Disrupting the disruptors

Disrupting youth entrepreneurship with digital and data: the digital opportunity to empower young entrepreneurs for growth

G20 Young Entrepreneurs' Alliance

EY Building a better working world

Foreword

Digital technologies are ubiquitous to business and entrepreneurship today. Read any blog and you'll find that digital, data and analytics feature in stories of innovation and transformation. Digital platforms are powerful forces for disruption. Most often, we think of entrepreneurs leading the charge and disrupting their industries through digital. Although this is undoubtedly the case, there is an important underlying story: digital is also disrupting entrepreneurs themselves, reshaping the nature of an entrepreneur's journey from an idea to an established business. For young entrepreneurs – the "digital natives" – this demands a different approach to policy to drive effective support.

This is an important point for G20 governments. Policy initiatives in the entrepreneurial ecosystem should reflect the upheaval of youth entrepreneurship from digital. It also creates an opportunity to advance inclusiveness through entrepreneurship, particularly for young women. Harnessing digital disruption to empower young entrepreneurs is the focus of our report for this year's G20 summit. For the 2016 policy agenda, we propose a set of clear policy recommendations to G20 governments to support young entrepreneurs to thrive on digital disruption, including:

- A mobility visa for young entrepreneurs to gain exposure to digital
- Clear governance on data access and privacy
- Support for clusters and university-entrepreneur collaboration on R&D

To get here, we developed a G20 Digital Entrepreneurship Barometer, which gives us a systematic analysis of the entrepreneurial ecosystem across G20 countries. This builds on the EY G20 Entrepreneurship Barometer (2013), which assessed the entrepreneurial ecosystem in G20 countries. We also interviewed high-performing young entrepreneurs in G20 markets, in digital and traditional sectors.

This report was prepared by EY and the G20 Young Entrepreneurs' Alliance (G20 YEA). We work closely together on research and insights on youth entrepreneurship and policy. The alliance represents the voice of young entrepreneurs, without which we could not provide an honest, on-the-ground perspective on youth entrepreneurship within G20 countries.

At EY, we firmly believe the solution lies in the "Power of Three," where government, business and entrepreneurs join forces to create new opportunities for young entrepreneurs and drive lasting change. EY is the world leader in advising, guiding and recognizing entrepreneurs. For over 30 years, EY has worked with entrepreneurs and the leaders of fast-growth businesses to help them become market leaders. We also run the EY Entrepreneurial Winning Women™ program, which identifies high-potential female entrepreneurs and helps them to scale their businesses. This gives us a unique, bottom-up perspective on entrepreneurship and the policy alternatives that can support youth entrepreneurs in building their success.

Rohan Malik
Partner: Strategic Growth Leader – Global Industry,
Emerging Markets Leader – Global Government & Public Sector

G20 Young Entrepreneurs' Alliance

The G20 Young Entrepreneurs' Alliance (G20 YEA) is a collection of organizations across G20 countries that promote youth entrepreneurship to drive economic renewal, job creation, innovation and social change. The alliance represents more than 500,000 young entrepreneurs. Each year, the G20 YEA brings together hundreds of the world's top young entrepreneurs to share their ideas with B20 and G20 leaders to catalyze global change.

This year, the G20 YEA will be held in Beijing, China, on 8–10 September. Building on the success of our previous summits in Canada, France, Mexico, Russia, Australia and Turkey, we are focusing on hosting a forward-looking meeting of young entrepreneurs from across China and around the world under the theme "Disruptive Innovation. Smart Entrepreneurship." We will discuss solutions to some of the most pressing issues that young entrepreneurs face today, and one topic that sits high on our agenda is the power and implications of digitalization.

Today, the trends of digitalization are shifting the commercial landscape, creating both opportunities and challenges for entrepreneurs. China, the world's largest e-retail market, is at the forefront of this transformation, with 668 million internet users who purchased CNY3.877 trillion (US$589.61 billion) worth of goods online in 2015, according to the National Bureau of Statistics of China and the China Internet Network Information Center. A deeper understanding of how these trends affect entrepreneurs, especially young entrepreneurs – the "digital natives" – is critical to developing policy that can help empower them. For that reason, we are pleased to have EY as our Knowledge Partner for the G20 YEA, and we are pleased to include the ideas and findings in this report in our communiqué and present it to the G20 Leaders. We look forward to continuous interaction and collaboration with G20 governments to create an enabling business environment for young entrepreneurs around the world.

Xia Bing
President, G20 YEA China

The digital opportunity to empower young entrepreneurs for growth: our top policy recommendations to G20 governments

To empower young entrepreneurs to grow and scale their businesses through digital, policymakers can help set the right conditions in the entrepreneurial ecosystem. Through the EY G20 Digital Entrepreneurship Barometer and interviews with young entrepreneurs, we have identified key recommendations for proactive policy. Our top 11 recommendations are included below, with the full suite of recommendations presented in the main report.

Access to finance

- **Promote** the development of early-stage financing and support schemes for young entrepreneurs, including incubators and accelerators
- **Reduce** investment barriers to promote access to foreign capital for entrepreneurs

Entrepreneurial culture

- **Introduce** entrepreneurship as a specialized stream in higher education and integrate it throughout courses at the primary and secondary levels
- **Engage** industry in developing and delivering tech-, digital- and management-focused training
- **Protect** young entrepreneurs with targeted intellectual property provisions to encourage innovation and collaboration with larger organizations and investors

Digital business environment

- **Champion** a G20 entrepreneur visa and promote the development of support networks for newly arrived entrepreneurs in G20 host countries
- **Establish** clear guidelines on data privacy and security, including usage, data rights and quality

Digital skills and entrepreneurial education

- **Teach** entrepreneurship in schools, from elementary to the final years of high school, and prioritize science, technology, engineering and mathematics (STEM), particularly for female students
- **Promote** youth entrepreneurship mentoring and coaching programs within industry and entrepreneurship networks

Digital knowledge base and ICT[1] market

- **Foster** multi-stakeholder digital clusters and networks, including those with a sector- or city-level focus, along with coaching and mentoring schemes
- **Support** university-entrepreneur collaboration, including through funding incentives for universities

[1] Information and communications technology.

Digital, big data and analytics are omnipresent in the economy and society. The digital economy is estimated to contribute up to 8% of GDP in G20 countries and is growing at a rapid pace.[2] With this transformation well underway, digital platforms and data flows have significant impact on how businesses grow, scale and operate. The trend is opening the door to new products, services and business models and is causing continual change in the nature of innovation; global trade and value chains; mobility and collaboration; and connectivity among businesses.[3] This disruptive force will only strengthen in the coming years as technological innovation charges ahead, processing power costs continue to decline, and the integration of digital tightens through robotics and artificial intelligence, for example.

The growth of these drivers and their penetration into consumer markets, business models and decision-making are disrupting large and small companies alike. "Digital disruption" is a pivot point for entrepreneurs, particularly young ones. Business models — including strategy, value creation and measurement, customer insights and expectations, and operating models — are all ripe for disruption. Entrepreneurs aren't just disrupting their industries; the very nature of entrepreneurship is also prone to disruption. The influence and reach of digital, big data and analytics can have significant implications for how entrepreneurs innovate, iterate and scale. These drivers are at work throughout the entrepreneurial ecosystem, affecting finance, culture, education, coordinated support, and regulation and taxation.

This is especially important for young entrepreneurs — "digital natives" who have a stronger connection to digital technologies[4] than prior generations do. As they start down their business growth path, they possess a unique opportunity to benefit from the tools, insights and market opportunities that data and analytics can provide. They can also accelerate female entrepreneurship by promoting key drivers of economic empowerment,[5] such as access to mentorship, networks, markets, and new and tailored funding platforms, as well as reinforcement of technological capabilities.

Policy can play an important role in turning digital disruption into a powerful opportunity for young entrepreneurs. Supporting an entrepreneurial ecosystem that empowers young people to ideate, grow and scale their businesses through digital, data and new analytical tools is a significant opportunity for G20 governments. This report presents a Digital Entrepreneurship Barometer model to evaluate the digital ecosystem across the G20. It considers the drivers of "digital disruption" and their impact on the young entrepreneur's venture — the business model, technology and data. To bring together the "top down" entrepreneurial ecosystem and the "bottom up" view of digital, it presents a set of clear policy recommendations for G20 governments to strengthen the digital-enabling environment.

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[2] "The importance of the digital economy," *European Commission website*, http://ec.europa.eu/growth/sectors/digital-economy/importance/index_en.htm, accessed April 2016.

[3] "Digital Economy: Innovation, Growth and Social Prosperity," *OECD website*, http://www.oecd.org/sti/ieconomy/sti-cancun-2016-flyer.pdf, accessed May 2016.

[4] "Are digital natives really good at using technology?" *World Economic Forum Agenda Blog*, https://www.weforum.org/agenda/2015/05/are-digital-natives-really-good-at-using-technology, May 2015; "Increasing Entrepreneurship in the Digital Economy," *World Bank Group website*, http://www.worldbank.org/content/dam/Worldbank/document/Trade/InnEntre_EntreInDigitalEconomy.pdf, accessed May 2016.

[5] Geri Stengel, "Is Change In The Wind For Women Entrepreneurs Raising Capital?" *Forbes*, 2016.

Digital disruption is a dominant business force

Some headline figures from the Organisation for Economic Co-operation and Development (OECD) set the scene for discussion on how digitalization, data and analytics have altered the economic and business environment. According to the OECD, some 90% of internet users bank online, and 80% shop online. Business productivity is boosted through data by 5%–10% on average. Looking to the future, the OECD estimates that 65% of children today will work in jobs that do not yet exist and expects OECD economies to have 14 billion connected devices, for a population of 1.3 billion, by 2022 alone.[6]

Digital, big data and analytics

- **Digital platforms** are the technological basis for service delivery, information exchange, and transactions between businesses and peers through the value chain and end users.
- **Big data** is high-volume, high-velocity and highly varied data.
- **Big data analytics** is about examining big data sets using algorithms. This can drive descriptive, predictive or prescriptive analysis

These trends have important implications for business. For example, the customer is transforming from an end user to a strategic driver and key influence through the value chain. Customers want more speed, convenience and connectivity, and business models need to flex or grow with these expectations. The quantum of consumer data created every day drives significant opportunities for businesses to leverage this information, including for more personalized services, changes to distribution channels and marketing. Data-driven decisions, particularly reflecting customer data, are the foundation for value creation.[7] The data itself is also an important asset that can be monetized and needs to be protected. At the same time, it is a catalyst for greater transparency from business leadership.

Building blocks for digital, data and analytics are ubiquitous, meaning real value creation for business needs to come through digital transformation.[8] Businesses that can use these platforms in novel ways — to create new revenue streams, engage with stakeholders differently or transform their customer experience — can drive significant gains from digital. This is where entrepreneurs arguably have an edge on incumbents, challenging existing industry models and using digital platforms as a foundation for growth.

The edge for "digital native" entrepreneurs

> "The new generation of entrepreneurs are much more savvy than previous generations. The way in which people use and interact with technology has changed enormously in a very short period, and the new breed of entrepreneurs are very adept at understanding the potential of digital and inventing new services."
>
> **Arsalain El Kessir**
> Founder and President, BoursedesCrédits (France)

For young entrepreneurs, their relationship with digital technologies can be a further differentiator. Young people are consistently the first to adopt new digital technologies, absorbing them into their daily activities, including social and business interaction and decision-making.[9] Because digital tools are effectively a utility for many young people in G20

[6] Digital Economy: Innovation, Growth and Social Prosperity," *OECD website*, http://www.oecd.org/sti/ieconomy/sti-cancun-2016-flyer.pdf, accessed May 2016.

[7] "How can data transform customer experience," *World Economic Forum website*, http://reports.weforum.org/digital-transformation-of-industries/transforming-customer-experiences-with-data, accessed May 2016.

[8] Bala Iyer, "Young entrepreneurs, this is your time. But are you a digital innovator?" *LinkedIn Pulse*, 2016.

[9] "Increasing Entrepreneurship in the Digital Economy," *World Bank Group website*, http://www.worldbank.org/content/dam/Worldbank/document/Trade/InnEntre_EntreInDigitalEconomy.pdf, accessed May 2016; "The Fallacy of the 'Digital Native': Why Young People Need to Develop their Digital Skills," *ECDL.org*, http://www.ecdl.org/media/TheFallacyofthe'DigitalNative'PositionPaper1.pdf, accessed May 2016.

Digital to empower young female entrepreneurs:

For both young female and young male entrepreneurs, digital will likely be inherent to founding and scaling a venture. The relevant capabilities to most effectively use emerging and digital technologies to help their organizations grow and scale will be critical.

There are clear gaps in entrepreneurial activity between women and men, suggesting digital could represent an important opportunity to level the score. In OECD countries, men are estimated to be three times more likely to own a business with employees. At the same time, women rarely own large businesses in these economies, and their average earnings from self-employment are up to 60% lower than men's.[10] Furthermore, a measure of high-potential female entrepreneurship, the Global Entrepreneurship and Development Institute's Female Entrepreneurship Index (2015), shows that 61% of countries score below 50 out of 100. Many countries need to pursue significant changes to reduce barriers to female entrepreneurship.[11] At the same time, progress to empower young women has reportedly been patchy. In the EU, recent research suggests that women's participation in digital enterprise lags behind men's and that the core challenges are funding structures and access to resources.[12]

There is a significant opportunity here because digital offers tremendous potential to scale up activity among young female entrepreneurs. Policy initiatives that promote access to finance, training and awareness-raising, as well as access to mentorship, can empower young women as entrepreneurs.[13] Digital could be a particularly effective conduit. For example, fostering networks and mentorship through digital channels could change the game for young female entrepreneurs. Digital can also provide access to global markets through online channels, reduce barriers to entry for new business ideas[14] and act as a platform for targeted fundraising.[15] Thus, policy support for skills development in ICT and other techno-managerial skills will be an important complement. Confidence is a critical barrier to female entrepreneurship: 46% of US women, for example, say they have the skills and knowledge to start a business, compared with 61% of men.[16] Empowering young women with digital and IT capabilities could go a long way toward closing this gender gap.

[10] Mario Piacentini, "Women Entrepreneurs in the OECD," OECD, 2013.

[11] "The 2015 Female Entrepreneurship Index," Global Entrepreneurship and Development Institute, https://thegedi.org/2015-female-entrepreneurship-index-press-release, accessed May 2016.

[12] "Gender equality and empowering women in the digital age," *Global Greens*, 2015.

[13] Mario Piacentini, "Women Entrepreneurs in the OECD," OECD, 2013.

[14] Nellie Akalp, "Why Women Make Excellent Entrepreneurs in the Digital Age," *Mashable.com*, 2011.

[15] Geri Stengel, "Is Change In The Wind For Women Entrepreneurs Raising Capital?" *Forbes*, 2016.

[16] Ibid.

countries, their proliferation has a significant impact on this wave of entrepreneurship, not only in high-tech industries but also across sectors. This suggests that "digital disruption" means something different for young entrepreneurs than for earlier generations, and it underscores the need to understand how younger entrepreneurs transform in the face of digital drivers: how do these tools impact organizations and business processes? How are younger entrepreneurs thinking about using emerging and digital technologies to help their businesses grow, improve and become more efficient?

> "When I compare my company to my father's, I can say that the revenue growth we achieved in the first 5 years equals what it took his company to do in its first 15 years. This is both because of the nature of the technology sector we are operating in and because of my company's high engagement level to digital technologies."
>
> **Sezen Sungur Saral**
> Founding Partner and Vice President, Reeder, Turkey

Understanding how digital disrupts young entrepreneurs is crucial to developing policy that can help empower them.

To take a comprehensive look at how digital, data and analytics are driving disruption and empowerment for young entrepreneurs across the G20, we need an "on the ground" perspective. Interviews with leading young entrepreneurs in the EY and G20 YEA networks provide invaluable insights on disruptors at the business level. We need to map this to the entrepreneurial ecosystem to link these insights to opportunities to support growth through public policy.

At EY, we have developed the Digital Entrepreneurship Barometer to assess relative strengths and weaknesses in the digital ecosystem in G20 countries. The model also helps compare and contrast performance across economies to identify leading practices and guide policy design.

The EY G20 Digital Entrepreneurship Barometer

- The EY G20 Digital Entrepreneurship Barometer takes a focused digital lens to the five pillars of entrepreneurship to assess country performance and help identify areas of relative strength and opportunities for improvement.
- The model is composed of quantitative data to capture entrepreneurial conditions across G20 economies. Conditions are assessed by pillar: access to finance; entrepreneurial culture; digital business environment; digital skills and entrepreneurial education; digital knowledge base and ICT market.

The following represents the overall ranking of G20 countries by quartile

- Quartile 1 represents the countries that are leading in fostering entrepreneurship. Each of the five digital entrepreneurship pillars are weighted equally to provide an overall country ranking

EY G20 Digital Entrepreneurship Barometer: G20 countries by quartile (in alphabetical order by quartile)

Quartile 1	Quartile 2	Quartile 3	Quartile 4
Canada	Australia	China	Argentina
Germany	EU	Indonesia	Brazil
Japan	France	Italy	India
United Kingdom	Saudi Arabia	South Africa	Mexico
United States	South Korea	Turkey	Russia

The EY G20 Digital Entrepreneurship Barometer: overall results

Rankings and scores – pillars (EY G20 YEA 2013 Report Entrepreneurship Barometer pillar indicated in parentheses)

Rank	Access to finance (Access to finance)	Score	Entrepreneurial culture (Entrepreneurial culture)	Score	Digital business environment (Regulation and tax)	Score	Digital skills and entrepreneurial education (Education)	Score	Digital knowledge base and ICT market (Coordinated support)	Score
1	Canada	8.09	United States	9.67	United Kingdom	7.57	United States	8.44	United States	9.10
2	United States	8.08	Germany	8.65	Canada	7.27	Japan	7.72	United Kingdom	8.96
3	Japan	7.37	Japan	7.97	United States	6.85	Australia	7.69	Germany	7.82
4	Australia	7.14	United Kingdom	7.96	South Korea	6.66	France	7.60	Canada	7.64
5	France	7.01	Canada	7.80	Germany	6.48	Canada	7.58	Japan	7.56
6	South Africa	6.91	Australia	7.33	Japan	6.34	South Korea	7.26	France	7.49
7	Saudi Arabia	6.59	Saudi Arabia	6.56	Australia	6.31	United Kingdom	6.89	Australia	7.40
8	Germany	6.54	EU	6.46	Saudi Arabia	6.30	EU	6.72	EU	7.11
9	United Kingdom	6.22	South Korea	6.45	EU	6.28	Germany	6.70	South Korea	6.06
10	China	5.95	France	6.10	France	5.91	Italy	5.66	Saudi Arabia	5.20
11	Indonesia	5.71	Brazil	4.84	Russia	5.53	Turkey	5.00	Italy	4.38
12	EU	5.54	South Africa	4.61	South Africa	5.19	China	4.53	South Africa	4.37
13	India	5.20	Turkey	4.45	Turkey	4.96	Saudi Arabia	4.43	China	4.36
14	Turkey	4.57	Indonesia	4.15	Italy	4.87	Argentina	4.31	Mexico	4.16
15	Brazil	4.14	Mexico	3.77	Indonesia	4.56	Russia	4.18	Indonesia	4.13
16	Mexico	3.99	China	3.68	China	4.47	South Africa	3.85	Russia	3.39
17	South Korea	3.79	Argentina	2.59	Mexico	4.37	India	3.85	Turkey	3.22
18	Russia	3.53	Italy	2.51	India	3.83	Indonesia	3.34	Argentina	2.68
19	Italy	2.45	India	2.46	Brazil	3.39	Mexico	2.39	Brazil	2.57
20	Argentina	1.17	Russia	1.99	Argentina	2.85	Brazil	1.87	India	2.40

The entrepreneurial ecosystem disrupted: the impact of digital, data and analytics

How does the digital entrepreneurial ecosystem vary throughout the G20? Assessing the performance of G20 countries across the five pillars can help inform our understanding of how digital disruption impacts young entrepreneurs and how policy could better support opportunities.

> "Yes, young people are different, and this is an advantage. ... We believe young people are digital natives, very familiar with digital technologies and how to use them. They learn a lot faster. They have the right mindset to remain open to innovation, disruption and changes ... to being flexible, to working with very diverse stakeholders and environments. This is where new generations are different. The fact is you can start any business with nothing – you need office space, an internet connection and that's it."
>
> **Mats Carduner**
> Cofounder and CEO, fifty-five (France)

Access to finance

(corresponding to EY G20 YEA 2013 Report Entrepreneurship Barometer pillar: access to finance)

EY Digital Entrepreneurship Barometer rankings, 2016

G20 country	Ranking
Canada	1
United States	2
Japan	3
Australia	4
France	5
South Africa	6
Saudi Arabia	7
Germany	8
United Kingdom	9
China	10

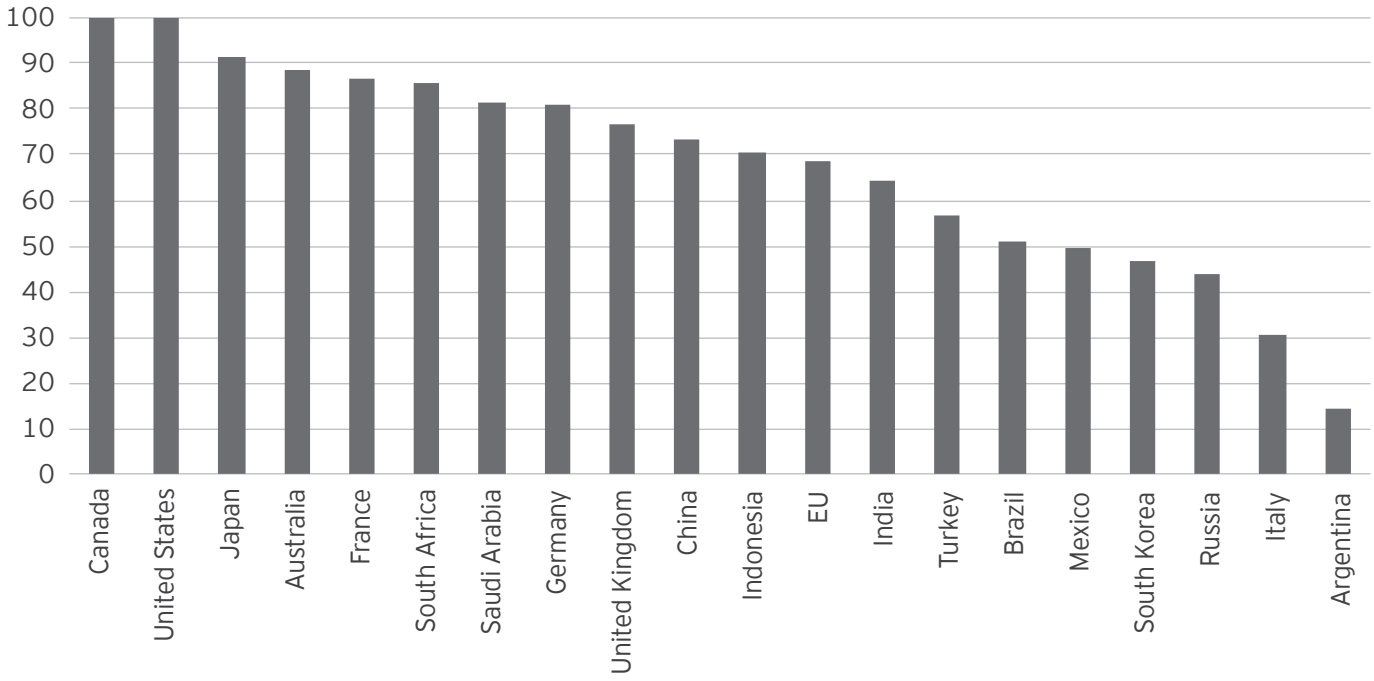
G20 country	Ranking
Indonesia	11
EU	12
India	13
Turkey	14
Brazil	15
Mexico	16
South Korea	17
Russia	18
Italy	19
Argentina	20

Risk capital, lending and financial regulation drive the assessment of financial conditions in the Digital Entrepreneurship Barometer. In fact, anecdotal evidence[17] suggests that accessing finance – tapping into risk capital and sufficient capital to scale – is a major hurdle for entrepreneurs, irrespective of their digital fluency. As a result, the Digital Barometer highlights risk capital as a key determinant of overall performance; countries with the highest scores on risk capital were typically the strongest overall performers on access to finance. This also indicates clear areas for opportunity for reform, or further improvement, on access to financing sources, including venture capital and angel funding . Effective financial regulation is an important complement, with regulation and risk capital highly correlated, particularly relative to regulation and lending.

For digital natives, this suggests that new mechanisms to access risk capital could be important. For example, the ability to obtain alternative financing using different collateral, or different markers of creditworthiness, could have a high impact, alongside financing regulations.

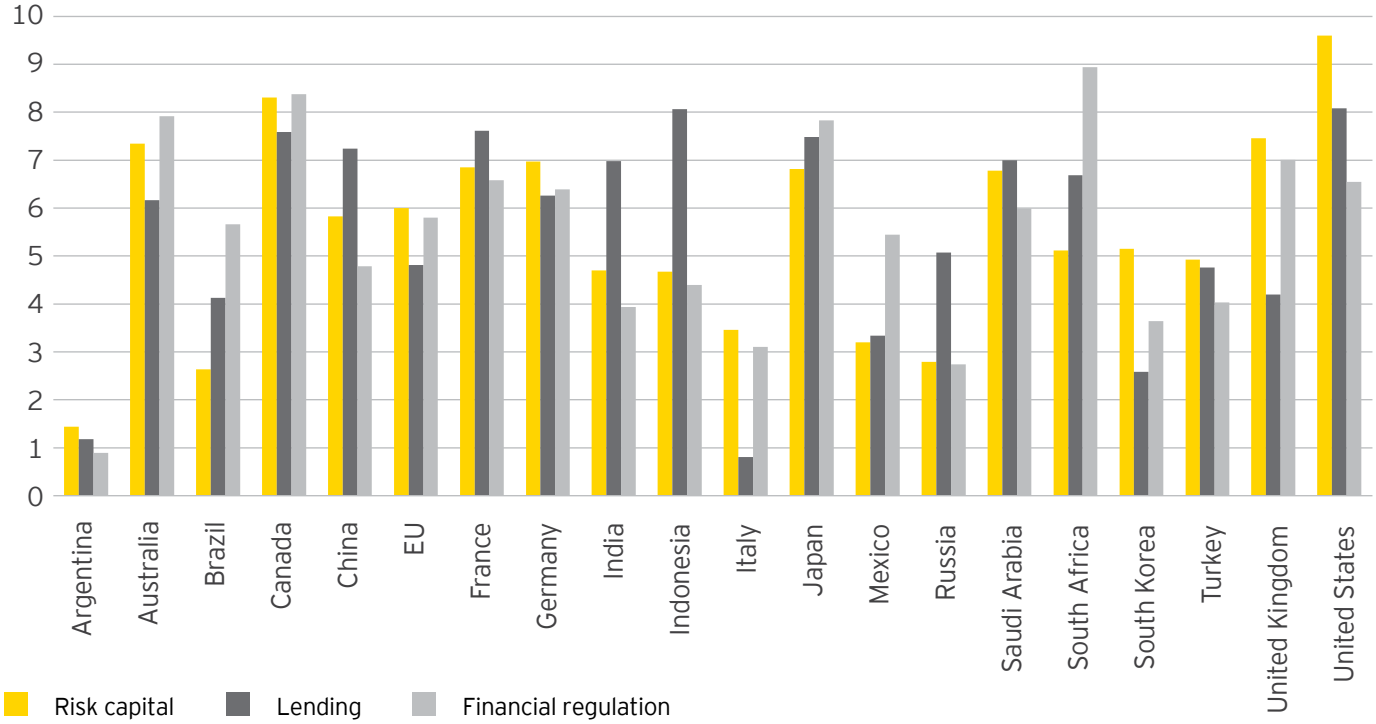
[17] Refer to interviews for this report and the G20 Barometer (2013).

Financial conditions vary widely across the G20



Access to finance distance to best-performing G20 country (best performing =100)

Risk capital is a critical determinant of overall financial conditions



Entrepreneurial culture

(corresponding G20 YEA 2013 Report Entrepreneurship Barometer pillar: entrepreneurial culture)

EY Digital Entrepreneurship Barometer rankings, 2016

G20 country	Ranking
United States	1
Germany	2
Japan	3
United Kingdom	4
Canada	5
Australia	6
Saudi Arabia	7
EU	8
South Korea	9
France	10

G20 country	Ranking
Brazil	11
South Africa	12
Turkey	13
Indonesia	14
Mexico	15
China	16
Argentina	17
Italy	18
India	19
Russia	20

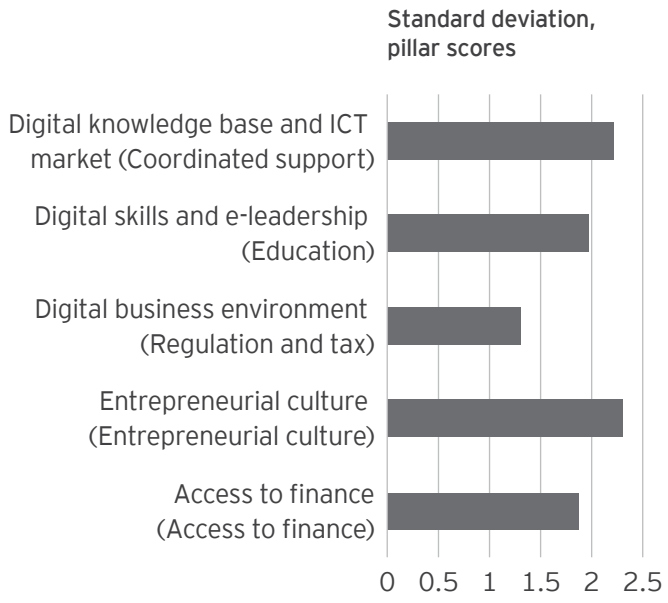
The entrepreneurial culture pillar shows the widest dispersion in scores across G20 countries. Cross-country differences in technology absorption are a key factor, reflecting notable variation in firm-level absorption and patent activity. This makes sense, reinforcing interview feedback from young entrepreneurs that protection of intellectual property (IP) is a precondition for a more supportive digital entrepreneurship culture. For countries with lower absorption scores, this suggests a big opportunity to boost uptake through reform.

> "A patent is only as strong as the depth of your pockets. ... The first thing investors want to do is take IP offshore. It is a shame to see this. ... I want to keep this innovation here."
>
> **Georgia Beattie**
> Founder, Beattie Wines (Australia)

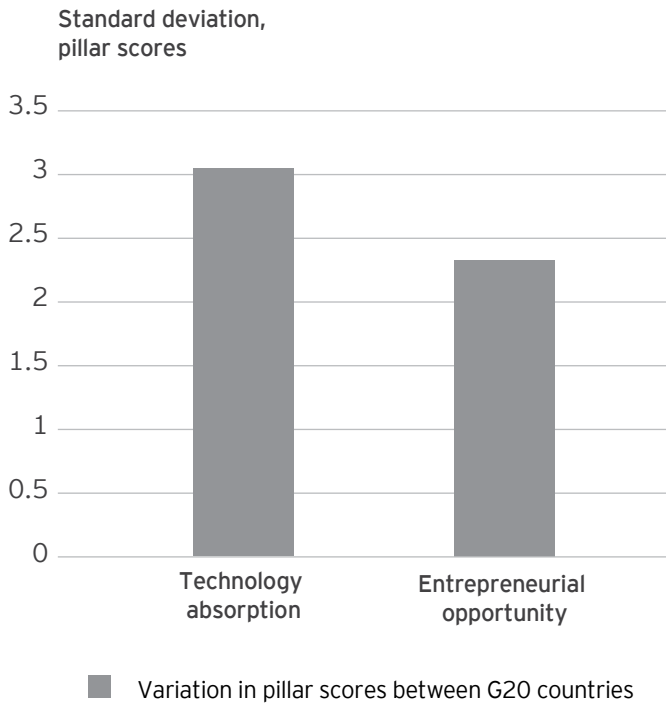
Overall, entrepreneurs' perceived opportunity was the softer component of culture, indicating that public perception of entrepreneurship as a career option and a country's capacity to retain talent are points that demand improvement in G20 countries. Young entrepreneurs also made this clear in their interview feedback, highlighting that some nurturing is required to help digital innovation thrive. For these digital natives, this could mean explicit policy support for entrepreneurship as a career choice, including through education.

> "Canada is quite strong in supporting technology, for example with SR&ED credits to finance new innovation. However, the government and early education programs need to better embrace an entrepreneurial mentality and actively build the culture to support it."
>
> **Daniel Rodic**
> Cofounder (Canada), Exact Media

There is wide variation in entrepreneurial culture pillar scores across the G20. ...



... Big differences in technology absorption between countries are a key factor.



Digital business environment

(corresponding G20 YEA 2013 Report Entrepreneurship Barometer pillar: regulation and tax)

EY Digital Entrepreneurship Barometer rankings, 2016

G20 country	Ranking
United Kingdom	1
Canada	2
United States	3
South Korea	4
Germany	5
Japan	6
Australia	7
Saudi Arabia	8
EU	9
France	10

G20 country	Ranking
Russia	11
South Africa	12
Turkey	13
Italy	14
Indonesia	15
China	16
Mexico	17
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Argentina	20

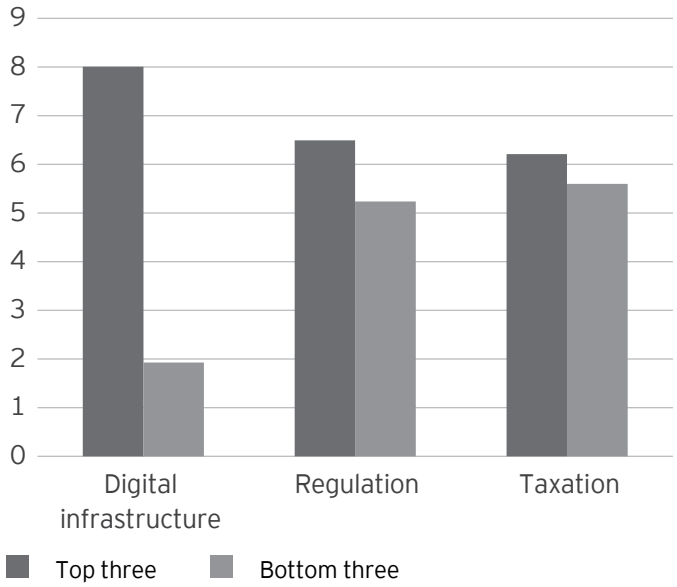
Digital infrastructure is the standout subpillar for the digital business environment, with significant variation between high- and low-scoring countries in the Digital Barometer. This highlights the importance of strong ICT infrastructure, such as broadband connectivity, and the impact of digital technology use on entrepreneurial opportunities in the G20.

At the same time, solid regulation and taxation frameworks provide a critical foundation for the entrepreneurial ecosystem. In particular, those countries with stronger performance on regulation, including hiring and firing practices, time to start a business and legal efficiency, typically had higher scores for their overall digital business environment.

To best support digital natives, this analysis suggests, a sound business regulatory and taxation environment should be a cornerstone of the entrepreneurial ecosystem. Streamlined business administration requirements and a clear and competitive tax code are fundamental for digital drivers to shine through. Governance of data and privacy rules is also vital.

Digital infrastructure is the key differentiator for the strength of the digital business environment.

Average score for subpillar



"Regulation is a key aspect we need to figure out. It's not only about businesses being transparent and open to users. It's not only about education. Regulation is going to be key to establish the balance of power between business and users.

"Digital and data need coordination across the globe. We need a homogenous framework across major economic areas. It needs to be realistic and intelligible and faster to adapt. There is a trade-off between being innovative and respecting users. Policy needs to find the right balance between protecting user rights and promoting innovation."

Mats Carduner
Cofounder and CEO, fifty-five (France)

Digital skills and entrepreneurial education

(corresponding G20 YEA 2013 Report Entrepreneurship Barometer pillar: education)

EY Digital Entrepreneurship Barometer rankings, 2016

G20 country	Ranking
United States	1
Japan	2
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France	4
Canada	5
South Korea	6
United Kingdom	7
EU	8
Germany	9
Italy	10

G20 country	Ranking
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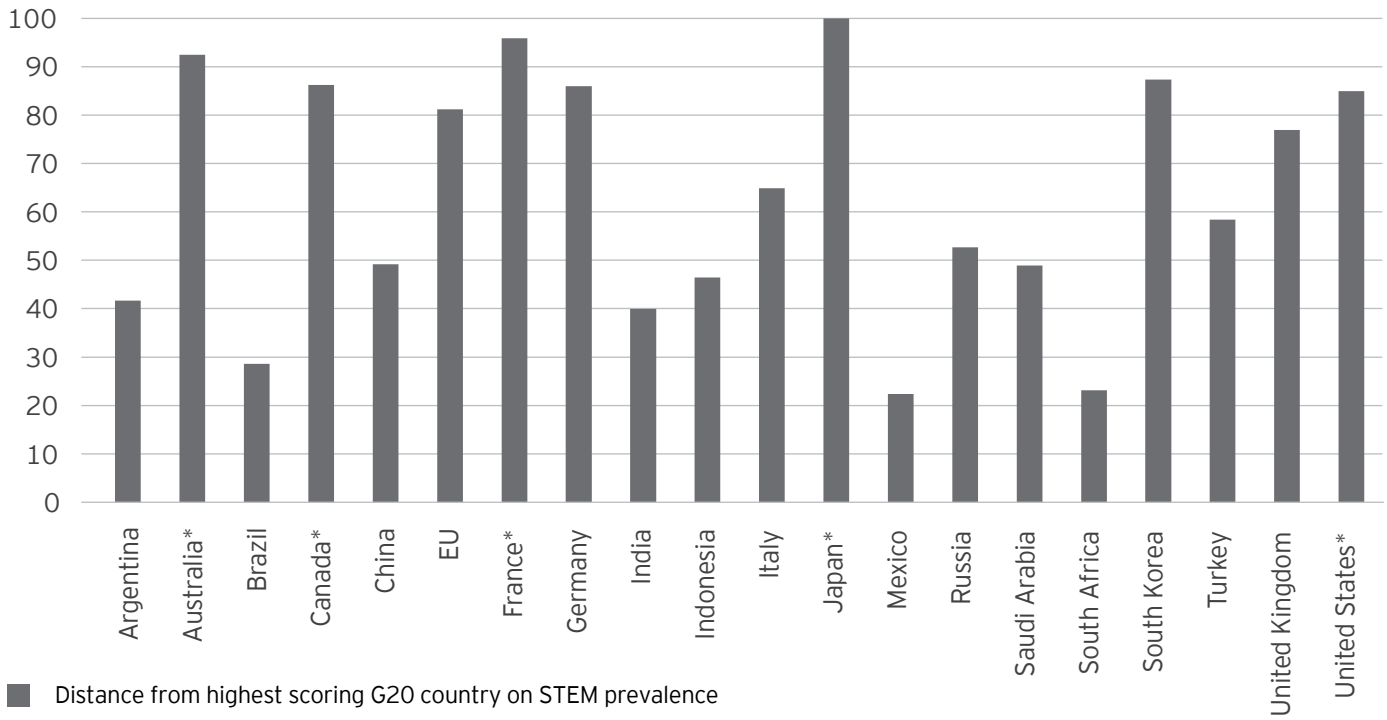
Saudi Arabia	13
Argentina	14
Russia	15
South Africa	16
India	17
Indonesia	18
Mexico	19
Brazil	20

The prevalence of technology, as well as science and quantitative skills, in an economy is a major driver of performance on "digital skills and entrepreneurial education" in the Digital Barometer. Results suggest wide variation across G20 countries, indicating scope for investment and upside in many markets. Stronger scores on technology and quantitative skills are also typically associated with higher scores for "business leadership," or management education and human capital. This highlights that the two go hand in hand to empower young entrepreneurs for digital innovation, supporting their preparedness for digital disruption.

This suggests that the opportunity to gain both technical and leadership skills can support young entrepreneurs for success in a digital environment. Mentorship and coaching programs seem critical, providing young people with real-world exposure to these competencies in action. This includes extracurricular activities and networks for young people focused on entrepreneurship. Formal classroom programs could also give young people hands-on experience with tech and data tools and teach them to think strategically on digital and data, including customer engagement, product development, and the use of artificial intelligence and predictive analytics in decision-making.

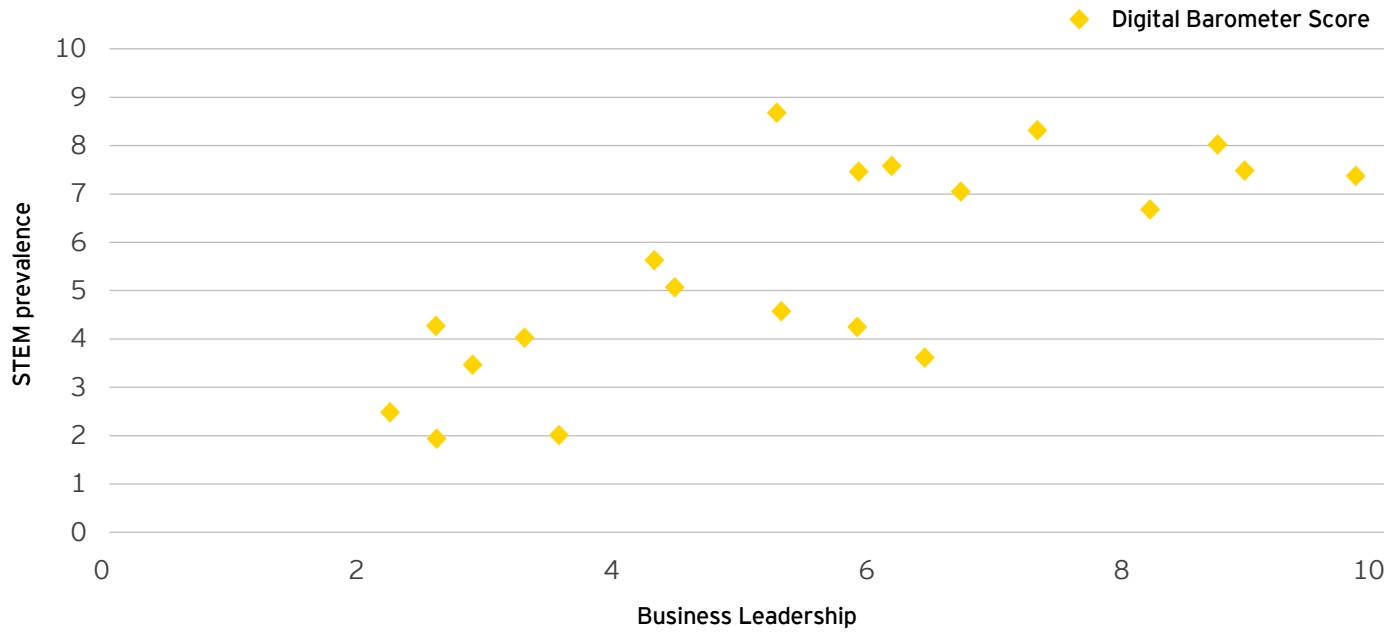
The opportunity to gain technical and managerial skills empowers entrepreneurs in a digital environment.

Distance from highest scoring country on STEM prevalence (highest score=100)



* Denotes country in Quartile 1 of the G20 Digital Entrepreneurship Barometer.

Opportunities to obtain technology and leadership skills go hand in hand (stem prevalence vs. business leadership)



Case study: teaching entrepreneurship and digital skills – Startup Tech, US

In their middle school class, two bilingual Latino students are building an app that helps Latinos connect with lawyers in their area, since many bilingual people in their community are afraid to visit a law office on their own.

Another middle school team is building an app where people can learn about different endangered species and make donations to protect the animals.

High school students from the New York metro area created MTAlarm, an alarm clock app that adjusts for any traffic changes in your morning commute and wakes you up earlier if need be.

These young people, all from underresourced communities, are seeing firsthand that they can help people (and other living things) – and marry this with profit – by using technology to solve problems. They are participants in the Startup Tech course from the Network for Teaching Entrepreneurship (NFTE). The blended-learning tech-entrepreneurship course asks students to identify ways to improve their world through marketable digital solutions.

Startup Tech is offered for grade levels 6–9 and 9–12. With no experience necessary, every student imagines and builds an app, develops an original business plan and pitches his or her business for the chance to win funding. Startup Tech graduates demonstrate an increased interest in STEM careers and a more developed entrepreneurial mindset, the life-changing set of skills and behaviors that equip youths to recognize opportunity, take initiative and innovate in the face of challenges. NFTE believes that teaching the entrepreneurial mindset alongside coding and app building can equip students not only with the programming languages of the day but also with the skills required for long-term success.

Digital knowledge base and ICT market

(corresponding G20 YEA 2013 Report Entrepreneurship Barometer pillar: coordinated support)

EY Digital Entrepreneurship Barometer rankings, 2016

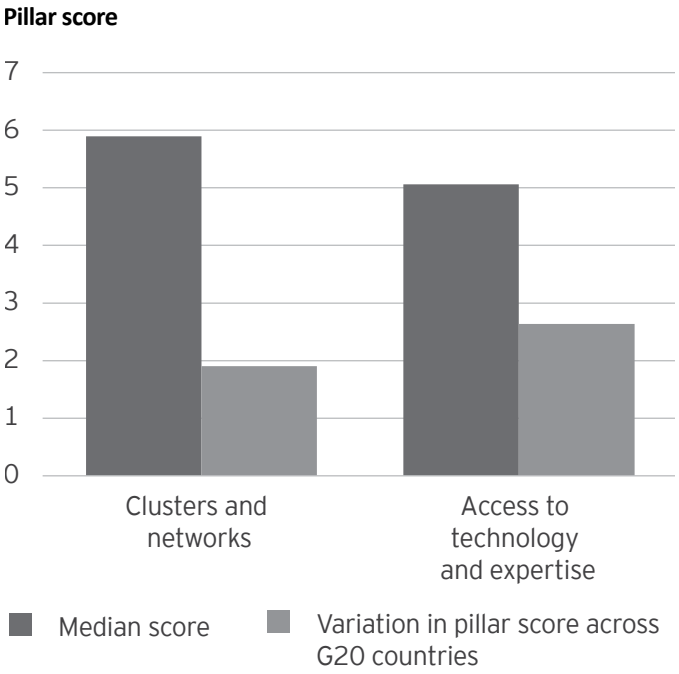
G20 country	Ranking
United States	1
United Kingdom	2
Germany	3
Canada	4
Japan	5
France	6
Australia	7
EU	8
South Korea	9
Saudi Arabia	10

G20 country	Ranking
Italy	11
South Africa	12
China	13
Mexico	14
Indonesia	15
Russia	16
Turkey	17
Argentina	18
Brazil	19
India	20

"Access to clusters and networks" is an important foundation for the digital knowledge base and ICT market pillar of the digital entrepreneurial ecosystem in the G20, reflecting entrepreneurial networks, university R&D programs and availability of technical talent. Access to coaching and mentorship programs also likely goes hand in hand, providing well-rounded support for young entrepreneurs. Countries generally scored higher on "access to clusters and networks," relative to "digital knowledge base and ICT market," which considers access to technology and expertise and captures the quality of research institutions and availability of technology.

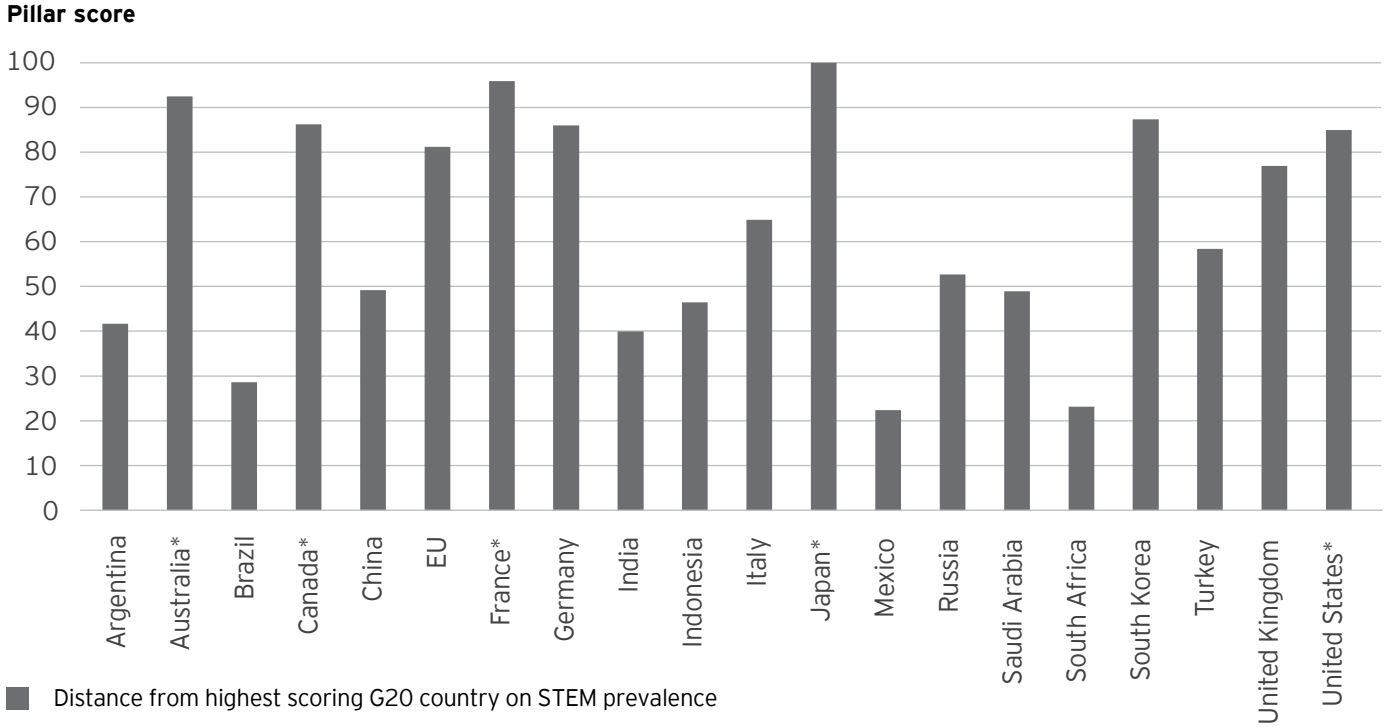
At the same time, this pillar looks extremely important to overall ecosystem strength. All the top-quadrant countries also ranked highest on digital knowledge base and ICT market. This suggests that further investment and policy support in clusters, networks and technology access are important for all G20 countries to help young entrepreneurs perform. Whether it be through "soft" measures, such as support for networking or tech-focused clusters, or "harder" measures, such as formal university and start-up R&D programs in technology, growing the technological and digital knowledge base seems to produce important benefits.

Cluster and networks are an important foundation. ...



> "We need access to universities. ... This has been very slow as it falls outside academic KPIs."
>
> **Georgia Beattie**
> Founder, Beattie Wines (Australia)

... A strong digital knowledge base is critical for overall digital ecosystem strength.

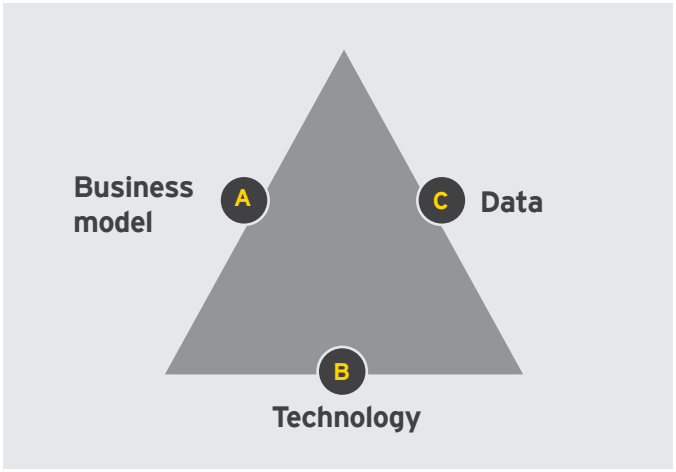


* Denotes country in Quartile 1 of the G20 Digital Entrepreneurship Barometer.

Digital natives in a disrupted world

The Digital Barometer provides a top-down view of the digital entrepreneurial ecosystem that can inform effective policy recommendations. Connecting the Barometer model with the business model of an individual firm highlights where policy can support digital natives in succeeding as entrepreneurs.

What skills mix is required at the firm level – technical, managerial, communications – for young entrepreneurs to thrive in a world of digital disruption? From a digital standpoint, a business has three drivers: business model, technology and data . The model highlights strengths and weaknesses unique to digital natives. Leveraging strengths and remedying gaps will enable digital natives to succeed.



Spotlight

Interview with Sunteng (China)

Sunteng is an advertising technology pioneer in China, using best-in-class technology to drive digital advertising, marketing and insights for global organizations and brands looking to unlock opportunity in the China market. The firm leverages programmatic and big data to deliver on brand objectives for its clients. Mahdi Shariff, Chief Strategy Officer offers insights on the role of digital disruption for Sunteng.

How important are digital technologies, big data and analytics to your business?

Digital technologies, big data and analytics are the fundamentals of our business.

Our lives are being changed by the innovating technology and consumer behavior, and the digital transition has happened at an accelerating pace. Sunteng helps global and domestic companies acquire new customers and promote their products through internet marketing. We help our clients to better collect, integrate and organize data from different sources that then power advanced algorithms to deliver targeted reach and tailored messaging for different target audiences. For us, the digital technology is at our core.

Are any or all of these a differentiator for your business?

All of these provide a key differentiator to the traditional marketing. The traditional marketing is based on assumption with small-scale data by delivering message through various traditional media. Conversely, the digital marketing is driven by data. It provides personalized service by affording the best creative to the right person at the right time and right place through different popular media and social networks.

When you think about digital, data and analytics, what are you doing to be more strategic in their use?

Unlike traditional companies, we use data and technology in every department, not just in our products. For example, in HR, we constantly track and collect data from different digital channels to see which channels perform best, what new platforms and nontraditional means we can recruit people through. For example, when looking for internet innovators, Zhihu (Chinese Quora) has been a great source of candidates.

For us, we follow a process of collecting data, running analysis, driving insights and implementing strategies – with a constant process of iteration to enable the organization to grow.

Can you see any emerging opportunities or threats in how digital, data and analytics shape the landscape for young entrepreneurs?

Digital and data have unlocked the opportunity provided to young entrepreneurs, as digital natives have an intrinsic advantage over others. The process of how you use data is often also invisible, which makes it harder to replicate and copy, providing a barrier to entry.

Often when people talk about big data now, there is still a gap in understanding of what it really means and the opportunity of what it can unlock. Digital natives and young entrepreneurs have the mindset to rethink how we use data in a way that is more challenging if you're from a traditional culture or mindset.

Do you see any differences in how you've tested, grown and are working to scale your business compared with earlier generations of entrepreneurs in your field/your mentors? Where do digital technologies fit into this?

Taking a data-driven mindset through the organization was an important step in ensuring we can adapt based on sound data, not just instinct. It's now meant in the last two and half years we've grown from 15 to more than 170 people without VC funding, growing profitably.

From both an organizational and product perspective, digital technologies play a big role.

Is your team mainly composed of technical/subject-matter specialists or generalists/managers?

Eighty-five percent of the team are technologists/technical staff within the organization. The growth of the business has been driven by technology, rather than traditional sales and marketing thus far. This has meant we've created a more scalable infrastructure to continue growing the business in the future.

A

Business model

From the "digital native" perspective: business model disruptors

- A product approach is shifting to a client approach.
- The "empowered consumer" is demanding more and personalized services.
- Transparency and trust drive value.
- Teaming and collaboration across the organization are critical – sales, tech, marketing and customer relationship management are all interrelated.
- Impact measurement is increasingly important and scrutinized.

Datagrand: management skills a critical driver of success for data-driven firms

Datagrand provides big data SaaS that integrates with companies of any industry who are in need of big data technology. The Datagrand big data platform delivers data technology as a service so that companies can benefit from the latest advances in big data without having to hire an expensive team of data scientists and implement the complex big data infrastructure. Through this platform, Datagrand is capable of generating valuable insights and predictive analysis from company's massive and noisy data, which make data driven refined management and scientific decision-making possible.

Datagrand CEO, Yunwen Chen shares insight on the importance of management skills to drive business growth in this data-driven enterprise:

> "For my business, I am more dependent on digital technologies, big data and analytics while earlier generation entrepreneurs/mentors relied more on their personal experiences. Digital technologies make the business more efficient, more rational and more accurate. My major challenge is how to attract and retain talents with rich experience in digital technologies, data and analytics. Technology/data and analytics-focused functions are very important and a fundamental foundation for my business. However, management responsibilities are the ultimate blueprint that can enable us to scale."
>
> **Yunwen Chen**
> CEO, Datagrand (China)

Business strategy and operations, characterized by the integration of digital, data and analytics into the business model, are critical to an entrepreneurial firm operating under digital transformation. For a firm to thrive, it must effectively execute on a business idea. The ability to identify competitive or comparative advantage for a firm's product or service is the first step. Turning that into a well-run business, including by effectively managing processes and cash flow, is crucial for a good idea to effectively transition into a sustainable business.

> "Crowdfunding is a FinTech platform – it disrupts the old banking economy. Without digital technology, our business doesn't exist. ... In this space, all players have the same digital tools. All have the same offers. Differentiation comes from the more traditional level: customer service, the ability to select the best projects and to offer good return to investors. ... When we were established, we were launching a financial company. We focused our efforts on HR and management. ... Our financial background made us stronger. As the company grew, we were not a financial company but financial and technology! This has now grown, so the split is 50/50." (Caroline Lamaud, DG – Marketing and Communications, Anaxago (France))"
>
> **Caroline Lamaud**
> DG – Marketing and Communications, Anaxago (France)

Leadership skills are a critical dimension. The ability to lead, as well as create and communicate a vision,[18] is important as entrepreneurs grow and scale their business. Growing up "digital" does not necessarily translate into strengths in this domain: content and technology may be solid at a new firm, but business structure and leadership skills are often soft. This is evident in the observed divergence between lifestyle and workforce digital skills among young people.[19]

As a result, digital natives can redouble their focus on creating a digital operating model, using data to generate new products and services; to handle data-driven marketing and consumer segmentation; to optimize or automate production or delivery; and to guide organizational management and decision-making. Horizon-watching, including for the next generation of consumers and their demands, will be important. So will returning to the fundamentals of business management, including cash flow management, forecasting and customer relationship management. Integrating these foundational concepts with digital capabilities can set the stage for sustainable growth.

Case study: digital to disrupt traditional industry

Beattie Wines produces single-serve packages of wine for the Australian and international markets. The company's model demonstrates that it is not just about digital or technology but also about how they are applied in a business — the critical differentiator for digital innovation.

"As a person growing up with technology, I apply it to my business, and it is essential. … My production line is completely online; I can see wastage, production, any hour of the day. That clarity and the data I can draw from it is very important to making better and faster decisions. …

"We need it to compete with bigger players. We launched here and could not have done so without technology, including connectivity and transparency. … Our competitors are consolidated and doing things in a pretty unsophisticated way but can do things at scale. For us, it's sink-or-swim and, as far as I am concerned, we don't have a choice in whether or not to use technology. … It is applying technology to more traditional, physical industries that is an opportunity for entrepreneurs in Australia."

Georgia Beattie
Founder, Beattie Wines (Australia)

[18] Momchil Bekyarski, "Digital entrepreneur vs. Traditional entrepreneur," *LinkedIn Pulse*, 2015.

[19] "The Fallacy of the 'Digital Native': Why Young People Need to Develop their Digital Skills," *ECDL.org*, http://www.ecdl.org/media/TheFallacyofthe'DigitalNative'PositionPaper1.pdf, accessed May 2016.

B

Technology

From the "digital native" perspective: technology

- Hiring young talent helps sustain a technology-based competitive advantage.
- Investing in R&D and participating in clusters and innovation networks are crucial.
- Exploring new technologies and data tools, such as deep learning, will be important catalysts for near-term expansion.
- Speed in the use of new and existing digital technology is a differentiator, not necessarily the technology itself.
- Getting integrated in a digitally connected, end-to-end value chain drives competitiveness.

> "Hire young talent, do R&D, go to scientific and business conferences. ... Also be part of an ecosystem such as data science/AI communities, wider university networks, tech hubs."
>
> **Ushan Ganeshananthan**
> CEO, KIANA Systems (Germany)

Digital natives possess an inherent grasp of digital technologies and user preferences, supporting an ability to design a product that is personalized and intuitive to the user. At the same time, low barriers to entry mean technology is democratizing product development, and maintaining competitive advantage purely through technology is a challenge.

For young entrepreneurs, this points to a compressed product development cycle. Strategic partnerships and positioning through the value chain and a commitment to R&D are critical to growing and sustaining a business. Equally important, if not more so, is having clear ways to monetize technological innovations. The goal is not just creating value but also capturing it. Digital natives should keep revenue and profitability squarely in focus.

Spotlight

Interview – technology as a business driver and disruptor, Selekt Bilgisayar, Turkey

Reeder manufactures and markets Reeder tablets and smartphones. With 20% market share, Reeder ranks No. 2 in the tablet market in Turkey. One Reeder model has been listed in the top 25 among 500 smartphone models sold in Turkey. Sezen Sungur Saral is the company's Founding Partner and Vice President.

How is technology contributing to your business growth?

We can offer more options to our consumers, understand them better, reach them in more ways as technology advances. We grow as the technology grows.

Have there been any "step changes" in big digital, data or analytics in your business model?

The application that is default in all Reeder models, Reeder ID, has been a game changer for us lately. Through this app, we now know our customers better. We know who chooses us, why do they choose us, what they do with us and what more we can do for them.

Also, the programs that we are using to analyze the big data in social media help us to manage most of the things from our reputation to customer care.

What are the major challenges and risks?

Major challenge in concentrating on digital/data is losing the real touch with the consumer in the field itself. Analyzing data leads us to business strategy, but businesses should never underestimate the power of human contact.

C

Data

From the "digital native" perspective: data

- Investing in in-house initiatives is vital to turning big data into an asset with commercial application.
- With data capabilities, business models are becoming more customer-focused.
- The balance of power is shifting toward consumers as they realize the value of their information.
- Increasing consumer demands for more transparency go hand in hand with more granular data.
- Effective data governance is crucial.

Data is a significant and expansive asset for the digital native. Digital platforms for business operations and customer engagement and throughout the value chain mean young entrepreneurs are accumulating an unprecedented amount of data on their business and market from the outset of their activities. Monetizing and protecting data are vital, and systematically analyzing it is the crucial next step — one that should lead to new uses, such as machine learning and gamification.

Data as an asset class:

"We are dealing with data in real time thanks to algorithms that let us identify, on the fly, the relevance and profitability of a request. For us, data is a real and valuable asset. Inevitably, we monetize cross-business data and exchange data with partners, but with the clear objective of delivering to our prospective clients the solution they are looking for at a specific moment."

Arsalain El Kessir
Founder and President, BoursedesCrédits (France)

Capturing value from data to support agility in the market, personalize products and streamline operating models hinges on careful governance. Maintaining data protection and privacy is paramount. Any vulnerability undermines business credibility and could damage relations with customers and, consequently, how much data they share. That could hamper the quality of insights that entrepreneurs have on their business. The right balance must be struck between monetization and privacy. Trust is a competitive advantage, so it is essential to respect customers' data privacy and maintain transparency in communications with external stakeholders.

Data governance:

"We are entering into a new balance of power with brands or services. Consumers increasingly understand that, when you give away your data, it has value. … This will get more balance and move more in favor of the consumer. Consumers will start to understand the power of data. Trust and ethical ways of using data will become a competitive advantage for businesses. There will be more accountability and responsibility to make good use of this data."

Mats Carduner
Cofounder and CEO, fifty-five (France)

Empowering young entrepreneurs for digital innovation

In a business environment characterized by digital disruption, young entrepreneurs have unique perspectives and important levers for growth. They are navigating a digital ecosystem, approaching the challenges of growing and scaling their businesses with a different set of competencies, and have a distinct relationship with technology. Policymakers can help empower young entrepreneurs by setting the right enabling conditions throughout the entrepreneurial ecosystem. The EY G20 Digital Entrepreneurship Barometer and interviews with young entrepreneurs highlight several recommendations for policies to support young entrepreneurs through digital, data and analytics.

Access to finance

> "The biggest issue at the moment is that the new business models are not properly understood by the bankers, and in particular the early stages of the business. More support is required during the prime cycle for digital entrepreneurs."
>
> **Arsalain El Kessir**
> Founder and President, BoursedesCrédits, France

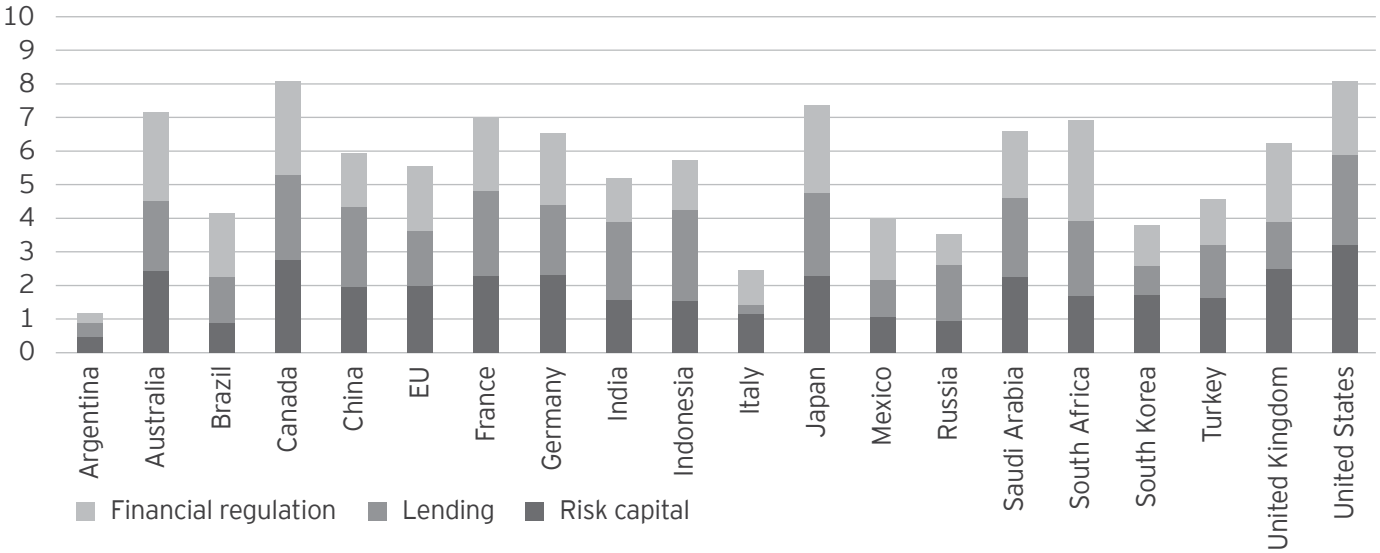
Securing funding is crucial in determining whether young entrepreneurs can turn an idea into a business launch, then grow and scale their firm. The EY G20 Digital Entrepreneurship Barometer illustrates that enhancing access to risk capital offers huge opportunities for expanding youth entrepreneurship. This subpillar is most influential on the overall access-to-finance score for G20 countries, though conventional lending and regulation are important complements. Similarly, feedback from young entrepreneurs suggests that access to risk capital is deeply embedded in the innovation system and that policies that promote access to venture, angel and other risk capital can play an important role.

We recommend:

- **Supporting** the development of early-stage financing and support schemes for young entrepreneurs, including incubators and accelerators
- **Enabling** access to venture capital and other alternative sources through tax incentives for investors
- **Driving** the development of angel networks through targeted incentives
- **Reducing** investment barriers to promote access to foreign capital for entrepreneurs

Enhanced access to risk capital would give young entrepreneurs a boost.

Access to finance: Digital Barometer score



Entrepreneurial culture

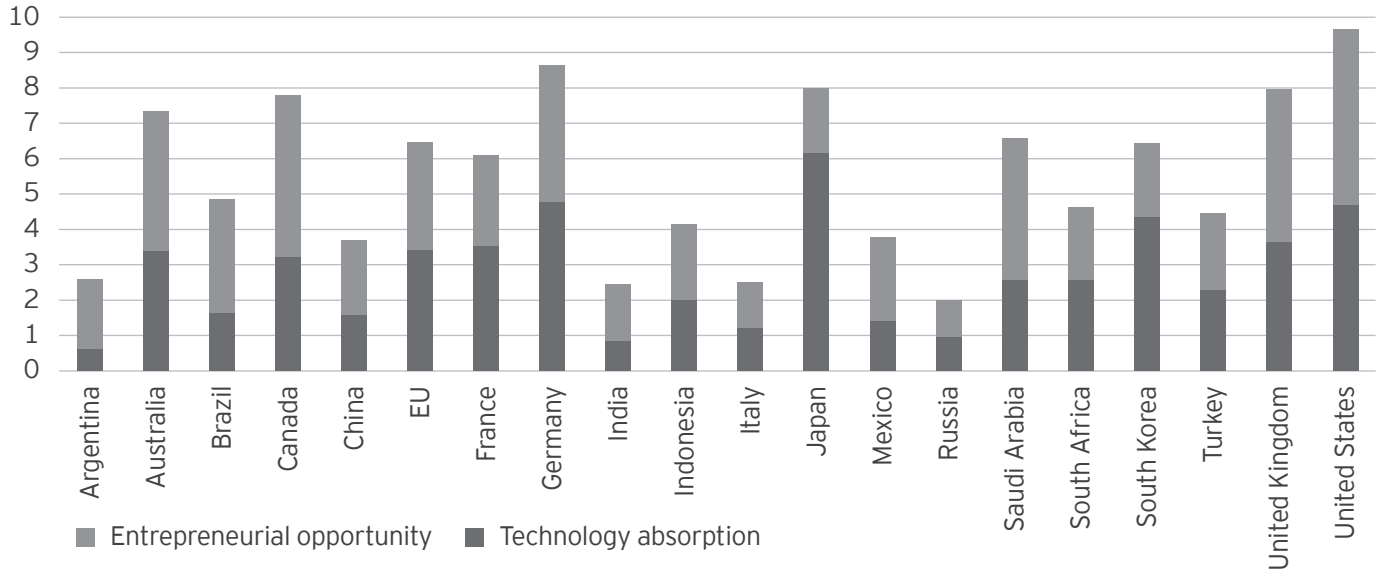
Developing a supportive entrepreneurial culture is not an instantaneous process; rather, it grows over generations and needs nurturing during the secondary, or even primary, school years. Barometer results and interview feedback highlight that culture and education are tightly connected, suggesting that positive attitudes toward entrepreneurship, in addition to relevant skills, should be systematically introduced through education in G20 countries. This concerns not only entrepreneurship in its most obvious sense but also the capacity of young people to adapt to and adopt change, as well as their mindset on managing digital disruption. At the same time, an innovative culture needs the right IP support, especially where digital or technological innovations, which are highly portable, are being developed.

We recommend:

- **Introducing** entrepreneurship as a specialized stream in higher education and integrating it throughout primary and secondary courses
- **Engaging** industry in developing and delivering tech-, digital- and management-focused training
- **Protecting** young entrepreneurs with targeted intellectual property provisions to encourage innovation and collaboration with larger organizations and investors
- **Promoting** collaboration between large and small firms in digital or ICT, including through targeted government procurement guidelines

Entrepreneurship and technical education can support greater opportunities for young people.

Entrepreneurial culture: Digital Barometer score



Digital business environment

> "The start-up mobility visa concept is really interesting. This will help local companies to become global faster. It is in the best interest of the home country sponsoring – entrepreneurs may want to go overseas to grow their business but it does not mean they want to leave permanently … Participating countries that enable their entrepreneurs to grow and prosper internationally will benefit home countries in the long-term by allowing this talent to develop."
>
> **Daniel Rodic**
> Co-Founder (Canada), Exact Media

To thrive on digital, young entrepreneurs need the right tools – world-class digital infrastructure and competitive business regulatory and taxation systems. Real differentiation and opportunity across G20 countries will come from reform to digital-specific rules, including privacy and data governance. Young entrepreneurs can then have clarity on requirements and risks as they experiment with new businesses. Reform to promote their access to global value chains is also important to the digital entrepreneurial ecosystem.

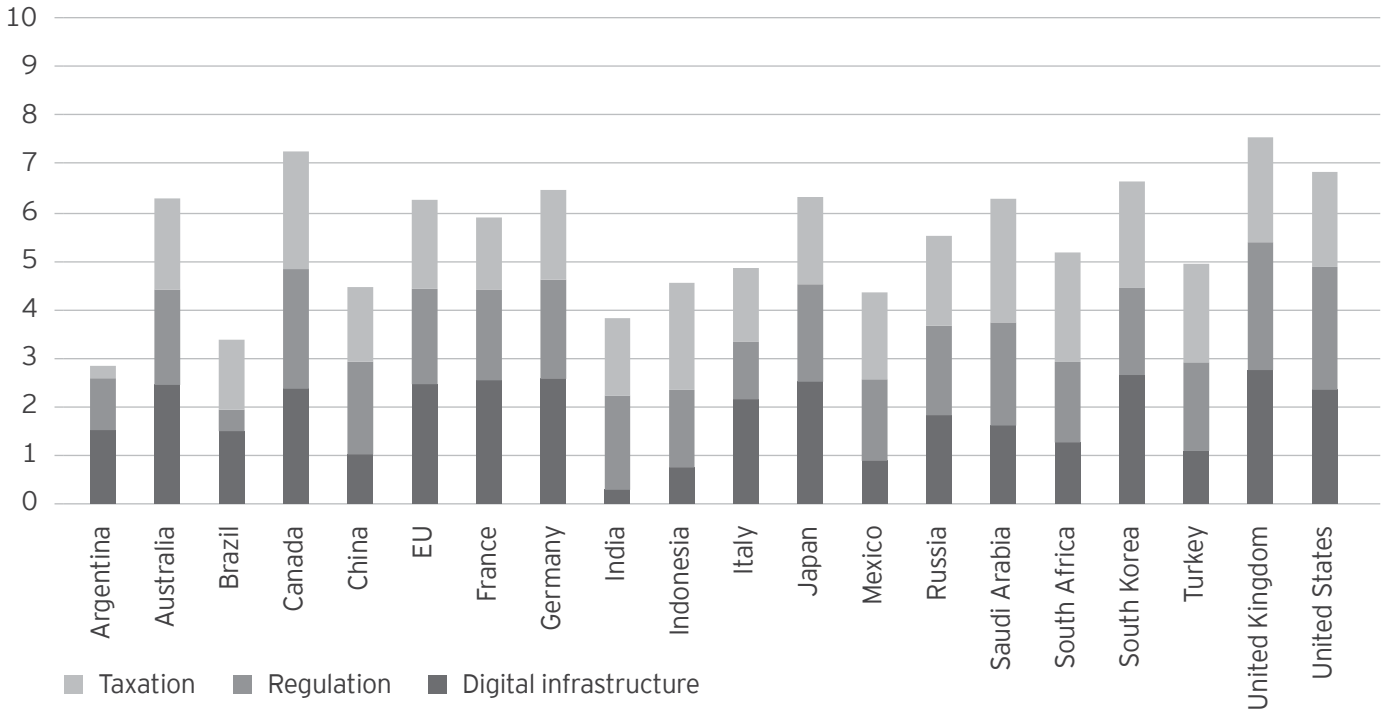
Regulation should also reflect a theme from the Barometer and from interviews: just as the enabling environment is characterized by regulation and tax, it is also driven by culture. As a result, mobility is an important domain for regulatory reform. Start-up visa programs, which let young entrepreneurs travel through the G20 and acquire digital and tech skills, are important to consider.

We recommend:

- **Championing** a G20 entrepreneur visa and promoting the development of support networks for newly arrived entrepreneurs in G20 host countries
- **Investing** in broadband internet and other ICT infrastructure
- **Establishing** clear guidelines on data privacy and security, including usage, data rights and quality
- **Reducing** trade barriers to support young digital entrepreneurs in integrating into global value chains and scaling across borders

Sound digital infrastructure and targeted regulatory measures drive a supportive digital business environment.

Digital business environment: Digital Barometer score



Digital skills and entrepreneurial education

> "Improve education to ensure that young people not only have the right technical skills, but the right mindset, approach and understanding of the true objective of the work they do."

Mahdi Shariff
Strategy Leader, Sunteng, China

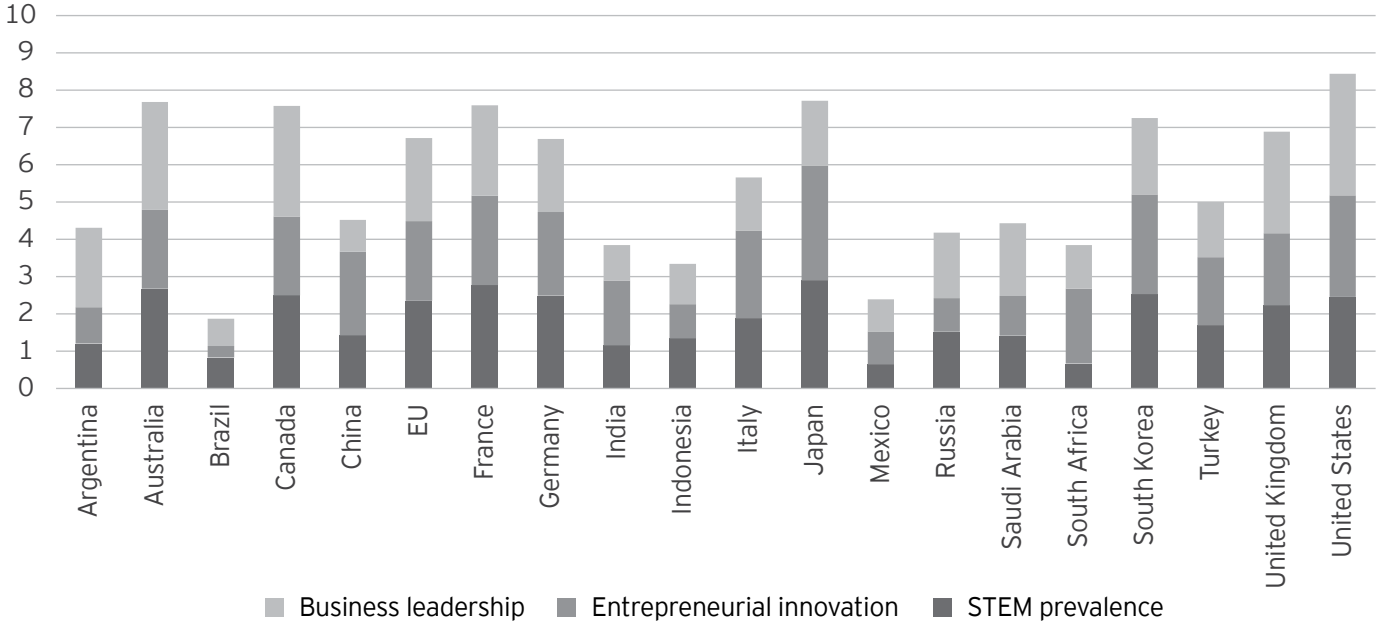
The Barometer and the interviews underscore a clear need for education initiatives to hone young entrepreneurs' technical and leadership skills. Developing digital competencies is one thing, as is science- and technology-focused education. But nurturing an entrepreneurial mindset through education and management training is equally important.

We recommend:

- **Teaching** entrepreneurship in elementary through high school and prioritizing STEM education, particularly for female students
- **Incorporating** management, finance and organizational leadership skills into tech-focused curricula
- **Promoting** youth entrepreneurship mentoring and coaching programs within industry and entrepreneurship networks
- **Prioritizing** mobility for G20 tertiary and grade school students to travel across borders and learn entrepreneurship skills

Education initiatives to support technical and managerial skills are important.

Digital skills and e-leadership: Digital Barometer score



Digital knowledge base and ICT market

> "We need access to universities. ... This can be very slow as it falls outside academic KPIs. ... Some university systems need a different industry engagement culture."
>
> **Georgia Beattie**
> Founder, Beattie Wines (Australia)

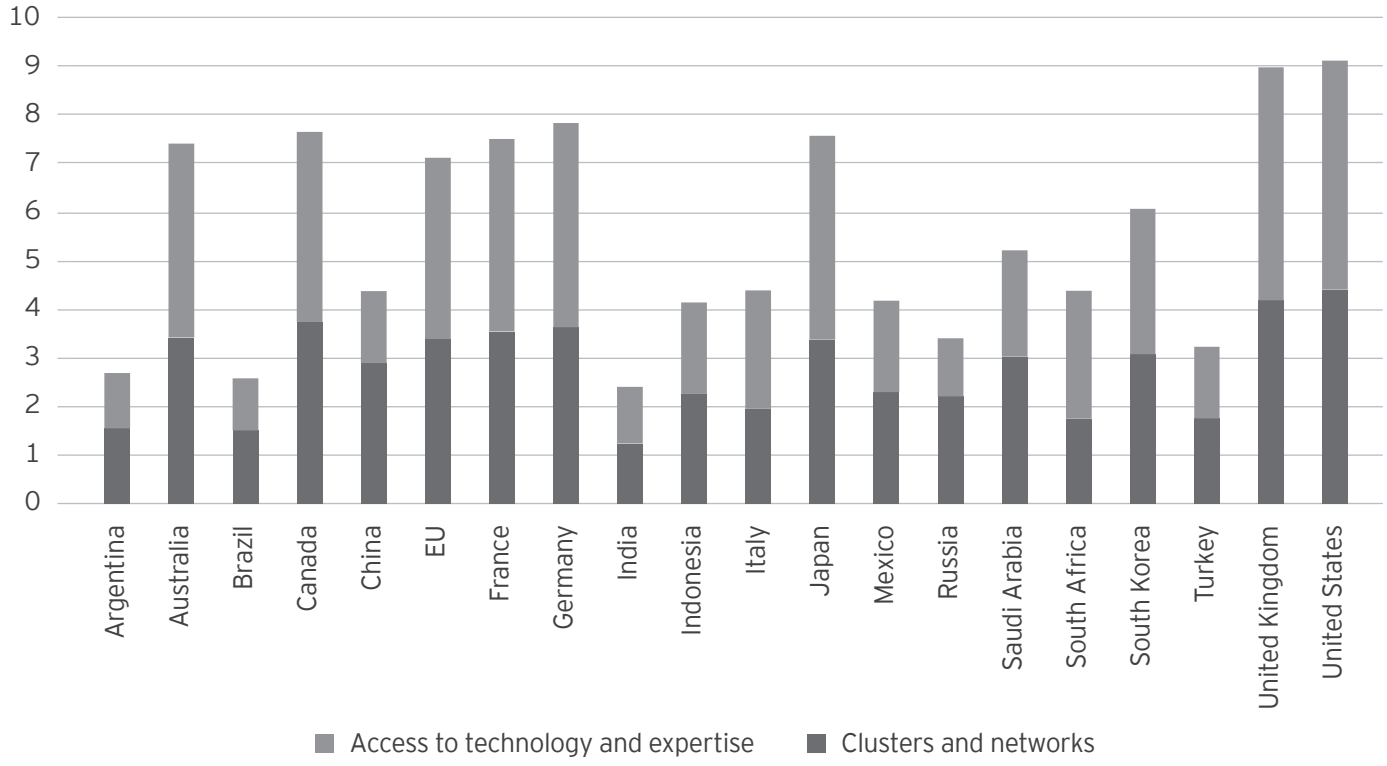
To thrive on digital disruption, young entrepreneurs need connectivity with peers, industry and research institutions. The Barometer and interview feedback suggest that access to deep technical and business expertise can help young entrepreneurs develop technologies and digital platforms and integrate new or disruptive technologies into their business models.

We recommend:

- **Fostering** multi-stakeholder digital clusters and networks, including those with a sector- or city-level focus, along with coaching and mentoring schemes
- **Supporting** university-entrepreneur collaboration, including through funding incentives for universities
- **Investing** directly in experimental technology through university-led R&D programs, or targeted grants for entrepreneurs

Expanding clusters and networks can support young entrepreneurs in developing and adopting digital innovation.

Digital knowledge base & ICT market: Digital Barometer score



The digital opportunity to empower young entrepreneurs for growth

Digital disruption is a powerful opportunity for young entrepreneurs. As consumer markets, business models and decision-making change, the very nature of entrepreneurship is ripe for disruption, just as entrepreneurs themselves are disrupting their industries. The EY G20 Digital Entrepreneurship Barometer indicates these drivers are at work right through the entrepreneurial ecosystem, impacting finance, culture, education, the digital knowledge base and ICT market, and the digital business environment. They are also important enablers to accelerate female entrepreneurship, through new and disrupted models for business.

Young entrepreneurs can use digital, data and analytics as forces for digital transformation and a springboard for differentiation, growth and scale. "Digital natives" must show skilled management across the business model, technology and data. Policy can also play a crucial role in fostering the ecosystem and giving young entrepreneurs the best possible opportunities for success across the G20. Targeted reforms and programs could be instrumental in making digital disruption a catalyst for youth entrepreneurship.

About the EY Entrepreneurship Digital Barometer model

The 2016 EY/G20 YEA report includes a model for scoring G20 countries across the digital dimensions of the five pillars of entrepreneurship. The purpose is to provide a standardized assessment of the digital entrepreneurship ecosystem across the G20 to help identify areas of relative strength by country and opportunities for improvement. The model complements our Entrepreneurship Barometer (2013), which assesses the five pillars of entrepreneurship in G20 countries.

The model is composed of publicly available data on digital, business and entrepreneurial conditions across G20 economies.

Methodology

The EY Entrepreneurship Digital Barometer provides country scores on the overall digital entrepreneurial ecosystem and across the five pillars of entrepreneurship, which are in turn based on several subpillars, each rated on a 10-point scale.

This is a four-step process: the raw data is normalized; constituent scores are computed on a scale of 1 to 10; subpillar scores are calculated; and these scores are then combined (as a simple average) to generate a pillar score.

Data normalization

Statistical information is adjusted by capping outliers at three standard deviations from the mean value for a given series.

Transformation to a 1–10 score

We follow leading practice, per the transformation methodology in the World Economic Forum's Global Competitiveness Report, to convert the adjusted data into scores on a 1–10 scale. This formula is used:

(9 * (adjusted data – minimum value) / (maximum value – minimum value)) + 1

Calculation of pillar score

We use a simple average of all constituents of a given subpillar to generate a score for that pillar. Each country's scores are then multiplied by 5.5, the midpoint of the 1–10 scale. This adjustment prevents a pillar with relatively high, or low, level or trend scores from skewing the final score.

Calculation of pillar and overall entrepreneurial ecosystem scores

We use an average of the scores for each pillar to generate an overall country score. These scores are the basis for country rankings.

Key indicators

The specific indicators for the Barometer model are listed below, alongside their overlay to the EY Entrepreneurship Barometer model (2013). Each indicator is explained in more detail in the following table.

Digital entrepreneurship ecosystem component (EY Entrepreneurship Barometer pillar)	Constituents
Access to funding (Access to funding)	
Risk capital	Risk capital, venture capital availability, financing through local equity market
Lending	Ease of access to loans
Financial regulation	Regulation of securities exchanges
Digital skills and entrepreneurial education (Education)	
STEM prevalence	Technology absorption, quality of math and science education
Entrepreneurial innovation	Product innovation, process innovation
Business leadership	Quality of management schools, start-up skills, human capital
Digital business environment (Regulation and tax)	
Digital infrastructure	ICT use, telecommunications infrastructure
Regulation	Number of days to start a business, hiring and firing practices, efficiency of legal framework in settling disputes
Taxation	Corporate tax rate
Digital entrepreneurship culture (Entrepreneurship culture)	
Technology absorption	Firm-level technology absorption, patent applications
Entrepreneurial opportunity	Opportunity perception, cultural support, country capacity to retain talent
Digital knowledge base and ICT market (Coordinated support)	
Clusters, networks and collaboration	Networking, availability of scientists and engineers, university-industry collaboration in R&D
Access to technology and expertise	Quality of scientific research institutions, availability of latest technologies

Key performance indicators: sources and definitions

Measuring the digital enablers of entrepreneurship based on publicly available data is a challenging objective with a range of inherent issues:

- Entrepreneurship is a rich activity with multiple factors, such as cultural and economic matters, many of which are not tracked in a comparable manner.
- The G20 countries do not share the same definition of entrepreneurial businesses.
- Public and private organizations provide few indicators focusing on entrepreneurial activity; when available, they typically do not cover all the G20 countries.
- Indicators with comprehensive coverage of G20 countries are often broad, with no specific focus on entrepreneurship.
- Data on digital and youth dimensions of entrepreneurship is nascent.

Our analysis is confined to indicators that are timely and largely available for G20 countries. These include publicly available data from the United Nations, World Bank and International Finance Corporation and publicly available survey data from leading research institutions, including the World Economic Forum and the Global Entrepreneurship and Development Institute. The key performance indicators by pillar are listed in the table below.

Digital entrepreneurship ecosystem component (EY Entrepreneurship Barometer pillar)	Definition	Source
Access to funding (Access to funding)		
Risk capital		
Risk capital	Rate of informal investment; depth of debt capital markets	Global Entrepreneurship and Development Institute, Global Venture Capital and Private Equity Country Attractiveness Index
Venture capital availability	Ease of access to venture capital	World Economic Forum Executive Opinion Survey
Financing through local equity market	Ease of obtaining finance through local equity market	World Economic Forum Executive Opinion Survey
Lending		
Ease of access to loans	Ease of access to loans with a good business plan and no collateral	World Economic Forum Executive Opinion Survey
Financial regulation		
Regulation of securities exchanges	Effectiveness of regulation and supervision of securities exchanges	World Economic Forum Executive Opinion Survey

Digital skills and entrepreneurial education (Education)		
STEM prevalence		
Technology absorption	Country capacity for firm-level technology absorption	Global Entrepreneurship and Development Institute, World Economic Forum
Quality of math and science education	Assessed quality of math and science education	World Economic Forum Executive Opinion Survey
Entrepreneurial innovation		
Product innovation	Country potential to generate new products and to adopt or imitate existing products, reflecting technology and innovation transfer	Global Entrepreneurship and Development Institute
Process innovation	Gross domestic expenditure on research and development (R&D, % of GDP)	Global Entrepreneurship and Development Institute
Business leadership		
Quality of management schools	Assessed quality of business schools	World Economic Forum Executive Opinion Survey
Start-up skills	Percentage of the population who believe they have adequate start-up skills	Global Entrepreneurship and Development Institute
Human capital	Education level, level of investment in business training and employee development	Global Entrepreneurship and Development Institute
Digital business environment (Regulation and tax)		
Digital infrastructure		
ICT use	Country use of ICT	World Economic Forum, International Telecommunication Union
Telecommunications infrastructure	Telecommunications infrastructure index – internet users; online population; PC users; fixed telephone subscriptions; mobile telephone subscriptions; television sets	United Nations
Regulation		
Number of days to start a business	Number of days to start a business	World Bank, International Finance Corporation
Hiring and firing practices	Assessed flexibility of hiring and firing practices	World Economic Forum Executive Opinion Survey
Efficiency of legal framework in settling disputes	Assessed efficiency of the legal framework for private businesses in settling disputes	World Economic Forum Executive Opinion Survey
Taxation		
Corporate tax rate	Combination of profit tax (% of profits), labor tax and contribution (% of profits), and other taxes (% of profits)	World Economic Forum, World Bank, International Finance Corporation

Digital entrepreneurship culture (Entrepreneurship culture)		
Technology absorption		
Firm-level technology absorption	Assessed extent that businesses adopt new technology	World Economic Forum Executive Opinion Survey
Patent applications	Number of applications filed under the Patent Cooperation Treaty per million people	World Economic Forum/OECD/IMF
Entrepreneurial opportunity		
Opportunity perception	Opportunity recognition (the percentage of the population who can identify good opportunities to start a business in the area where they live); market agglomeration (size of the domestic market by the percentage of the population living in urban areas)	Global Entrepreneurship and Development Institute
Cultural support	Percentage of the population aged 18–64 who consider entrepreneurship a good career choice; level of corruption in the economy	Global Entrepreneurship and Development Institute
Country capacity to retain talent	Assessed ability of country to retain talented people	World Economic Forum Executive Opinion Survey
Digital knowledge base and ICT market (Coordinated support)		
Clusters, networks and collaboration		
Networking	Percentage of the population who personally know an entrepreneur who started a business within the previous two years; internet usage	Global Entrepreneurship and Development Institute
Availability of scientists and engineers	Assessed availability of scientists and engineers	World Economic Forum Executive Opinion Survey
University-industry collaboration on R&D	Assessed extent of business-university collaboration on research and development	World Economic Forum Executive Opinion Survey
Access to technology and expertise		
Quality of scientific research institutions	Assessed quality of scientific research institutions	World Economic Forum Executive Opinion Survey
Availability of latest technologies	Assessed extent that latest technologies are available	World Economic Forum Executive Opinion Survey

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