female employees have contributed significantly to building Shell Ventures, the first corporate venture capital arm of an oil and gas company, and in developing Shell's downstream technology innovation.

Table 3: Shell's performance in gender diversity and climate innovation

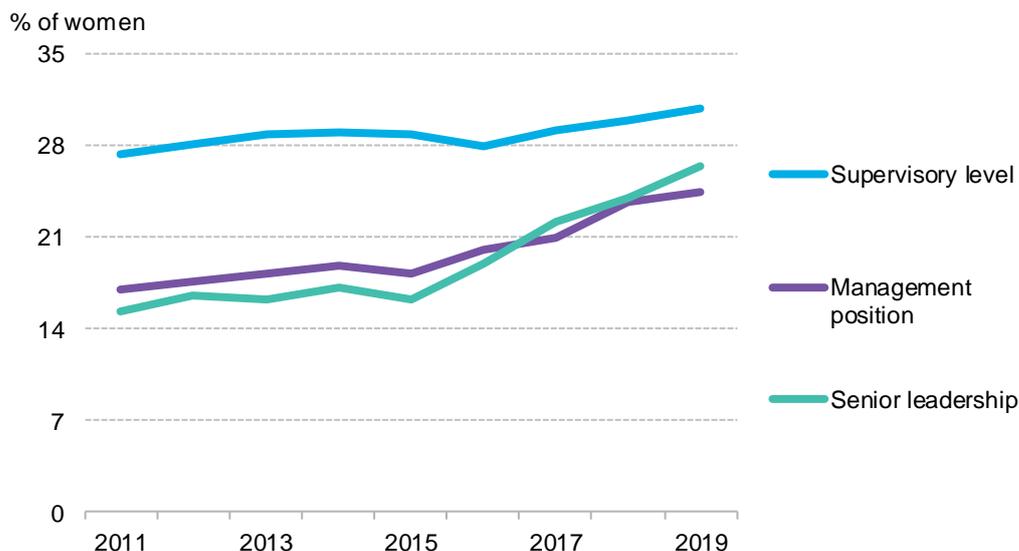
Metrics	Current progress
Gender diversity	<ul style="list-style-type: none"> • 50% of board members are women • 25-30% management roles are held by women, with a female CFO • 48% graduate new hires are women • Shell Ventures has 38% female employees; Shell GameChanger has 50% female employees • Shell's chief digital officer for downstream products is a woman
Climate innovation	<ul style="list-style-type: none"> • 65% emissions reduction target by 2050 • Shell Ventures has made 81 investments • Shell's accelerator incubated 150 ideas • 0.3% revenue for R&D budget, 223 R&D projects in 2019 • Shell believes digital technologies can help reduce its Scope 3 emissions by 20% • Digital training course for all employees

Source: BloombergNEF.

Shell has been working towards greater gender diversity since 1997, as part of a larger diversity and inclusion plan. Chief Executive Officer Ben van Beurden is a member of the Catalyst CEO 'champions for change', a group of more than 50 CEOs who have pledged to support women's advancement at all levels of leadership. The results of this transformation have been significant. Shell was the only oil and gas company since 2014 to be listed in The Times's Top 50 employers for women list. Half of Shell's board members (six out of 12) are women – one of the highest shares in the integrated oil and gas sector companies globally. The percentage of women in Shell's senior leadership, middle management and supervisory level has also grown significantly over the last decade (see Table 3). Shell does a good job of maintaining gender diversity among entry-level employees too – 48% of the graduate new hires, and 51% of the business operation center employees were women in 2019.

Shell has implemented some programs internally to facilitate this change: the ‘senior women connect program’ (SWC) helps women make professional connections within and beyond the company; and the women’s career development program (WCDP) has supported 3,500 women in developing effective strategies to balance their career and personal success. Shell has also been promoting the global STEM program and the Royal Academy of Engineering campaign to attract more women into tech and engineering. There are also specific initiatives, such as maternity leave, flexible working hours, and a training program for new mothers, aimed at supporting women during various life events.

Figure 38: Change in the percentage of women in Shell’s management level



Source: BloombergNEF, Shell

Table 4: Shell Ventures clean tech investments (select)

Company	Tech
Sense Labs, Palmetto	Energy efficiency
AutoGrid, Innowatts	Decentralized energy
Brill Power, Geli	Battery storage
Forge Hydrocarbons	New fuels
Via	Carpooling

Source: Pitchbook

Venture capital and accelerator benefit from gender diversity

Gender diversity has an impact on Shell’s venture capital and accelerator business. The group established Shell Ventures in 1996, making it the first oil and gas company to launch a venture capital fund to invest in new technologies. Since then, venture capital has become an important pillar of support for Shell’s diversification into renewables and new businesses, with 81 investments made so far (see Table 4 for portfolio companies). Shell GameChanger is the accelerator unit Shell launched to incubate early-stage technologies, and has turned more than 150 ideas into reality so far.

Both venture units of Shell have a relatively high proportion of women for the venture capital industry. Some 38%, or 15, out of the 44 employees in Shell Ventures are women, compared to an industry average of 30% in the venture capital sector (U.K. samples). Some 40%, or two out of the five, investment principals in Shell Ventures U.S. are women, much higher than the venture capital industry average of 13% in 2020. Similarly, the Shell GameChanger accelerator is led by a female managing director, with women accounting for 50% of the team.

Women employees in the company’s VC and incubator units have made an impact on Shell’s investment focus on renewable energy, new fuels, e-mobility and sustainability. For example, Shell Ventures U.S.’s only investment principal that focuses on sustainability is a woman. Shell GameChanger’s women members have been the champion incubators of companies tackling energy transition and alternative fuels. The managing partner of Shell Ventures called out for

more women to join the company in 2019. The regional branches established more recently, such as Poland and China, have much higher women representation. Shell Ventures Poland’s three team members are all women, and focus on e-mobility and digital business. Some 50% of Shell Ventures China employees that invest in clean energy and mobility are women.

Downstream digitalization driven by women innovators

Women are leading Shell’s innovation in its downstream business. In addition to investing in clean technologies, Shell is also working to reduce emissions from its existing petroleum-based products, such as lubricants. The downstream digital unit is tasked with developing new digital technologies to optimize the use of its products for the customers (Table 5). Shell believes these innovations can potentially reduce its Scope 3 emissions by around 20%.

Shell has a female chief digital officer (CDO), leading the development of new digital tools and services for downstream customers. Her team has a very high female representation, with the country innovation leads in the U.S. and Asia-Pacific also women. This is rare among oil and gas companies – for example, the chief digital officers at BP, Total and Equinor are all men.

Gender diversity has contributed to a new approach and perspective to innovation in the team. Instead of starting from the technology perspective, the team began with customer interviews and pilot projects. According to Shell, women innovators tend to think from the customer’s perspectives and understand their pain points and problems, which could then provide inspiration for the innovations. This process also involves a lot of trial and error, requiring significant patience to go through, which a diversified team tends to do well. For example, the team realized the mining sector has similarities to the oil and gas sector, but is much less energy-efficient and digitalized. Starting from 2019, it launched multiple software packages to test the market in the mining sector. The digital team has a very flat structure and gives significant opportunities to young female innovators to take the initiative. For example, the innovator of the Tulli wind software and Shell Remote Sense lubricant software is a junior female employee.

Table 5: Shell downstream innovation

Product	Use
Accuport & Remote Sense	Software to optimize lubricant use
Machine Max	Software to optimize fleet utilization
FitCar	Software to monitor car fuel use and maintenance

Source: BloombergNEF

5.2. Alibaba: gender diversity at the core of the business

Alibaba is a Chinese technology company specializing in e-commerce, logistics, cloud services and data analytics. We think Alibaba is a particularly good example of how gender diversity is correlated with innovation, because the company was born in the context of women’s empowerment in China and the founders made gender diversity one of the core company policies. The female ratio of executives is 42%, much higher than the global average of 13.4% for the technology sector. Alibaba is also the only Chinese company that has committed a fixed percentage of its revenue (0.3%) to fund climate actions every year.

Table 6: Alibaba’s performance in gender diversity and climate innovation

Metrics	Current progress
Gender diversity	<ul style="list-style-type: none"> • 42% of executives are women • 33% of Alibaba partnership leaders are women • 47% of total employees are women • Half of the product designers and testers are women • Alibaba has a woman chief people officer • Alibaba has women leaders in new business groups
Climate innovation	<ul style="list-style-type: none"> • 0.3% of revenues go to Alibaba Foundation for environmental actions

- The second-hand item trading platform is estimated to have reduced emissions by 5,848 metric tons
- AI reduces logistics material use by 15%
- 55 million trees planted on behalf of the customers

Source: BloombergNEF.

Alibaba is known to have gender diversity as part of its founding values. Women contribute to over 65% of Alibaba's e-commerce sales, and most of the retailers selling on Alibaba's platform are women, making 30% more sales on average than male retailers, according to the media. It is fair to say Alibaba's success came hand in hand with women's empowerment in China – the new generation of women born in the 1990s have been driving China's \$670 billion 'sheconomy' for the past decade.

Aware of women's role in its business, Alibaba's founder Jack Ma is a supporter of gender diversity. Ma said the 'secret' recipe of Alibaba's success is the women in the company, and that he thinks the proportion of women employees is positively correlated with long-term growth. He set a requirement for women to make up at least 33% of employees, and made it part of the management's performance indicators. Ma also founded the 'global conference on women and entrepreneurship' in 2016, and has since partnered with UN Women, Melinda Gates and other popular female entrepreneurs to promote innovation by women.

The representation of women in Alibaba is significant on different levels. Some 42%, or 6 out of 14, of management executives are women. Some 33%, or 12, out of the 36 partners within Alibaba who take on senior management positions, are women. So far, women account for 47% of Alibaba's total employees, much higher than the 33% minimum requirement Ma set.

Product innovation link to gender diversity

Gender diversity plays a critical role in Alibaba's product innovation. In the product R&D department, although men account for 87% of the workforce, Alibaba says it aims to make sure half of the product designers and testers are women. Ma has highlighted the role of women in understanding customers and improving product design. He said that gender diversity helps to make sure a diversified perspective is incorporated in the product design, taking into account the user experiences of people from all backgrounds. He also emphasized that women's unique strengths in being adaptive to change and attentive to human feelings, are crucial for Alibaba's product innovation.

There are a couple of consumer products with innovative sustainability features. They might not have happened without a diversified product design team that thinks beyond technical excellence to attend to what the users want and need. For example:

- Alibaba developed a second-hand item trading software called Xianyu in 2014. Through enabling the use of second-hand items such as clothes, books and electronics, Alibaba estimates it has saved 5,848 metric tons of CO₂.
- Alibaba's logistics unit Cainiao Network is developing an optimization algorithm that matches packaging needs, based on a parcel's mass and volume. This reduces the use of packaging materials by approximately 15%.
- Amap, a map service provider acquired by Alibaba in 2014, launched an environmental mapping service in 2018. The map presents data on air pollution and water pollution across different cities in China, aiming to push relevant entities to disclose emissions data and address environmental issues.

- The Alipay mobile payment app designed a unique feature to engage the public in environmentally friendly actions. Users of the app can collect ‘green points’ through low-carbon options in their daily lives, such as using e-payments and choosing public transportation, and Alibaba would plant trees on behalf of the users in return. As of May 2018, 55 million trees had been planted on behalf of 350 million program participants.

Diversified management fosters diversified entrepreneurs

Women not only contributed to the development of these new products, but also led some of the new business teams.

- Lucy Peng, one of the founder members of Alibaba alongside Ma, has been heading Ant Financial since 2018, the \$150 billion unicorn born out of Alibaba that manages Alipay and the tree planting initiative.
- Judy Tong, the chief people officer of Alibaba, was appointed in 2019 to head the Cainiao Network – the logistics unit of Alibaba that launched the green supply-chain initiative.
- Ruihe Wang, the secretary of Alibaba Foundation, is the key driver of the Xianyu software, and the founder of the ‘internet plus circular economy committee’ in the China Association of Circular Economy.

The women leaders in Alibaba are dedicated to empowering more women entrepreneurs. The 12 female partners of Alibaba launched a program called ‘model mom entrepreneurship competition’, to highlight female entrepreneurs from disadvantaged backgrounds, with the purpose of inspiring other women to start entrepreneurial ventures. The selected winners of the competition are each awarded interest-free loans and free training on Peking University’s entrepreneurship course. So far, 5,100 entrepreneurial moms have received opportunities there.

5.3. Lendlease: gender diversity shaping corporate culture

Lendlease is an Australian property company specializing in construction, project management and real-estate development. The company stands out because of the important role gender diversity plays in shaping its innovative culture. Lendlease has one of the most ambitious sustainability and innovation targets in the construction sector, with a carbon-neutral goal set in 2019, and ambition to build a digital team from scratch. There is a dynamic culture within the company, on which gender diversity has made a big impact.

Table 7: Lendlease performance in gender diversity and climate innovation

Metrics	Current progress
Gender diversity	<ul style="list-style-type: none"> • 40% of board members are women • 27% of executives are women • 32% of total employees are women • Programs to address gender gaps in salary and job functions • Lendlease has a female head of innovative culture • Lendlease has significant gender diversity in the sustainability team
Climate innovation	<ul style="list-style-type: none"> • 20% emission reduction by 2020; carbon-neutral goal set in 2019 • Hired a chief digital officer from GE and founded a digital team

-
- Digital software and research lab to reduce construction emissions by 50%
 - Smart building pilot to reach carbon neutrality
-

Source: BloombergNEF.

The company is trying to address the occupational segregation in the real-estate industry – only 21% of the construction workforce is female, while the female proportion in other functions is much higher. To achieve better gender diversity for the engineering and technology roles, Lendlease is making sure there is similar participation of both men and women students in its graduate program, despite the majority of the universities it recruits from being male-dominated. It is also engaging with high schools in Australia to encourage more women to take on STEM subjects and career paths in construction. Currently, women account for 32% of total employees and 27% of the executives at Lendlease. The company has set a goal to have 30% women in senior management roles, and has been working toward it by increasing the share of women by two percentage points every year.

Another two steps Lendlease identified to aid diversity are addressing gender pay gaps and increasing flexibility. The company's CEO, Steve McCann, is a champion of gender equality and has been monitoring and addressing pay gaps between women and men. The chief people officer highlighted in the media interview the company's focus on ensuring flexibility at work – a lot of working parents in the construction sector struggle as most construction projects have firm delivery deadlines and allow little flexibility. These two programs can incentivize more women or working mothers to stay in the company and work their way to the leadership roles.

A dynamic and inclusive culture linked to gender diversity

Jasna Sims was appointed in 2017 as the head of innovation, working with the leadership to create a supportive environment for new ideas. A lot of her team members are women as well. Building an innovative culture is not an easy task, especially in the construction industry, which traditionally competes on cost and speed. It requires challenging the hierarchical organizational structure, and enabling everyone to contribute their ideas and talents.

Lendlease launched an innovation lab to encourage employees with their innovation efforts. According to the head of innovation, because construction projects have a long timeframe, innovation will have to be forward-looking – addressing challenges and customer needs 30 years from now. Sims has set out to change Lendlease in these ways:

- **Turning ideas and knowledge into execution:** Rather than simply running training sessions for employees, Sims thinks learning by doing is a better approach. Through handing out innovation assignments to the employees and coaching them to execute these ideas, they can understand how lean and fast experiments look in practice.
- **Creating a safe space for trial and errors:** Sims supports the creation of 'sandboxes' for people to experiment, to fail and to try new things. She also suggested lifting of the standard key performance indicators and rigorous five-year business planning for the innovation team, as they will never be able to innovate if they are not allowed to fail.

This is the culture that helped give rise to Lendlease's digital team – established in 2019 to develop proprietary software to improve processes in the construction sector. About 23.5%, or four out of the 17 people in the leadership team of Lendlease digital, are women. They play important roles in product, HR and finance. While other construction giants such as Balfour Beatty and Bechtel are still exploring their digital transformation, Lendlease has already hired a chief digital officer from GE and built the industry's first digital twin software. Called Podium, it can

simulate and optimize the design and schedule of construction projects, speeding up construction by 20% and thus reducing the use of material and energy. In 2018, Lendlease won a \$28 million grant from the Australian government with its smart building research center, which aims to achieve an 80% reduction in construction waste and 50% reduction in CO2 emissions with digital technologies.

Sustainability going hand in hand with gender diversity

Lendlease has achieved high gender diversity in the sustainability team. The sustainability board is headed by a woman, who has been driving these goals for Lendlease since 2013. Half the sustainability heads within the company are women, and they have helped incorporate the sustainability agenda within its innovation practice. Some female leaders were transferred from the sustainability team to the digital team to drive strategy planning.

Gender diversity has gone hand-in-hand with the sustainability performance of Lendlease. Women in the team had a significant role in putting sustainability on top of the agenda of Lendlease. The company is a supporter of the TCFD framework, and the international leader of the 'global real estate sustainability benchmark' (GRESB), with five funds ranking it number one among the hundreds of participants globally. In 2015, Lendlease set a target to reduce energy use, emissions and water use by 20% by 2020, and has been progressing towards this goal. It also committed to tackle Scope 3 emissions in 2019, working with its supply chain to advance low-carbon materials and purchasing certified carbon offsets to reach carbon neutrality. Lendlease developed Australia's first carbon-neutral community – Barangaroo South, where it uses the iviva software to integrate building and process information.

5.4. Sony: diversity policy bringing out the best in people

Sony is a Japan-based conglomerate specializing in electronics, gaming, music and movie entertainment. Sony stood out among Japanese companies due to its high gender diversity and clear sustainability targets. One-third of board members are female, compared to a global average of 20% for mobile electronics manufacturers. Sony has a particularly high gender diversity in its sustainability-related teams, spanning R&D, corporate sustainability practices and external communications.

Table 8: Sony performance in gender diversity and climate innovation

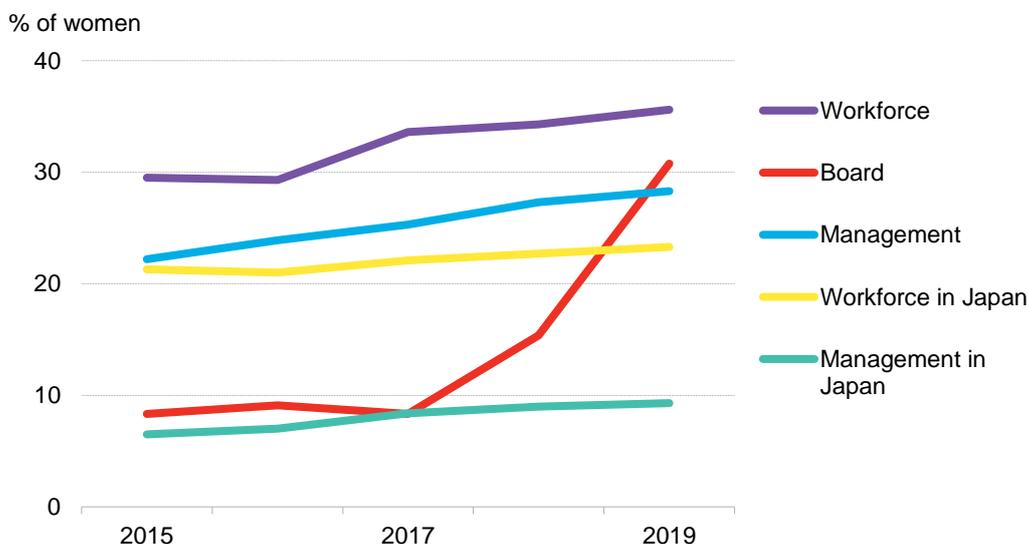
Metrics	Current progress
Gender diversity	<ul style="list-style-type: none"> • 33% of board members are women • 28% of managers are women • 10% target for women managers in Japan by 2020 • Sony has high gender diversity in sustainability leadership roles • Sony has female scientists in the R&D department
Climate innovation	<ul style="list-style-type: none"> • Net-zero emissions target by 2050 • Emissions from its products reduced by 52% by 2019 • Sony computer science lab researches sustainable agriculture and nature conservation • Sony startup accelerator <u>partnered with UNOPS</u> on a global innovation challenge for startups using AI to mitigate climate changes • RE100 member

Source: BloombergNEF. UNOPS is United Nations Office for Project Services. RE100 members are companies who are committed to be 100% powered by renewables.

Sony says it believes gender diversity is not just a corporate responsibility initiative, but it can bring competitiveness and economic returns to companies. Sony Group published a 'diversity statement' in 2013 to recognize diversity as a key management strategy of the company, one of the first Japanese companies to make a commitment in this area. In the statement, Sony recognized the importance of diversity in fostering an inclusive workplace and supporting all employees to make the most of their individual strengths and skills.

Since the launch of the diversity statement, Sony has been setting targets and increasing female representation within the company. The percentage of women on the board and in management roles has increased significantly (Figure 39). Although the percentage of women at the headquarters in Japan is lower than its global average, the absolute number has doubled in the last five years. To fill the gap in Japan, Sony has set a target for women to hold 15% of management positions at Sony Corporation (the parent company), and 10% of management positions in the Sony Group (which includes the Sony Corporation and its affiliates) by end of fiscal 2020 (in March 2021). As an international company with overseas business accounting for 70% of its revenue, Sony could benefit more from promoting gender diversity than companies focusing only on Japan's domestic market, for both branding and business purposes.

Figure 39: Change of women employees in Sony, Sony Group (global) and the Japan unit



Source: BloombergNEF, Sony

Women rising up to lead sustainability practices

Sony is committed to fostering women leadership in the company. It joined the United Nations Global Compact with an NGO (Athena) to promote gender equality, putting some of its female employees on Athena's women leadership training programs. Sony also has two internal programs designed specifically to support women to progress in their careers. The women of action, vision and empowerment (WAVE) program offers mentoring and networking training for women employees so that they are better equipped with leadership skills. The Sony team of

enterprising parents (STEP) supports the needs of working parents so that women do not have to sacrifice career progression for families.

While Sony has been working to improve gender diversity in Japan, it has already achieved a significant female representation in the sustainability-related management roles. Sony’s policy to support female leadership has empowered women employees to rise up to management roles, taking advantage of their interest in sustainability and their strengths in communications and project management. Some examples include:

- **Sustainability department:** Mitsu Shippee is the head of corporate social responsibility (CSR), working with stakeholders on supply chain sustainability and other CSR issues. Keiko Shiga is the head of the environment section, managing Sony’s plans in achieving environmental and climate targets. Mami Imada is the senior general manager of the whole sustainability department.
- **Public relations and investor relations departments:** Naomi Matsuoka is the senior vice-president managing investor relations for Sony on ESG issues. Yurika Kamitani is the senior general manager leading the public relations and government communication on ESG issues. Kamitani stated that the support from colleagues has been crucial for her to keep taking on challenges and rising up for promotion opportunities.

These female leaders have contributed to building Sony’s climate and sustainability roadmap. Sony has been a pioneer of climate actions since 2006, when it committed to reduce carbon emissions by 7% by 2010. More recently, in 2011, the company set a target to achieve a ‘zero-environment footprint’ by 2050, and has been working towards this goal on a five-yearly basis – it met the goal of reducing carbon emissions by 30% by 2015. Sony’s sustainability roadmap is very specific and comprehensive, making it stand out from its peers. The plan takes into account all the stages of its product lifecycle, and tackles all the aspects from emissions, material use, chemical use and biodiversity (See Table 9).

Table 9: Sony’s action plan in different areas related its environmental goals

Area	Target by 2020	Current progress	Technology
Energy use	Reduce electronic products’ energy use by 30% (from 2013); reduce mobile product’s power use in idle mode to under 0.03W	Sony reduced energy consumption per product by 52% by 2019	Energy efficiency technologies for electronics
Material use	Reduce the amount of oil-based plastic per product unit by 10% (from 2013)	The amount of oil-based plastics per product unit increased 10% by 2019, due to stricter regulation on recycled plastic imports and the expansion of the average TV screen size	Digitalizing product manuals; developing new recycled plastic material
Chemical use	Eliminate substances of high concern such as polyvinyl and chloride	N/A	Using measurement devices to detect chemicals; new hardware that uses alternative substances

Source: BloombergNEF, Sony. Note: *Green* means Sony achieved the target while *red* means otherwise.

Women achieving their potential in tech R&D

Sony believes inclusion and diversity are linked to innovation, according to [Cheryl Goodman](#), head of corporate communications at Sony Electronics. She joined Sony three years ago and has been driving its commitment to female leadership in technology. Sony has been quoted saying that a diverse team is more likely to remain objective, identify potential errors and be less timid about scrutinizing another's points of view.

The diversity policy of Sony has encouraged more women to join and contribute to technology R&D, which is fundamental in developing low-emission products and nature conservation technologies in general. [Sony Computer Science Laboratories \(CSL\)](#) is a research lab with around 30 scientists that looks into frontier technologies with high social impacts. One of the main focuses there is on climate innovation, with scientists exploring [environmentally friendly agriculture](#) and [distributed energy systems](#), enabled by digital technologies. The lab has some [female scientists](#) – Kaoru Yoshida is one of them and leads the research into the [global circulation system](#) and environmental disruption. Sony also has [a R&D center](#) working on new technologies to support the company's various businesses in electronics and entertainment. Sony profiled the journey of a female AI researcher called [Hiromi Wakaki](#) in its R&D department. She mentioned that "Kando" (to move people emotionally), and a supportive environment, distinguished Sony from her previous company. After she took on a management role, she has been trying to apply the same values in managing her team, encouraging every team member to voice their opinions and ideas. She said that her parenting experience has enabled her to be more empathetic with what other people are going through or feeling.

Section 6. Recommendations

1. **Public corporate commitments** to shared gender diversity benchmarks will prove valuable, by allowing companies to benchmark to global peers.
2. **Disclosure:** Increased and standardized disclosure of gender diversity will be essential, and will ultimately enable companies and financial markets to better assess the linkages between diversity and business performance. Data and benchmarks will allow markets to back-test the relationships between gender diversity and performance.
 - a. Disclosure is still a big issue in both gender diversity and climate performance. With the exception of board diversity, the level of disclosure on other diversity metrics such as women in management and women in workforce varies widely by company. To date, only 13% of companies in our data coverage (out of more than 11,700 companies) had disclosed data on women in management roles, while 33% had done for the female share in employees.
 - b. Definitions of gender diversity metrics should be standardized. The proportion of female employees in management positions is defined differently by market and by company.
 - c. Lack of disclosure would make it difficult for financial markets to look for investment opportunities in companies with both high gender diversity and climate performance.
 - d. Global initiatives that set gender disclosure guidelines and standardization are needed at the same level as those for greenhouse gas protocols for climate change. There are already some initiatives, like the 30% Club, mentioned in [section 3](#).
3. **Diversity goals:** Companies should consider setting longer-term diversity goals in the same fashion that they set goals for financial performance, climate governance and performance toward initiatives such as RE100. Our analysis has shown a 30% share of women on the board is correlated with climate and innovation performance. Companies should consider this threshold in setting their diversity goals.
 - a. Longer-term commitments on diversity and climate innovation will be increasingly important for companies, as they give a clear signal on direction of their businesses to stakeholders and financial markets.
 - b. Back-testing gender, climate and business performance has been done, to look for correlation metrics. Lessons should be learned, to apply to future company strategies.
 - c. Forward-looking analysis on gender and climate could increasingly play a crucial role in company valuation and cash flow analysis. Climate-related opportunities and risks may influence business performance more than ever before. Gender diversity should be treated as an additional metric that influences corporate performance.
 - d. Financial markets should respond to integrate forward-looking analysis on gender and climate not only into valuation analysis but also into their engagement with companies.

Appendices

Appendix A. Data coverage, definition, gender data

A.1. Data coverage:

More than 11,700 companies with ESG data available on Bloomberg Terminal, from 102 countries and longer than 10-year history, providing transparency data since 2006. More than 84% of global market capitalization.

A.2. Definition

Bloomberg's environmental disclosure score:

Proprietary Bloomberg score based on the extent of a company's environmental disclosure, as part of environmental, social and governance (ESG) data. Companies that do not disclose ESG data and are not covered in Bloomberg ESG database stated above in A.1 have no score and will show N/A. The score ranges from 0.1 for companies that disclose a minimum amount of ESG data to 100 for those that disclose every data point collected by Bloomberg. Each data point is weighted in terms of importance, with data such as on greenhouse gas emissions carrying greater weight than other disclosures. This score measures the amount of environmental data a company reports publicly, and does not measure the company's performance on any data point.

Emission data:

Scope 1 + Scope 2 emissions used for all the companies in this research.

A.3. Top companies

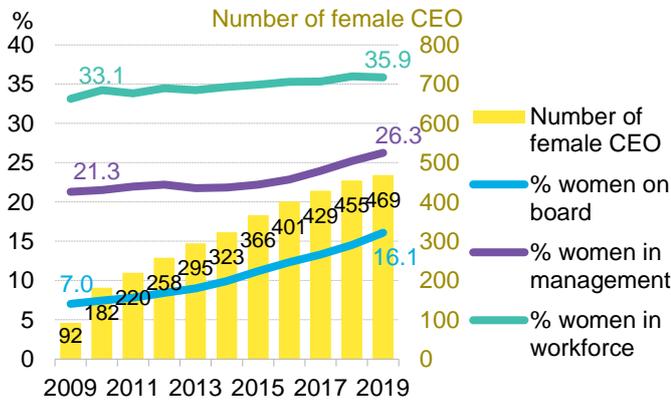
Table 10: Top 6 companies by % women on board

Rank	Name	Country	Sector	% women on board	Market cap (\$ million)
1	Bespoke Extracts	U.S.	Pharmaceuticals	100	2
2	Destination Maternity Corp	U.S.	Retail	80	0
3	Travelzoo	U.S.	Internet	80	104
4	Tootsie Roll	U.S.	Food	75	2,107
5	Wallenstam	Sweden	Real Estate	75	4,993
6	Empresa de Telecom de Bogota	Colombia	Telecom	71	199

Source: Bloomberg Terminal.

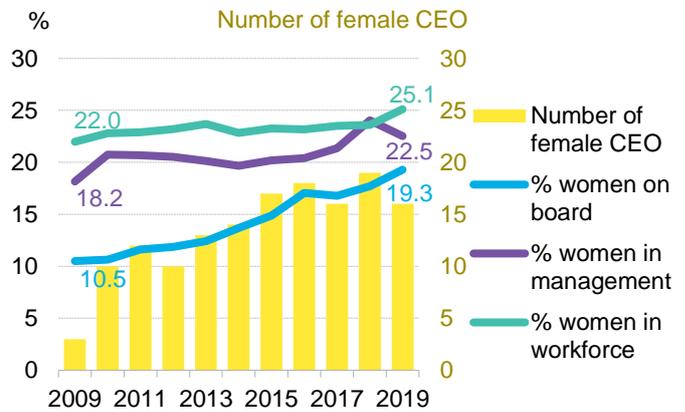
A.4. Gender data

Figure 40: Gender diversity global average



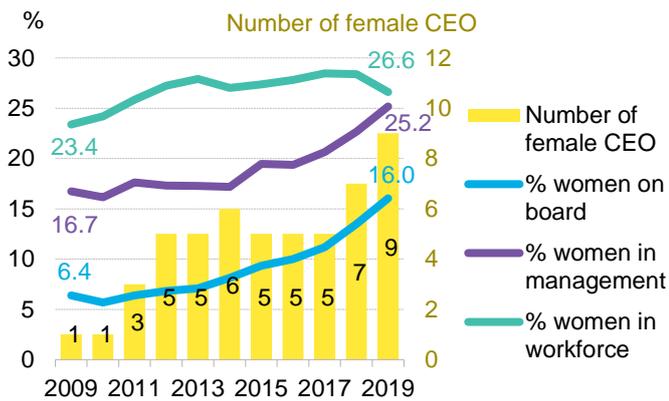
Source: Bloomberg Terminal

Figure 41: Gender diversity in electric utility sector



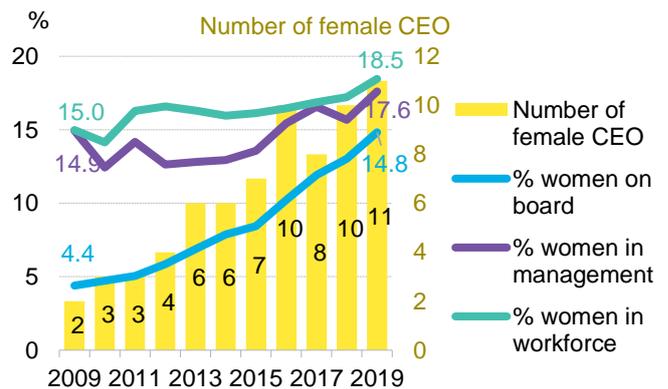
Source: Bloomberg Terminal

Figure 42: Gender diversity in oil and gas sector



Source: Bloomberg Terminal

Figure 43: Gender diversity in mining sector



Source: Bloomberg Terminal

A.5. Related BNEF research reports

- *Is Big Oil Serious About Going Low Carbon?* ([web](#) | [terminal](#))
- *How Oil and Gas Companies Are Addressing Climate Risk* ([web](#) | [terminal](#))
- *1H 2020 Digital Trends in Power, Oil and Gas* ([web](#) | [terminal](#))
- *Sizing the Market Opportunities for Oil and Gas Software* ([web](#) | [terminal](#))
- *Digitalization Strategies of Oil Majors: Company Profiles* ([web](#) | [terminal](#))
- *Task Force on Climate-related Financial Disclosures Primer* ([web](#) | [terminal](#))

A.6. Related research reports by the Sasakawa Peace Foundation

- *Gender Equality in Japan, Hong Kong & Singapore*
- *Gender Lens Investing Landscape East & Southeast Asia*
- *Sustainable Investing in Japan: An Agenda for Action*
- *The Role of Entrepreneurship in Closing Gender Gaps in Myanmar*
- *The Emergence of Angel Investment Networks in Southeast Asia Report I - III*

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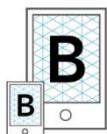
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