



DELL WE CITIES 2018

Technology Deep Dive



Outline of Technology Deep Dive

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 - Motivation and approach for the technology deep dive study
- Summarize Dell WE Cities Technology Results:
 - Analysis of the overall technology scores
 - › Distribution of Technology Scores overall
 - › Distributions of Technology Sub pillars
 - Benchmark Cities
 - › Identify the top cities in technology and analyze the metrics that set these cities
 - › Qualitative/quantitative research to identify outside forces that drive technology use in these cities
 - Correlations
- Identify the top cities in Technology
 - Analyze the metrics that set these cities apart
 - Qualitative/quantitative research to identify outside forces that drive technology access in these cities
 - Real world stories of women entrepreneurs
 - › Women using technology to scale businesses
 - › Women starting/scaling tech businesses
 - › Women who have found technology to be a barrier to scaling (i.e., where/how does lack of technology pose a constraint?)

Introduction



Motivation

- Based on the 2017 Dell WECities Index that ranked 50 cities for their ability on attracting and retaining women entrepreneurs, we found that many women entrepreneurs have difficulty talking about technology in general.
- They understand what they use, but many do not fully consider technology that is available that they may not be using, or how it can help them scale a business.
- This study is aimed at gaining insight into how women entrepreneurs use technology to scale businesses and how the technology ecosystem of a city can aid in that scaling.

Approach

- We analyzed the 2017 WE Cities data to identify which cities are leading in technology and what indicators within those categories are setting them apart.
- After identifying benchmark metrics and leading cities, we will do qualitative research into those cities to better understand what specific policies and practices are in place that are enabling greater access for high potential women entrepreneurs.
- The research will also uncover, what high potential women entrepreneurs are doing as well in terms of accessing and using technology (including what technologies and platforms women may be leading on)
- For example: 1) How are women entrepreneurs accessing and using and/or driving technology? 2) Do women in different regions access and use different technology platforms? 3) Do women in different industries use different technologies?
- With input from Dell and DWEN the studies will include real world stories from women entrepreneurs on their experience accessing and using technology.

Dell WE Cities Technology Results

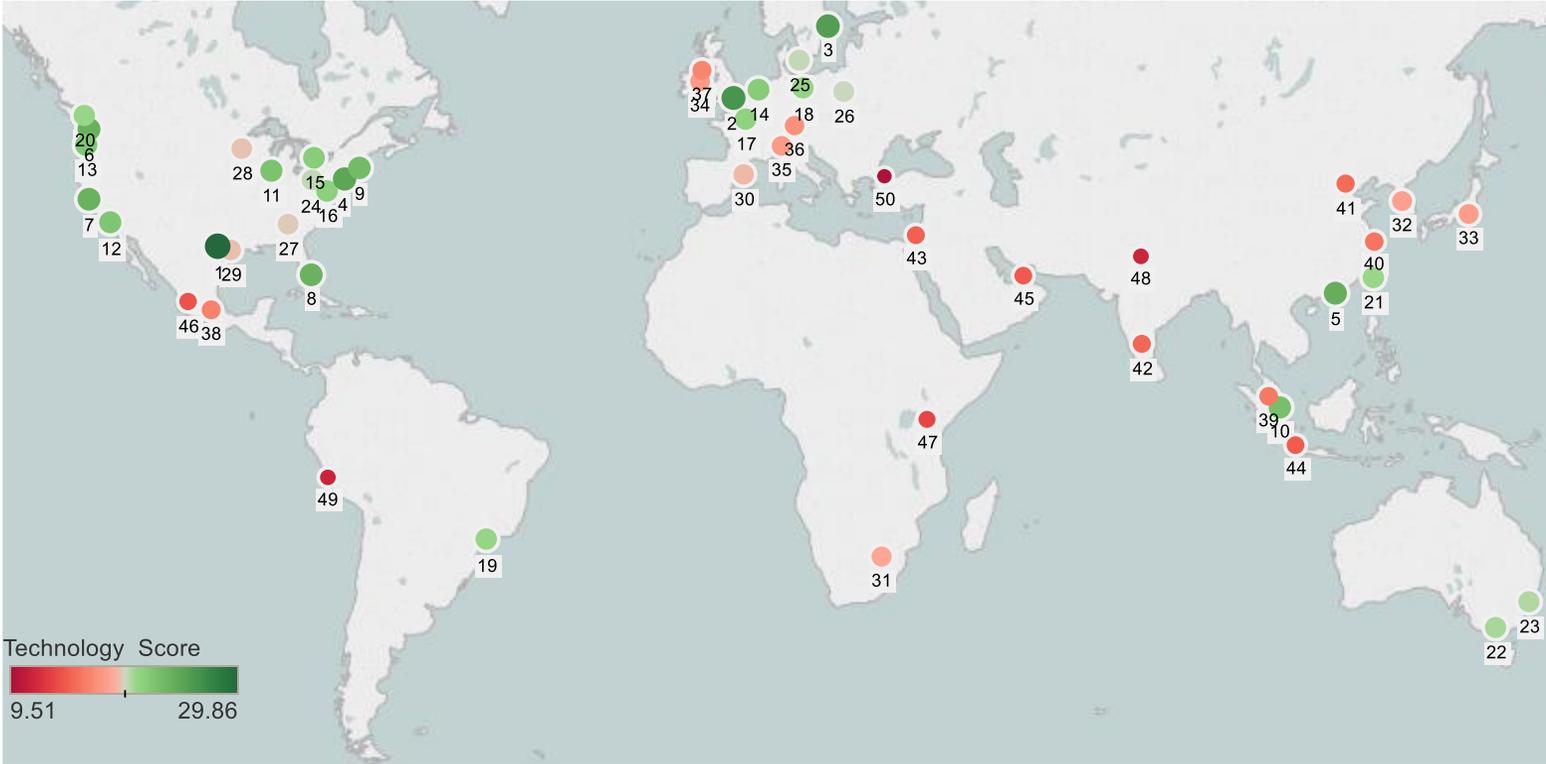


Rankings of the Technology Pillar



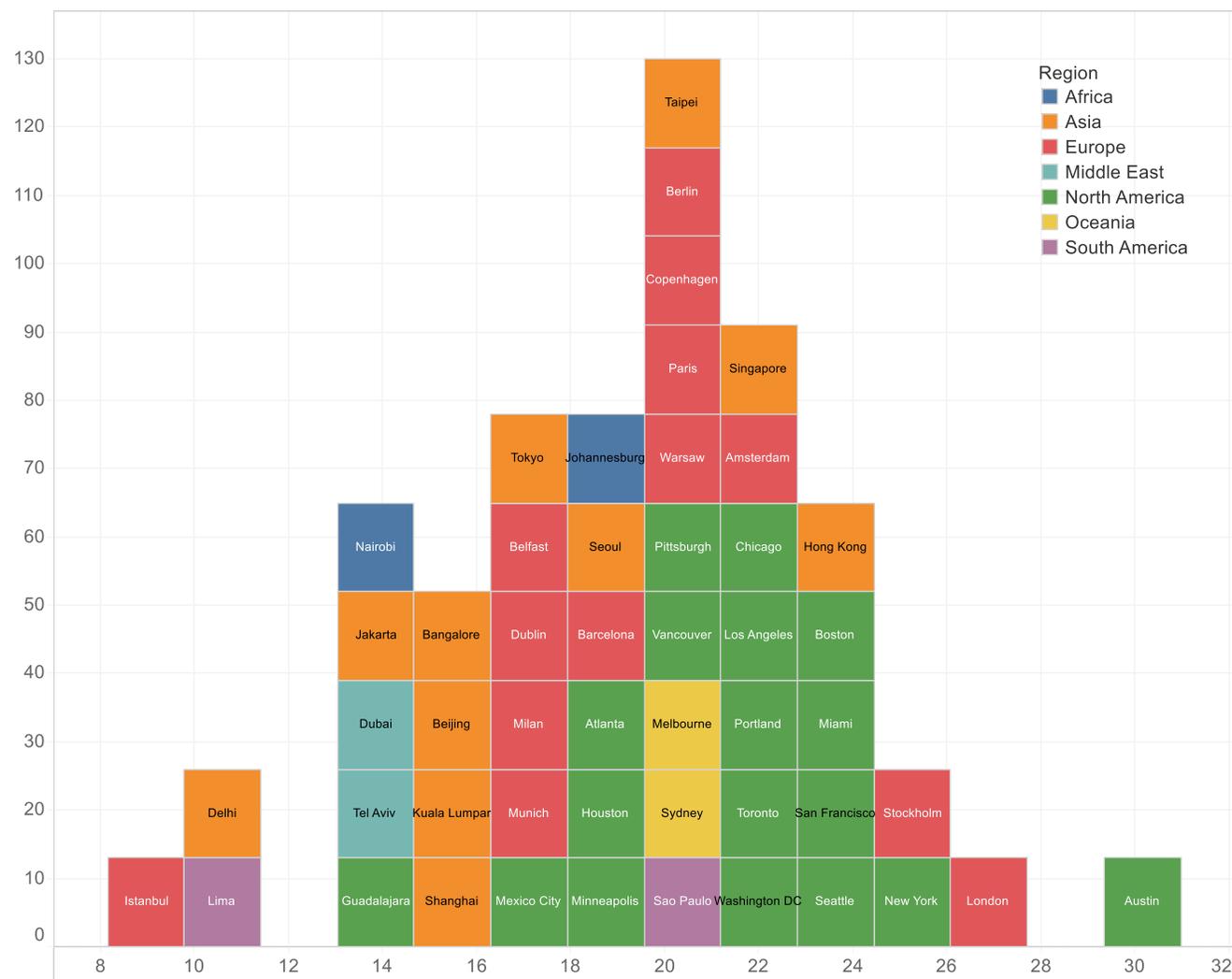
- Austin, Texas is the top city in the technology pillar
- Out of the top 10 cities, 6 are North American, 2 European, and 2 Asian
- Middle East, African, and Latin American cities lagged far behind in this pillar

Austin	1	Warsaw	26
London	2	Atlanta	27
Stockholm	3	Minneapolis	28
New York	4	Houston	29
Hong Kong	5	Barcelona	30
Seattle	6	Johannesburg	31
San Francisco	7	Seoul	32
Miami	8	Tokyo	33
Boston	9	Dublin	34
Singapore	10	Milan	35
Chicago	11	Munich	36
Los Angeles	12	Belfast	37
Portland	13	Mexico City	38
Amsterdam	14	Kuala Lumpur	39
Toronto	15	Shanghai	40
Washington DC	16	Beijing	41
Paris	17	Bangalore	42
Berlin	18	Tel Aviv	43
Sao Paulo	19	Jakarta	44
Vancouver	20	Dubai	45
Taipei	21	Guadalajara	46
Melbourne	22	Nairobi	47
Sydney	23	Delhi	48
Pittsburgh	24	Lima	49
Copenhagen	25	Istanbul	50



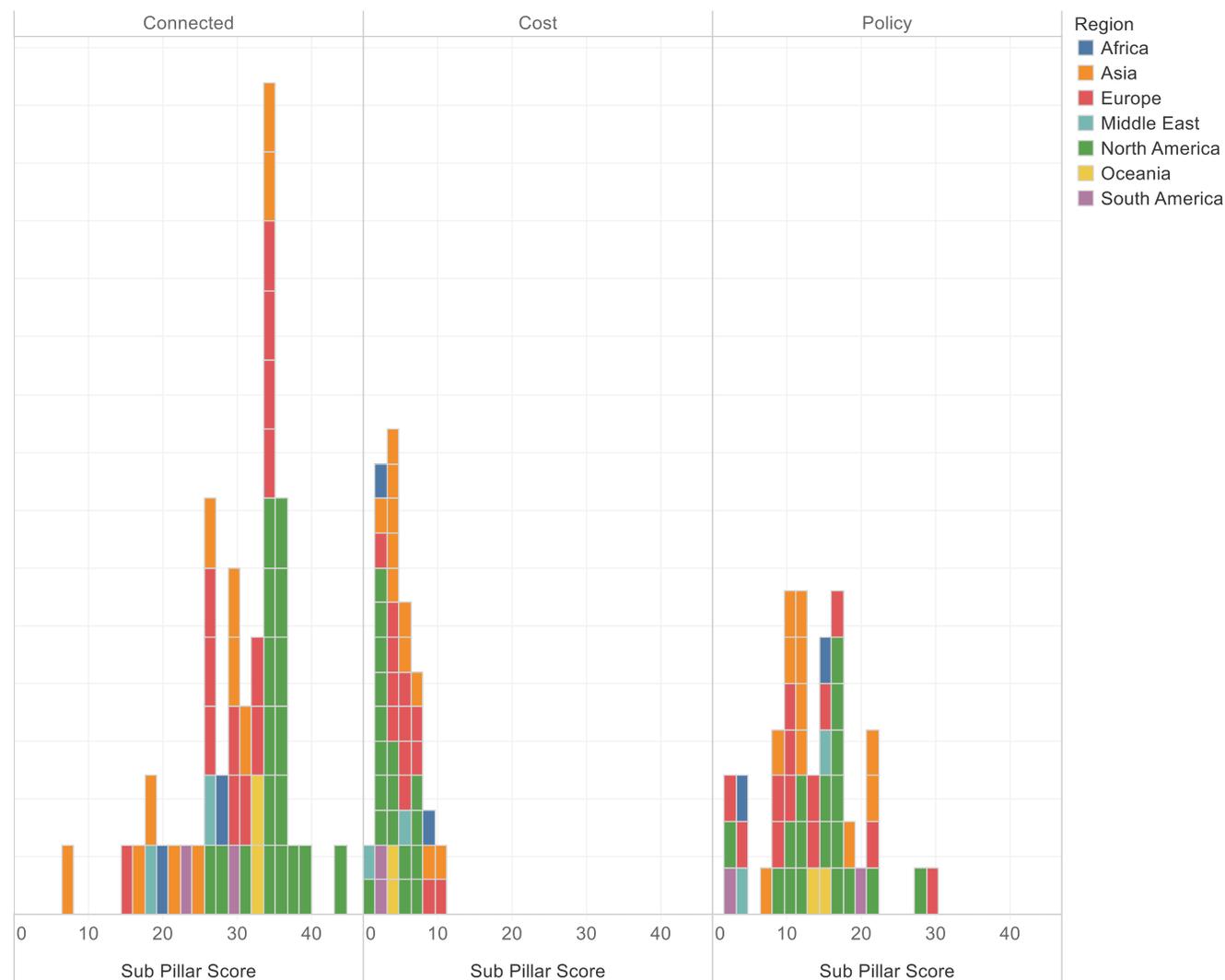
Technology Scores Distribution

- Access and use of technology varies widely across cities, creating a relatively normal distribution.
- This wide variation is spread fairly evenly across the cities in this study, suggesting that local policies and practices can make a significant difference.
- In general, Western cities and highly developed Asian cities fall on the upper half of the distribution.
- Austin only just outperforms other Western cities such as London, Stockholm, and New York in this category, while cities like Istanbul, Delhi and Lima lag far behind.



Technology Sub pillar Scores Distributions

- The distributions of the sub-pillar scores are very different from each other, giving an interesting picture of where disparities exist.
- The 'Connectedness' sub-pillar is highly skewed to the right-hand side, suggesting that high scoring cities are achieving relatively average levels of connectedness, with the others lagging far behind.
- 'Cost', on the other hand, is quite left-hand skewed, suggesting that cost is a category that could be improved across the board.
- Finally, 'Policy' has a wide, relatively flat distribution, suggesting that policies impacting the technology sector vary widely and can have a big impact on the pillar as a whole.



Benchmark City: Austin



The Austin Metro Area is the highest-scoring city for Technology. It ranks 2nd in Policy, 7th in Costs and 2nd in Connectedness out of 50 cities. Austin is an important tech hub that is well-positioned to provide female entrepreneurs with the knowledge to utilize new technologies.

Austin has a thriving tech network with women-oriented organizations and events that spread knowledge about technology. It ranks 1st in technology training, providing centers for women entrepreneurs across all sectors that enable them to improve their operations and scale up their businesses. The availability of mentoring is a meaningful factor driving the adoption of technology, as they encourage women to increase key technical skills and implement more advanced tools. Austin ranks 26th in the number of business organizations for women, many of which provide tech resources. Tech-specific ventures find well-funded start-up incubators and opportunities for collaboration with other women in the technology space.

Despite Austin's promising technology ecosystem, women entrepreneurs face a significant barrier in the form of high costs. The city ranks 42nd in mobile rates and 41st in standard internet rates. The 2015 study "Digital Inclusion in Austin" revealed that 61% of the city's 50,000 non-internet users agreed that costs were too high, and that they tended to be older, less educated and female. Efforts to expand cutting-edge telecommunications infrastructure, such as 5G and small-cell technology, are important to keeping up with Austin's booming growth.

Practices/Policies for success: Austin is one of the few cities that **collects and publishes data** on access to technology by gender and other demographics. This data enables the public, private and non-for-profit sectors to improve digital inclusion and address disparities that hold back women entrepreneurs of all backgrounds.

Tax incentives, grants and publicly-funded programs facilitate **access to technology**. These include a sales tax exemption on software and equipment employed in R&D, and the Grant for Technology Opportunities Program that awards funding and devices to projects that create digital opportunities for the community. The Texas' Skills Development Fund also provides training for employees through technical colleges.

Practices/Policies need for improvement: Austin ranks 1st both for the percent of women using the internet and using smart phones. However, investment in infrastructure to **support next-generation technology**, such as mobile broadband and high-speed optic fiber, lags behind the city's pace of growth. Reliable connectivity is crucial to supporting the business application of the internet of things and cloud computing.

Moreover, the development of interactive online sales platforms and streaming for retail promotion, as well as the ability to employ customer data insights in a smart-business ecosystem, require **improved connectivity speeds** that are relatively expensive in Austin compared to other cities.

Affordable internet access that can support emerging technologies would allow new and existing women-owned businesses to modernize, become more cost-effective and expand into global markets



Benchmark City: London



Greater London is ranked 2nd on Technology, with an international tech scene that has grown significantly over the past 5 years. It scores 1st in Policy, 16th in Cost and 30th in Connectedness out of the 50 cities studied.

London stands out for its ready availability of networking and professional development opportunities. A rich calendar of tech-related events enables women to access coaching schemes and establish cross-sector business relationships in a welcoming environment. The city ranks in the top 5 for mentoring programs for women entrepreneurs. Government initiatives, such as the Go to Grow program, offer mentoring, workshops and even access to trade missions to help businesses improve their use of technology and expand globally.

However, London scores low in the Connectedness category due to its lagging rates of smart phone ownership and social media usage compared to other large cities. It ranks 20th in the percentage of women who own a smart phone, at 89%. In addition, London ranks 35th on women's use of social media platforms such as LinkedIn, for which the ratio of women to men is only 76:100. While London scores 16th in Cost overall, it ranks 28th for the cost of mobile phone plans and 23rd for internet rates. This poses a significant barrier to internet access for women entrepreneurs.

In an effort to boost digital connectivity, the Mayor of London announced the creation of a Digital Infrastructure Fund to improve internet coverage in areas with poor provision in 2017. Moreover, the government launched an initiative to install free Wi-Fi in over 80 public buildings around the city in 2018.

Practices/Policies for success:

London ranks 7th for technology training, with a variety of **formal and informal educational opportunities** that are specifically designed for women. The city is host to many of the world's top universities and business schools, offering a wide range of courses on technology-driven innovation and the use of digital tools. Many of these award scholarships for aspiring female entrepreneurs. Community initiatives such as Code First: Professional Women organize workshops for women in all sectors to understand the role of digital tools and improve their practical tech skills.

The city's **technology-friendly policy environment** attracts investment from multinational companies and fosters the emergence of start-ups. London houses the regional headquarters of Google and Facebook, and in 2017 it received more venture capital funding for tech companies than all other major European cities put together. The importance of the tech sector creates a unique business ecosystem for women entrepreneurs to engage with emerging technologies.

Practices/Policies need for improvement:

London views data as an important part of its infrastructure, and has launched an ambitious plan to create a centralized City Data Market aimed at reducing data-sharing frictions. Nevertheless, the city could do more to ensure that gender-based disparities in technology utilization can be identified and rectified by expanding the scope of **data collection efforts** at the gender level.



Benchmark City: Sydney



Greater Sydney is an emerging global entrepreneurship center and ranks 23rd in the Technology pillar. The government actively seeks to promote innovation and gender diversity. The city ranks 24th in Policy, 34th in Cost and 22nd in Connectedness in the 2017 WE Cities Index.

The city ranks 18th in technology training organizations and provides a growing number of networking opportunities for entrepreneurs. The new Sydney School of Entrepreneurship, a government-funded NGO, brings together 12 universities and technical schools with the purpose of keeping the next generation of innovators in Australia. It hosts regular events aimed at expanding opportunities for women and spreading knowledge about the adoption of new technologies. Sydney is also home to some unique technology-oriented education initiatives. For example, the company Teacup Techies imparts personalized home lessons to help senior women use technology more effectively.

On the interviews conducted with female entrepreneurs for this study, a consistent theme amongst those operating in Sydney was the dichotomy between relying on technology to expand globally due to Australia's relative geographic isolation, and the relatively high barrier to leveraging that crucial technology.

Sydney has taken important steps towards improving internet access in recent years. The number of high-speed fiber connections rose to 1.4 million between December 2016 and December 2017, a 122% increase. In spite of this, the city ranks 44th in mobile rates and 35th in standard internet rates. Even though 89% of women in Sydney use the internet and own smart phones, a relatively high percentage, their ranks are only 20th and 21st respectively.

Practices/Policies for success: Australia offers some of the most **generous tax incentives** to start-ups in the world. These include a 10-year exemption on capital gains tax, a 20% tax offset for qualifying investments below 200,000 per investor per year, and a 10% tax offset on capital invested through early stage venture capital limited partnerships. Furthermore, in 2018 the government expanded the annual cap on cash refunds for early start-ups from AUD\$2 million to \$AUD4 million, and increased the R&D expenditure threshold for tax incentives from AUD\$100 million to AUD\$150 million.

The government of New South Wales opened the Sydney Startup Hub in 2018 to **bring entrepreneurs together**, along with investors, incubators and accelerators. It houses startups both within and outside the tech sector, providing a space for innovation, collaboration and knowledge transfer on cutting-edge technologies. Thanks to visionary projects such as this one, Australia is now in 1st place in the 2018 Economist Intelligence Unit's Technological Readiness Ranking along with Singapore and Sweden.

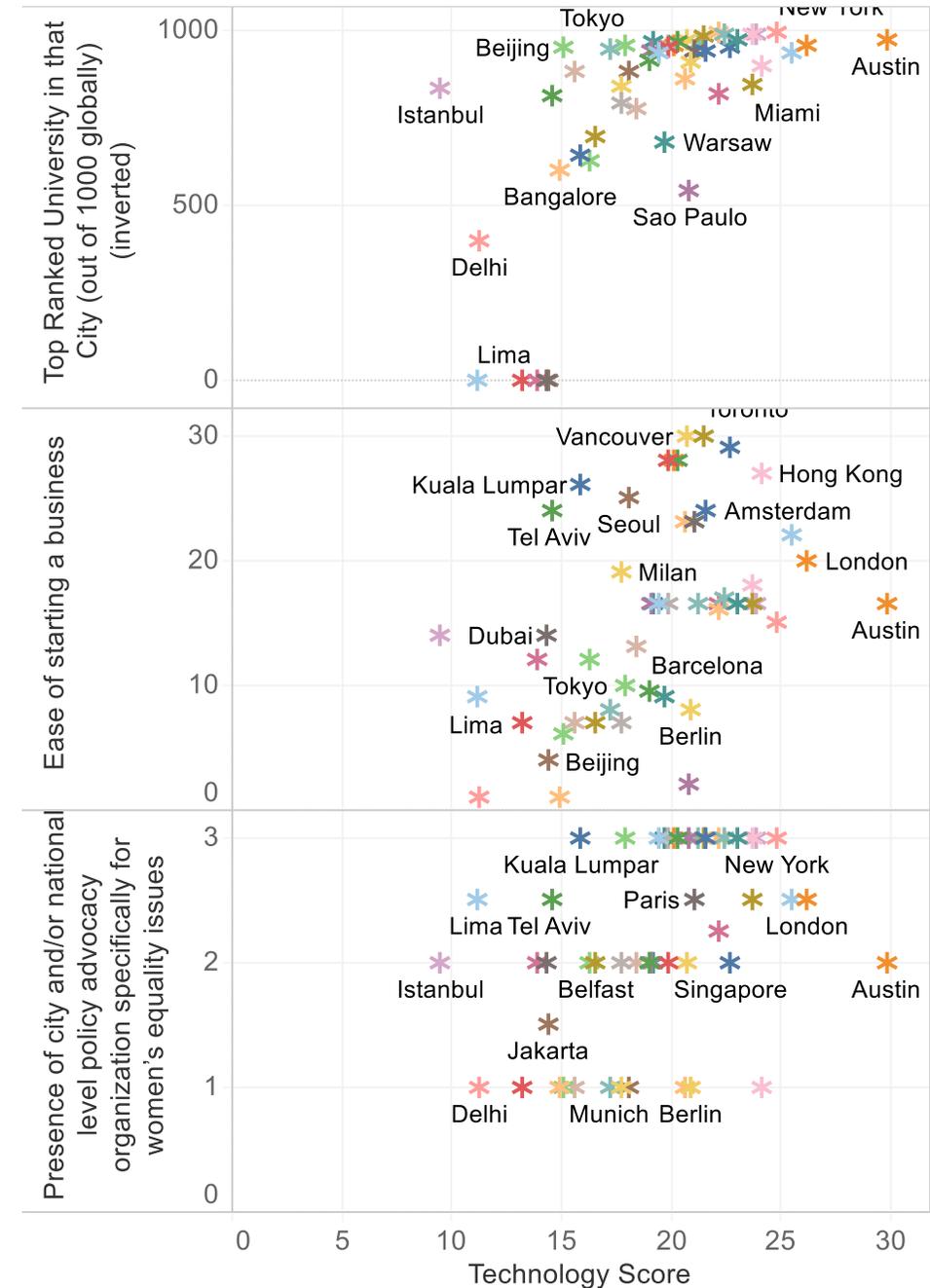
Practices/Policies need for improvement: Like other global cities looking to attract and support women entrepreneurs, Sydney would benefit from improving **data collection initiatives**. The Australian Bureau of Statistics gathers some gender-level data, but Sydney does not systematically collect data by gender or make it publicly available. Disaggregated data would facilitate the analysis of gender disparities in technology use and the design of policies that help empower women to reach their potential.

Relative geographic isolation makes global **scalability reliant on technology**, making improvements to access and cost of technology all the more crucial for female entrepreneurs in Sydney.



Non-technology Factors that drive technology access in WE Cities

- Correlations between technology and non-technology indicators provide insight into outside forces that drive technology access in WE cities.
- We calculated correlations between technology and non-technology indicators, focusing on the top 5 highest positively correlated non-technology. Then, we counted the frequency these indicators appeared in the top 3.
- The top 3 highest correlated indicators with technology are:
 - Top Ranked University in that City (out of 1000 globally) (inverted)
 - Ease of starting a business
 - Presence of city and/or national level policy advocacy organization specifically for women's equality issues



SUMMARY

RECOMMENDATIONS FOR ACCESSING TECHNOLOGY



Summary of Technology

- The Dell WE Cities technology analysis and the city case studies highlight the importance of connectivity, training and support networks.
- The cost of accessing the internet is a significant factor that affects how women use technology. Innovations that require high-speed connectivity strain telecommunications infrastructure and increase prices when investment can't keep up. Investing in improved connectivity can lay the groundwork for women entrepreneurs to derive tangible benefits from technological advancements.
- Mobile phone use and maintaining an active online presence are fundamental to scaling any business in today's fast-paced global economy. In some cities, there is a large gender gap in smartphone ownership, the frequency of mobile transactions and the use of social media platforms that magnify business visibility. Fostering parity is an important step towards empowering women entrepreneurs to improve their business outcomes.
- Technical skills training isn't just important to attract women into tech start-up hubs. Organizations that improve computer literacy in a judgement-free environment can enhance women's ability to use technology effectively regardless of what sector their business is in.

Summary of Technology

- Benchmark cities reveal the importance of mentoring networks to bolster the adoption of new technologies. Local and nationwide groups providing opportunities to ask for guidance from experienced entrepreneurs encourage business owners to implement more advanced systems.
- Tax incentives for investors and entrepreneurs play a prominent role in the development and acquisition of digital tools. Government schemes, including grants and cash refunds, can also help women entrepreneurs access the necessary technology infrastructure to expand their operations worldwide. This conclusion is supported by women interviewed across cities as part of this study.
- Reliance on technology for scaling a business beyond the local market means that high cost and restricted access to technology can have a disproportionate impact on women entrepreneurs scaling their business.
- Public access to data on technology use by gender can support the appropriate targeting and monitoring of policy interventions and community initiatives. Some of the top-ranking cities in the Dell WE Cities index have already begun to collect data on digital inclusion as part of their strategy to spur innovation and economic growth. Governments around the world can do more to make these indicators publicly available at regular intervals.